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Sustainable Procurement of Building Materials:
A Progressive Approach to Chemicals of Concern

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Sustainable Procurement of Building Materials: A Progressive Approach to Chemicals of Concern

Abbreviations and Acronyms

ACQ	Alkaline Copper Quaternary
ASHRAE	America Society of Heating, Refrigerating, and Air-Conditioning Engineers
BAMB	Building as Material Bank
BIS	Bureau of Indian Standards
BOM	Bill of Materials
BRE	Building Research Establishment
BREEAM	Building Research Establishment Environmental Assessment Method
CARB	California Air Resources Board
CARICOM	Caribbean Community
CASBEE	Comprehensive Assessment System for Built Environment Efficiency
CFC	Chlorofluorocarbons
CFP	Chemical Footprint Project
CIRS	Centre for Innovation in Regulatory Science
CLP	Classification, Labelling and Packaging of Substances and Mixtures
CMD	Chemicals Management Database
CoC	Chemicals of Concern
CP	Cleaner Production & Circular Procurement
CPV	Common Procurement Vocabulary
CSR	Corporate Social Responsibility
ECEU	Easter Caribbean Economic Union
EEE	Electrical and Electronic Equipment
EPA	US Environmental Protection Agency
EPD	Environmental Product Declaration
EPR	Extended Producer Responsibility
EUTR	European Union Timber Regulation
FMD	Full Materials Declaration
FLEGT	Forest Law Enforcement, Governance, and Trade
FSC	Forest Stewardship Council
GDP	Gross Domestic Product
GECA	Good Environmental Choice Australia
GEF	Global Environment Facility
GEN	Global Ecolabelling Network
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
GPC	Global Product Classification
GPP	Green Public Procurement
GWP	Global Warming Potential
HCA	Hazardous Chemical Agents
HCFC	Hydrochlorofluorocarbons
ICT	Information and Communications Technology
IEEE	Institute of Electrical and Electronics Engineers
IISD	International Institute for Sustainable Development
ILO	International Labour Organization

Sustainable Procurement of Building Materials: A Progressive Approach to Chemicals of Concern

Abbreviations and Acronyms *(cont.d)*

ISO	International Organization for Standardisation
KEBS	Kenya Bureau of Standards
KEITI	Korea Environmental Industry & Technology Institute
LCA	Life cycle Assessment
LED	Light-emitting Diode
LEED	Leadership in Energy and Environmental Design
LH	South Korean Land and Housing Association
MDDS	Materials Declaration Data Sheet
MEA	Multilateral Environmental Agreement
NACE	Statistical Classification of Economic Activities in the European Community
NAF	No-added formaldehyde
NAICS	North American Industrial Classification System
NHIS	South Korean National Health Insurance Service
ODS	Ozone Depleting Substances
OECD	Organization for Economic Cooperation and Development
OECS	Organization of Eastern Caribbean States
OJEU	Official Journal of the European Union
OPFR	Organophosphate Ester Flame Retardant
PBDE	Polybrominated Diphenyl Ethers
PBT	Persistent, Bio accumulative, and Toxic substances
PEF	Product Environmental Footprint
PEFC	Programme for the Endorsement of Forest Certification
PFAS	Per and polyfluoroalkyl substances
PPI	Public Procurement of Innovation
PVC	Polyvinyl Chloride
RCD	Regulatory Compliance Declaration
REACH	Registration, Evaluation, Authorization, and restriction of Chemicals
RMF	Raised Modular Flooring
RSL	Restricted Substances List
SAICM	Strategic Approach to International Chemicals Management
SCIL	Safer Chemical Ingredients List
SCP	Sustainable Consumption and Production
SDG	Sustainable Development Goal
SDS	Safety Data Sheet
SIN	Substitute it now!
SPP	Sustainable Public Procurement
SSQ	Standard Selection Questionnaires
SSS	Sustainable Supplier Selection
SRL	Substances Restrictions List
SVHC	Substances of Very High Concern
UNEA	Ozone-Depleting Substance

Abbreviations and Acronyms *(cont.d)*

UNEP	United Nations Environment Programme
UNSPSC	United Nations Standard Products and Services Code
VOC	Volatile Organic Compound
WFD	EU's Waste Framework Directive
WGBC	World Green Building Council

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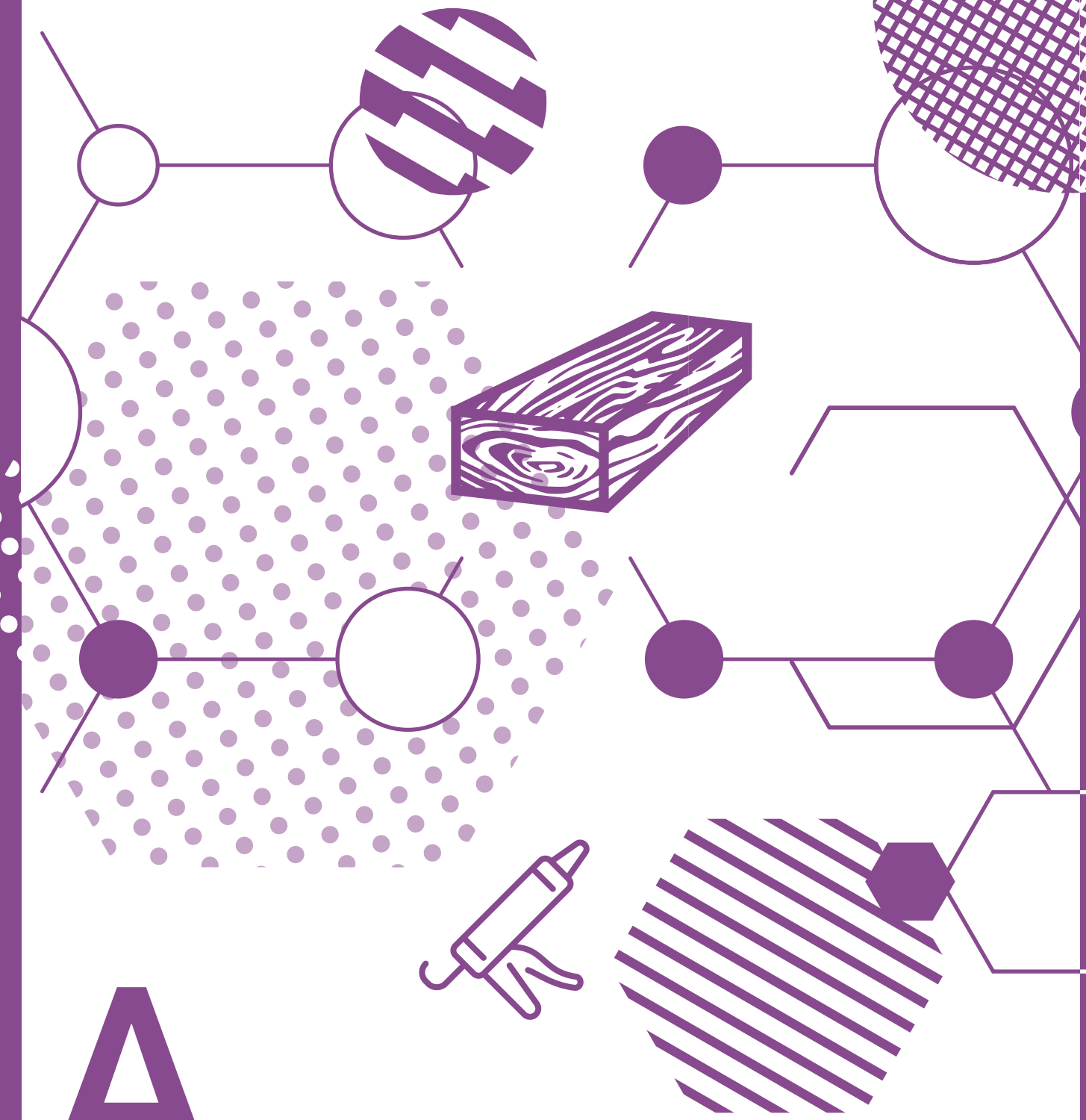
A Introduction & Key Issues 01



A.

Introduction & Key Issues

Sustainable Procurement of Building Materials:
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A. INTRODUCTION & KEY ISSUES

1.

Background, Scope & Purpose

Products within the building and construction sector cover many different use profiles, types, and materials. From structural products such as cement and steel, interior products such as floor and wallcoverings, to plastics, paints, coatings and construction adhesives, a range of environmental and health impacts are seen at all life cycle stages from building materials and the chemicals used within them, spanning their extraction, production, use and disposal.

The Global Chemicals Outlook (II)[1] reports that chemical pollution is a major cause of human disease and premature deaths. The World Health Organization estimated the disease burden preventable by sound management and reduction of chemicals in the environment at around 1.6 million lives and approximately 45 million disability-adjusted life years (DALYs) in 2016[1]. The report describes the presence of some chemicals in the global environment such as lead, bisphenol A, and per and poly-fluorinated compounds as “nearly ubiquitous”.

The buildings and construction sector makes a significant contribution to this as the largest end market for chemicals, with an annual revenue of USD $695 billion. Market growth for construction chemicals (such as concrete admixtures, adhesives and sealants, protective coatings, insulation, polymer composites) is estimated at 6.2% between 2018 and 2023. The sector’s chemical impacts are vast, due to its chemical-intensive nature coupled with its rapidly growing size, estimated at 3.5% annually[1].

Those affected range from communities based at the forefront of material extraction; workers exposed in processing plants, construction sites or in demolition and waste management processes, and the occupants of buildings. In some cases, impacts are disproportionately imposed on some of the most vulnerable members of society.

Improved chemicals management, and the movement towards safer products must be accelerated in this sector, and public procurement plays an important role in this transition. As well as accounting for a major share of the spend on building products, procurement can be a highly effective market pull instrument, driving transformation towards more sustainable products and materials. Solutions do exist to mitigate the impacts of the sector, and markets for sustainable building products and ‘green chemicals’ are seeing growth.

1 United Nations Environment Programme (2019). Global Chemicals Outlook II: From Legacies to Innovative Solutions.

However, research[2,3], has suggested that in some global regions, awareness for public procurers to address the impacts of chemicals of concern (CoC), and other sustainability aspects such as embodied carbon and circularity, is very limited. Specifications that consider chemical impacts of products such as paints, carpets and adhesives are in place in some regions, but are not widespread. There is also often low availability of chemical data, which may not be available at the source, or is not reliably passed along the value chain.

In some countries, there is limited support for procurers to fulfil minimum legal compliance obligations, such as those under Multilateral Environmental Agreements. The benefits of existing chemical legislation are globally significant - in terms of avoided health and environmental impacts, its economic value is estimated to be at least in the "high tens of billions" of US dollars per year[1] - but effective implementation is not in place everywhere. This is hindered by a lack of legal and institutional frameworks in some countries to address highly problematic materials and chemicals in building products (such as asbestos, or lead-based paints) for which phase-out laws have been enacted elsewhere.

However, good practice has been seen for addressing CoC in procurement that can be further developed and replicated elsewhere. Supporting tools such as databases and certification schemes are also becoming more widely available to aid procurers.

The aim of this guidance is to better inform chemicals management and reduction approaches in public tenders for building products and materials, as well as provide recommendations to integrate this into policy. The guidance takes a global focus, considering the level of support, existing specifications, and institutional capacity in a range of geographies, and recognizes a pathway from minimum compliance with existing regulations towards a more proactive and ambitious approach, that seeks to specify exemplar sustainable and safer building products.

The guidance forms a deliverable of the Strategic Approach to International Chemicals Management (SAICM) Global Environment Facility Project on Global Best Practices on Emerging Policy Issues of Concern (GEF) project. It seeks to build on existing support resources where possible, such as UNEP's Sustainable Public Procurement Guide *How to Wake the Sleeping Giant*[4], the One Planet Network's *Guidance Document on Procuring Sustainable Buildings and Construction*[5], and others aimed at the regional level, such as the

2 OECD (2016). The Role of Public Procurement in Low-carbon Innovation
3 Wendt-Rasch et al. Chemical requirements in Swedish municipal green public procurement: Challenges and opportunities
4 United Nations Environment Programme (2021). Sustainable Public Procurement - How to "Wake the Sleeping Giant"
5 One Planet Network (2018). Guidance Document on Procuring Sustainable Buildings and Construction

EU's *Buying Green handbook*[6] and the International Institute for Sustainable Development (IISD) publication *Implementing Sustainable Public Procurement in Latin America and the Caribbean*[7].

The guidance is produced by the Sustainable Public Procurement (SPP) Programme of the One Planet Network. The SPP Programme is a voluntary global multi-stakeholder partnership of governmental, non-governmental, public and private sector organizations that work together to promote and accelerate the implementation of sustainable public procurement globally.

SAICM was developed by a multi-stakeholder and multi-sectoral Preparatory Committee and supports the achievement of the goal agreed at the 2002 Johannesburg World Summit on Sustainable Development of ensuring that, by the year 2020, chemicals are produced and used in ways that minimise significant adverse impacts on the environment and human health. Work on building materials under SAICM is addressing the emerging policy issue of Chemicals in Products, which focuses on the building materials sector amongst others.

The expected expansion of both the buildings and construction sector, and the need for the sector's longer-term sustainability in relation to its chemical impacts - alongside the need for decarbonisation and improved resource efficiency - requires making commensurate improvements in environmental, health and safety, and social justice attributes, with public procurement a key instrument to achieving this.

2.

Who is the guidance for?

This guidance is **primarily aimed at public procurers involved in a range of contracting agreements related to building materials and products**. This includes the purchase of building materials for construction works, but may also extend to material extraction, manufacturing, building, retrofit, refurbishment, design, interior fit out, and end-of-life demolition or deconstruction processes. There are a variety of roles within the procurement cycle that the guidance can support, from commissioning, category management, tender preparation and evaluation, to contract management.

The guidance is also relevant for other actors involved in the procurement landscape as enablers and facilitators. This includes **policymakers, civil society and non-governmental organizations (NGOs)** supporting a transition towards improved sustainability in the sector, and end-users who can use their purchasing power to drive sectoral change.

6 European Commission (2016). Buying Green handbook
7 International Institute for Sustainable Development. Implementing Sustainable Public Procurement in Latin America and the Caribbean

3.

Approach

The guidance addresses a range of challenges for the building materials sector as follows:

- Chemical impacts of the building materials sector are significant and varied. Concerted action to address these is urgently needed, particularly in emerging economies where there are fewer protections from regulation. Some building materials and products have very chemical-intensive formulations or acute hazards – such as treated timber, solvent- and lead-based paints and asbestos, as well as the issue of products already installed that contain phased-out chemicals, which may become an exposure hazard when buildings are demolished or refurbished. Other impacts are due to longer-term persistence and accumulation of chemicals in the environment. Different approaches are needed to address both chronic and acute hazards, and of current and legacy chemicals in building materials.
- The supply chain for building materials can be complex and involve global sourcing, and issues with transparency and data accessibility may be encountered.
- Existing procurement procedures may prioritise other aspects such as cost, and for sustainability considerations, aspects such as embodied carbon and energy efficiency may currently be prioritised ahead of chemicals management.
- The buildings and construction sector operates in a different way to the chemicals sector. The buildings and construction sector is considered to be conservative[8], which may be a barrier to the uptake of new, innovative sustainable products and materials.
- Markets for building materials and associated chemicals evolve and change rapidly – the speed at which new chemicals are placed on the market means that chemicals management processes must keep pace to avoid gaps in knowledge.

8 World Economic Forum. Shaping the Future of Construction - A Breakthrough in Mindset and Technology

Box 1 How to navigate the guidance

To address the above challenges, the guidance provides support structured as follows:

- Part A presents the **context** of how procurement is a key instrument to improve sustainability, both in individual projects and by influencing markets. Background information related to chemical hotspots of the sector is included alongside a summary of key global legislation.
- Part B provides **background** to typical procurement processes related to building materials that can be influenced by SPP criteria. Additionally, the chapter lays out a framework for more sustainable procurement, agnostic to country, material or chemical, that can help develop an overarching procurement strategy. This explores policies, objectives and targets, chemical inventory and assessment, data management and engaging the value chain.
- Part C contains a toolbox for procurers, at three levels: **general, good practice** and **moving beyond good practice**. This provides practical guidance that recognizes public authorities' different starting points, levels of support, and ambitions for addressing CoC in building materials and products.
- The Recommendations section provides overarching **recommendations** for procurers, to enable performance improvement against a dynamic, changing market for both building materials and chemicals. Recommendations for policymakers on how public procurement can support the bigger picture of advancing the safer chemicals agenda, supporting national and international policies, are also included.
- A series of **best practice case studies** is provided. This includes success stories relating to phasing out problematic chemicals, and specification of safer building materials to address chemical hotspots. Other aspects such as supplier engagement and policymaking are explored in this section, alongside profiles of exemplar materials.
- Finally, Product Profiles contain **background information** on key building materials and products. These summarise common types, their associated chemical hotspots, procurement codes, and associated available criteria, providing a reference point for procurers, policymakers, and other value chain actors.

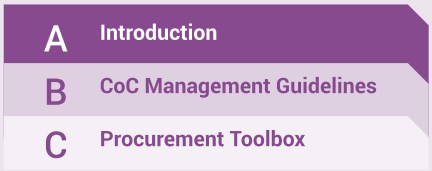
Box 1 How to navigate the guidance

Addressing CoC in building materials and products is directly linked to progress against various global sustainability goals and targets. These include:

- SDG3 (Good Health and Wellbeing), SDG12 (Sustainable Consumption and Production), with specific targets including:
  - Target 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.
  - Target 12.7: Promote public procurement practices that are sustainable, in accordance with national policies and priorities.
- UNEA Resolution 4/8, which calls for "minimizing and preventing, when feasible, the use of hazardous substances in material cycles".
- UNEA Resolution 5/7, which emphasizes the cross-cutting relevance of sound management of chemicals to many of the goals and targets of the 2030 Agenda for Sustainable Development.

To navigate back and forth between sections, click on the tabs, or the section names in the header

Tabs for **Part A, B & C**



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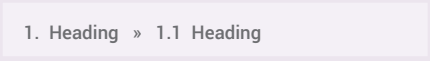


3.2
Three levels of action

The guidance provides support across a wide range of building products and materials with known issues to be addressed regarding chemicals of concern. It also addresses the associated hotspots related to circularity and embodied carbon, as well as social challenges from material sourcing, production, and disposal. The guidance provides support for procurers at three levels.

Three levels of action by procurers and procurement functions

01.

General Practice (Part C.1) – supporting procurers to achieve minimum compliance with regulations in their regional jurisdiction, which includes multilateral environmental agreements (MEAs) alongside national laws and codes that address the production, use and disposal of chemicals of concern.

02.

Good practice (Part C.2) – at this level, the guidance seeks to support procurers to move beyond compliance by taking a more proactive approach, using procurement to specify safer products, materials, and substitutes.

03.

Beyond good practice (Part C.3) – adopting a strategic approach to address CoCs in building materials, that considers an ambitious shift towards exemplar products, ambitious design processes and market engagement to encourage action at the level of the public authority, but also to drive wider market transformation.

It is acknowledged that public procurement is a highly varied process, globally. The size and influence of the public sector, and the amount of regulation varies between countries. The engagement and economic importance of private sector suppliers also varies between countries, which is an important consideration for procurement. It also bears mentioning that building projects are delivered in a range of climates requiring materials and construction techniques appropriate for that climate. Therefore, while some lessons and best practices are applicable globally, what works well in one country might not be directly replicable elsewhere.

This guidance has been developed through a combination of desk research, and consultation with key stakeholders comprising procurers, sustainability practitioners (including the One Planet Network Sustainable Public Procurement Multistakeholder Advisory Committee), technical experts on chemicals, policymakers, and representatives from industry. Interviews, and a consultation exercise comprising a webinar and a call for inputs have been held with stakeholders to assess current practices, gather feedback for the main priorities of the guidance and understand the barriers faced.

The guidance draws on existing procurement specifications related to a range of building materials and processes, taking into account the full product and building life cycle. Examples of 24 criteria from 145 sources relating to CoCs of different building materials, products and components have been used to inform the guidance.

4.

Life cycle sustainability impacts of building materials and products

4.1 Overview

Procurement should take a holistic life cycle approach to the sustainability impacts of building materials across production, installation, use, and end-of life phases to better address sustainability hotspots and avoid burden-shifting between life cycle stages.

Chemical pollution from resource extraction activities, processing and manufacturing, use, and end-of-life demolition and disposal of building materials contributes to environmental degradation, species loss and human health issues through the contamination of land, water, and air. This can lead to exposure to a range of chemicals that may affect health and, in some cases, have the potential for continued exposure due to a chemical's persistence and bioaccumulation.

Up to 90% of our time in modern life is spent indoors[9]. Long-term exposure to certain chemical substances in building materials can have damaging impacts on human health and is an increasing area of concern[10].

Figure 1 highlights key sustainability impacts across the life cycle of building materials, while Figure 2 maps the chemicals and buildings value chains alongside procurement processes, identifying the key linkages and opportunities to act for better chemicals management and impact reduction.

While addressing CoC in building products and materials is a primary objective of this guidance, sustainable procurement practices can be even more impactful as part of a holistic strategy factoring in embodied carbon and circularity, as these are other significant hotspots of the sector. 37% of global carbon emissions are due to construction and lifetime energy use in buildings[11], while the construction sector is responsible for 20% - 50% of the global consumption of natural resources, and 50% of total solid waste[12]. Additional impacts that may be necessary to integrate in procurement strategies are energy efficiency, climate adaptation, and social impacts for workers and communities.

9 Klepeis et al (2001). The National Human Activity Pattern Survey (NHAPS): a resource for assessing exposure to environmental pollutants

10 Vardoulakis et al (2020). Indoor Exposure to Selected Air Pollutants in the Home Environment: A Systematic Review

11 GlobalABC. 2022 Global Status Report for Buildings and Construction

12 Vasilca et al (2021). The Management of Environmental Resources in the Construction Sector: An Empirical Model

Figure 1 Life cycle impacts of the building materials value chain

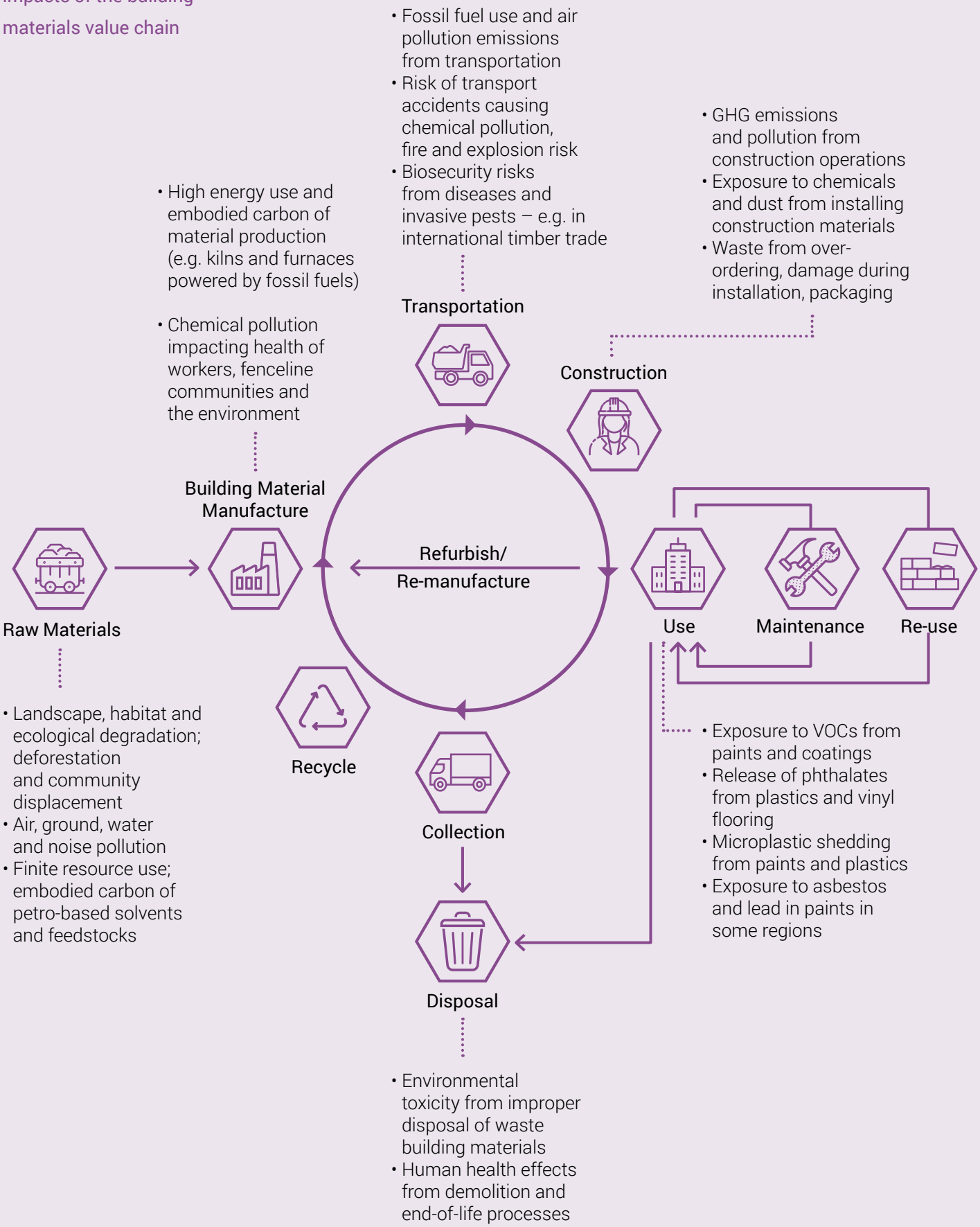
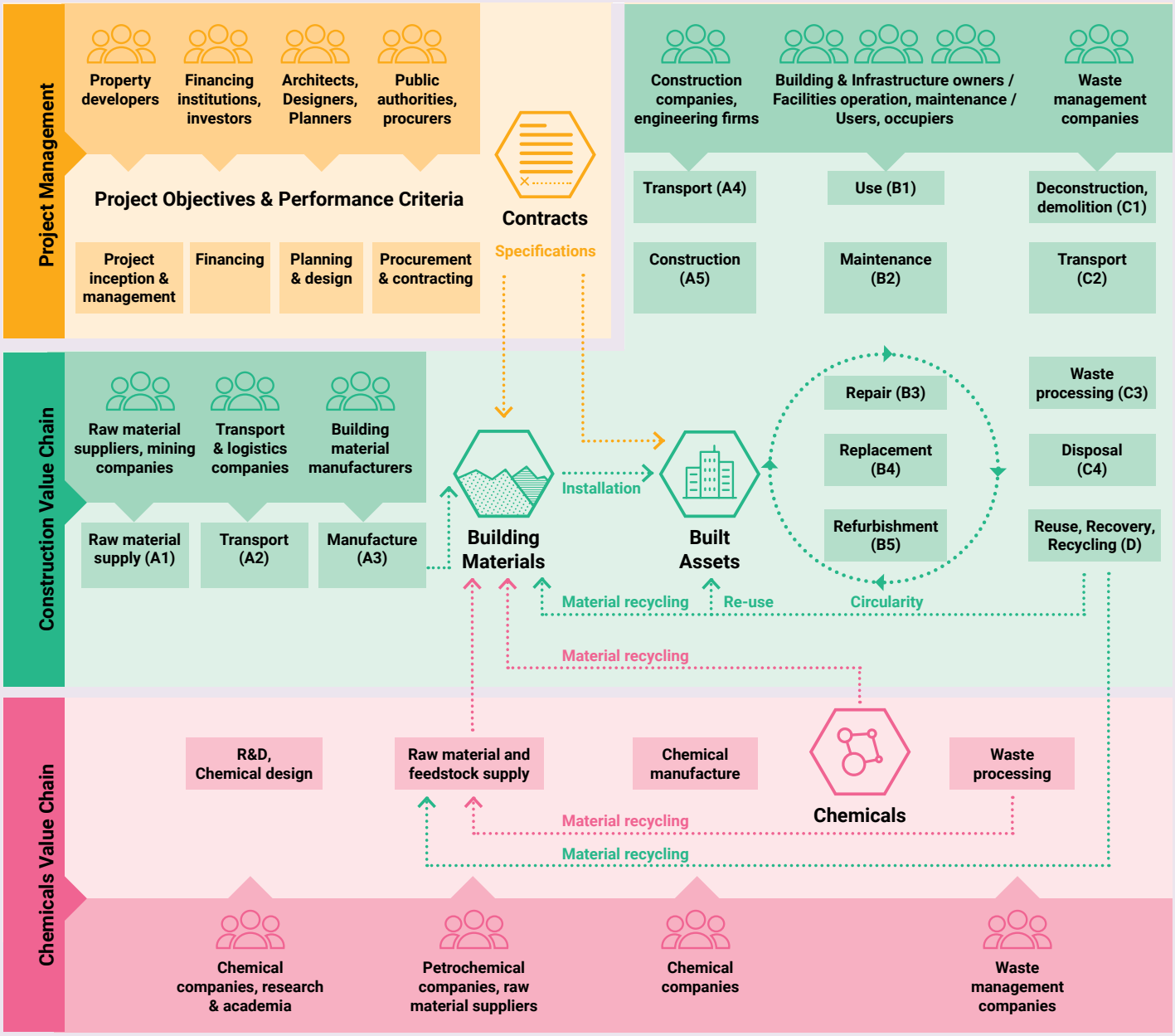


Figure 2 Linkages between the chemicals and buildings value chains with lifecycle stages according to EN 15804/EN 15978



4.2
Chemicals of concern in building products and materials

CoC may be encountered or released across the life cycle of building materials, with pollution impacts on human health and the environment. Some examples of common CoC encountered in building materials and products are detailed in Table 1, which has been adapted from the UNEP report *Chemicals of Concern in the Building and Construction Sector*[13].

Table 1 Chemicals of concern found in building materials

Chemical/Group	Application	Hazards
Certain halogenated flame retardants	Plastic roofing materials, wood boards, insulation, expanded polystyrene panels, glue, sealants	Neurotoxicity, potential endocrine disruptor, liver impairments, and indication of immune modulating effects. Bioaccumulation and persistence in the environment
Certain Phthalates	Plasticizer in PVC flooring and wall coverings, adhesives, sealants, and varnishes	Toxicity for reproduction and potential for endocrine disruption.
Certain solvents, formaldehyde, and other volatile organic compounds (VOCs)	Paints, varnishes, adhesives, engineered wood products	Carcinogenic and reprotoxic effects, neurotoxic effects
Per and poly-fluorinated substances	Wood boards, paint, damp proofing, insulation, fire-fighting foams	Indications of liver effects, developmental effects, potential for endocrine modulating effects, and indication for effects on the immune system. Bioaccumulation and high persistence in the environment
Certain metals: lead, cadmium, mercury	Stabilisers, pigments, anti-corrosion agents	Human health concerns related to carcinogenicity, mutagenicity, toxicity to reproduction and other systemic toxicity effects
Asbestos	Insulation spray coating and boards, cement profiled sheets, bitumen products, flooring	Concerns for human health related to asbestos, mesothelioma, and lung cancer

13 United Nations Environment Programme (2021). Chemicals of Concern in the Building and Construction Sector

Asbestos	Insulation spray coating and boards, cement profiled sheets, bitumen products, flooring	Concerns for human health related to asbestos, mesothelioma, and lung cancer

Building materials can release these chemicals in numerous ways[14].

Table 2 How do materials release chemicals?

Chemical/Group	Hazards
Volatilization	Off-gassing of chemicals, such as VOCs in paints.
Chemical degradation	As a result of chemical or physical breakdown of materials – for example the degradation of molecules in plastics releases chemicals into the environment. Compounds may display persistence and accumulate in the environment.
Abrasion	The physical release of particulates and dust from wear of a material. Substances may enter the body through inhalation or dermal absorption.
Leaching	Dissolved materials that enter other media, for example water soluble compounds that may enter water sources (e.g., lead in pipes). These may be ingested through food and drink.
Oxidation	Seen from burning or corrosion processes – for example incineration of PVC can release dioxins.

14 Healthy Materials Lab. How do materials release chemicals?

5.

Regulatory landscape for sustainable building materials

A non-exhaustive selection of examples of global legislation governing chemical use related to building materials and associated labour practices is provided in this section.

5.1 Policy frameworks

The Global Chemicals Outlook (II) has called for a comprehensive global framework for the sound management of chemicals and waste beyond 2020, with ambitious priorities and coherent indicators.

The framework's priorities are recommended to include target setting for elimination of certain chemicals, increased education and awareness, data collection, standardizing of tools, and action by the private sector to embed sound chemicals management into their business models[15].

The main instrument to date to address this objective has been the Strategic Approach to International Chemicals Management (SAICM) - a voluntary, multistakeholder global policy framework to promote chemical safety around the world. Its initial objective was to achieve the sound management of chemicals throughout their life cycle by 2020, which will be updated – the beyond 2020 intersessional process is now developing a new process and framework.

5.2 Multilateral Environmental Agreements (MEAs)

At the international level, several chemicals and chemical families used in building materials have been designated for global phase-out by Multilateral Environmental Agreements (MEAs). While these are mandatory instruments, in practice, not every country is carrying out the required actions and reporting (see Figure 7).

15 United Nations Environment Programme. Inside the push for a global chemicals management framework

Globally, the following instruments cover the production, use, import and end-of-life management of hazardous substances and CoC, with relevance to building materials.

- The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal is in place to protect human health and the environment against the adverse effects of hazardous wastes.
- The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade promotes shared responsibility, cooperative efforts and information exchange in the international trade of pesticides and industrial chemicals that have been banned or severely restricted for health or environmental reasons.
- The Stockholm Convention on Persistent Organic Pollutants addresses highly persistent and accumulative chemicals in the environment. This addresses some halogenated flame retardants and per- and poly fluorinated compounds found in building materials.
- The Minamata Convention on Mercury is a global treaty protecting human health and the environment from adverse effects of mercury. Several release pathways for mercury are seen in the building materials life cycle, including from extraction[16] and demolition[17] activity, cement production[18] and some plasterboard products[19].
- The Montreal Protocol on Substances that Deplete the Ozone Layer focuses on developing a phase-out plan from ozone-depleting substances, with relevance to foam insulation materials, including legacy products.

16 Greenspec. Mercury
17 Rodriguez et al. Health and Safety Protocol for the Management of Building Demolition Waste with High Mercury Contamination
18 Global Mercury Partnership. Mercury release from the cement industry
19 Healthy Building Network (2020). Selecting the Wrong Drywall Could Introduce Mercury into the Environment

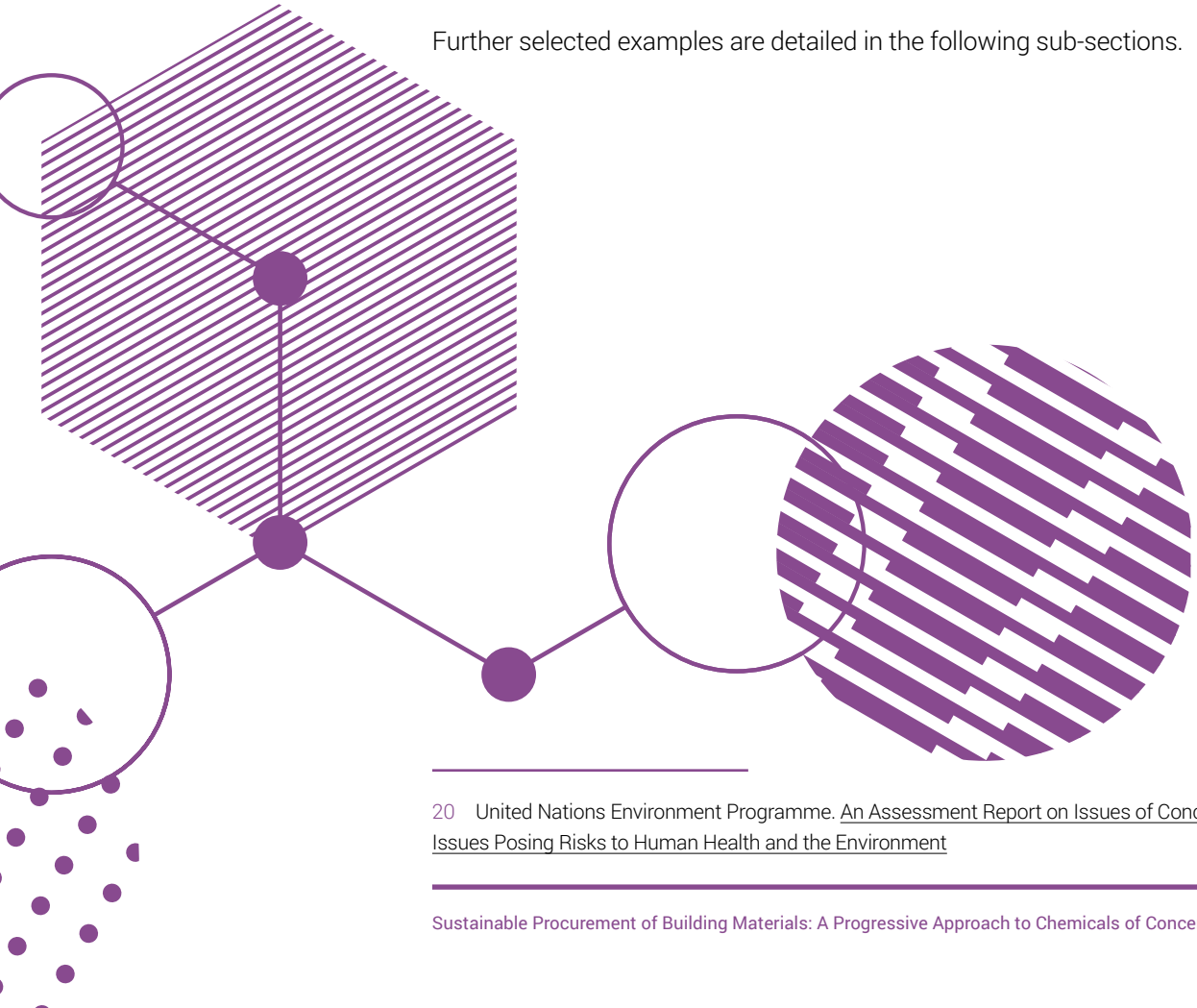
5.3
Labelling and identification

There is diverse legislation in different countries on how to identify hazardous chemical properties and pass this information through the value chain. The UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS) is a non-legally binding international standard that was set up to establish standardized hazard testing criteria, universal warning pictograms, and harmonized safety data sheets. GHS is considered one of the most important drivers for improved information provision but it is not implemented everywhere.

5.4
National level

At the national level, a range of regulations are in place relevant to CoC in building materials. The Annexes to the 2020 UNEP assessment report Chemicals and Waste Issues Posing Risks to Human Health and the Environment[20] has developed a comprehensive (but non-exhaustive) overview of these, covering legally binding instruments, 'soft law' instruments (e.g., resolutions and recommendations, codes of conduct, guidelines, communications, fiscal policies), and voluntary agreements (e.g., voluntary phase-out, awareness raising, capacity building, industry standards, labelling, partnerships).

Further selected examples are detailed in the following sub-sections.



20 United Nations Environment Programme. An Assessment Report on Issues of Concern: Chemicals and Waste Issues Posing Risks to Human Health and the Environment

5.5
Europe

The Registration, Evaluation, Authorisation, and restriction of Chemicals (REACH) is the main instrument for chemicals management and establishes a database of 'substances of very high concern' (SVHC) which have restrictions placed on production and content in a product. The list of SVHC is updated regularly and can be found on the European Chemicals Agency website.

The Regulation on the Classification, Labelling and Packaging of Substances and Mixtures (CLP Regulation) entered into force in 2009, incorporating the classification criteria and labelling rules agreed at the UN level (i.e., GHS), and taking over certain provisions of REACH. It outlines classification criteria, hazard symbols (pictograms), and labelling phrases that companies must comply with to protect workers, consumers, and the environment. According to the EU Construction Products Regulation 305/2011, Safety Data Sheets (SDSs) and information on SVHC used must be made available to the investor or building owner together with the declaration of performance.

There is no mandatory directive to include sustainability criteria in public buildings on an EU level. EU Green Public Procurement Criteria is a voluntary instrument setting criteria covering some building product types, building design, construction and management.

5.6
North America

The United States' main instrument of chemicals management is the Toxic Substances Control Act (TSCA).

In Canada, a Chemicals Management Plan was introduced in 2006 assessing and managing risks to human health and the environment posed by chemical substances, including some building products and industrial releases.

5.7
Latin America

The Central and South American chemical regulatory environment varies across the region. While most Central and South American countries do not currently possess formal chemical inventories, and generally have not adopted the GHS for their respective Safety Data Sheet (SDS) programmes, many have made significant progress in developing regulations similar to those in the USA, the EU, and Canada.

Relevant recent developments have been observed in three countries:

- Brazil: National chemical law framework PL 6120/2019, which is similar to REACH.
- Chile: Decree 57, Regulation on Classification, Labelling, and Notification of Hazardous Chemicals and Mixtures.
- Colombia: The second country in Latin America to enact a comprehensive chemical regulation under Decree 1630/2021 (REACH-inspired), this applies to industrial chemicals identified as hazardous by GHS.

5.8 Asia

The Centre for Innovation in Regulatory Science (CIRS) Group has published information on China's regulatory landscape, one of the leading countries in the building materials and construction industry.

Regulations include the Hazardous Chemical Registration and Inventory, China REACH, China GHS, Safe Management of Hazardous Chemicals (Decree 591), and the country's Chemical Import Trade Compliance. The Chinese government also partnered with UNEP in 2018 to support the implementation of MEAs in Asia, by building the capacity and knowledge of the country's customs officials in sound chemicals management.

In 2020, India, the other leading country within the building materials industry alongside China and the United States, has published the Indian Draft Chemicals (Management and Safety) Rules. Also known as India REACH, it provides restriction, prohibitions, labelling and packaging requirements, and registration requirements for chemicals placed on the market.

Other Asian countries have also implemented REACH-like chemical registration and control measures, such as in Korea and Vietnam.

5.9 Africa

Most countries in Africa do not have specific regulations applying to CoC in building materials and products.

South Africa has some relevant legislation, having published its Regulation of Hazardous Chemical Agents (HCA) in 2021, and also adopts the GHS classification and labelling of chemicals. There are some examples of SPP development such as the City of Cape Town's Green Procurement Action Plan, explored in the case study in section B3.

Kenya has made progress in implementing a regulation on chemicals management, supported by initiatives such as the UNDP-GEF *Sound Chemicals Management Mainstreaming and UPOPs Reduction in Kenya project*[21]. At the time of writing, Kenya's National Environment Management Authority (NEMA) has finalized draft Chemical Regulations. It is reported that environmental criteria are rarely implemented in public procurement in Kenya, with more emphasis placed on social and economic aspects[22].

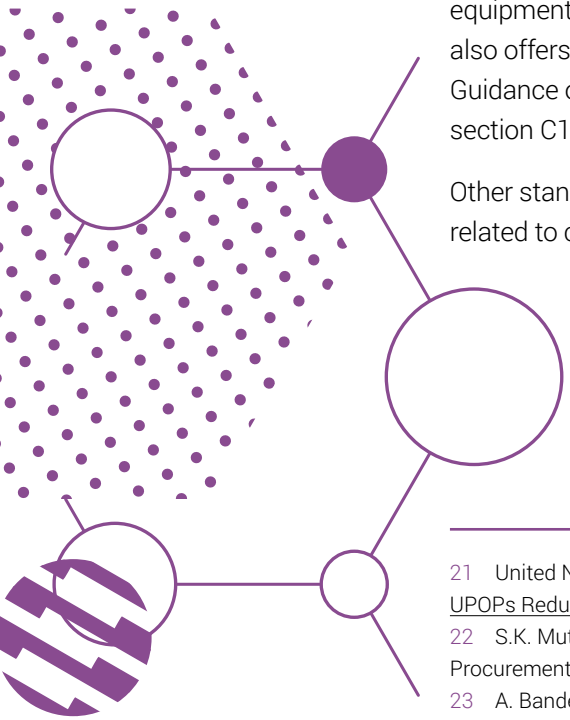
Lead in paint in Africa remains an important health issue. Although progress is being seen in countries implementing legislation, at the time of writing, only around 15% of African nations have lead paint laws in place. Limits in these laws vary in the continent. While some countries specify lower levels (at 90 parts per million [ppm] in several countries), others are still transitioning towards more stringent limits[23].

5.10
Global occupational environment, labour, and human rights

Some impacts of chemicals of concern are addressed by international labour standards relevant to the construction sector. From a social perspective, construction is considered a labour-intensive sector[24], characterised by low wages and, in some countries, precarious working conditions[25].

The International Labour Organization (ILO) also promotes codes of practice for the sector (e.g., safety and health in construction, and safety and health in building and civil engineering work), providing practical guidance on topics such as the work environment, equipment, fire protection, noise, and machinery. The ILO Chemicals Convention (ILO C170) also offers a more generic approach, addressing safe use of chemicals in the workplace. Guidance on addressing labour rights within public procurement can also be found in section C1.

Other standards that procurers can consider for responsible sourcing and ethical labour related to construction products include BES6001 and BES6002.



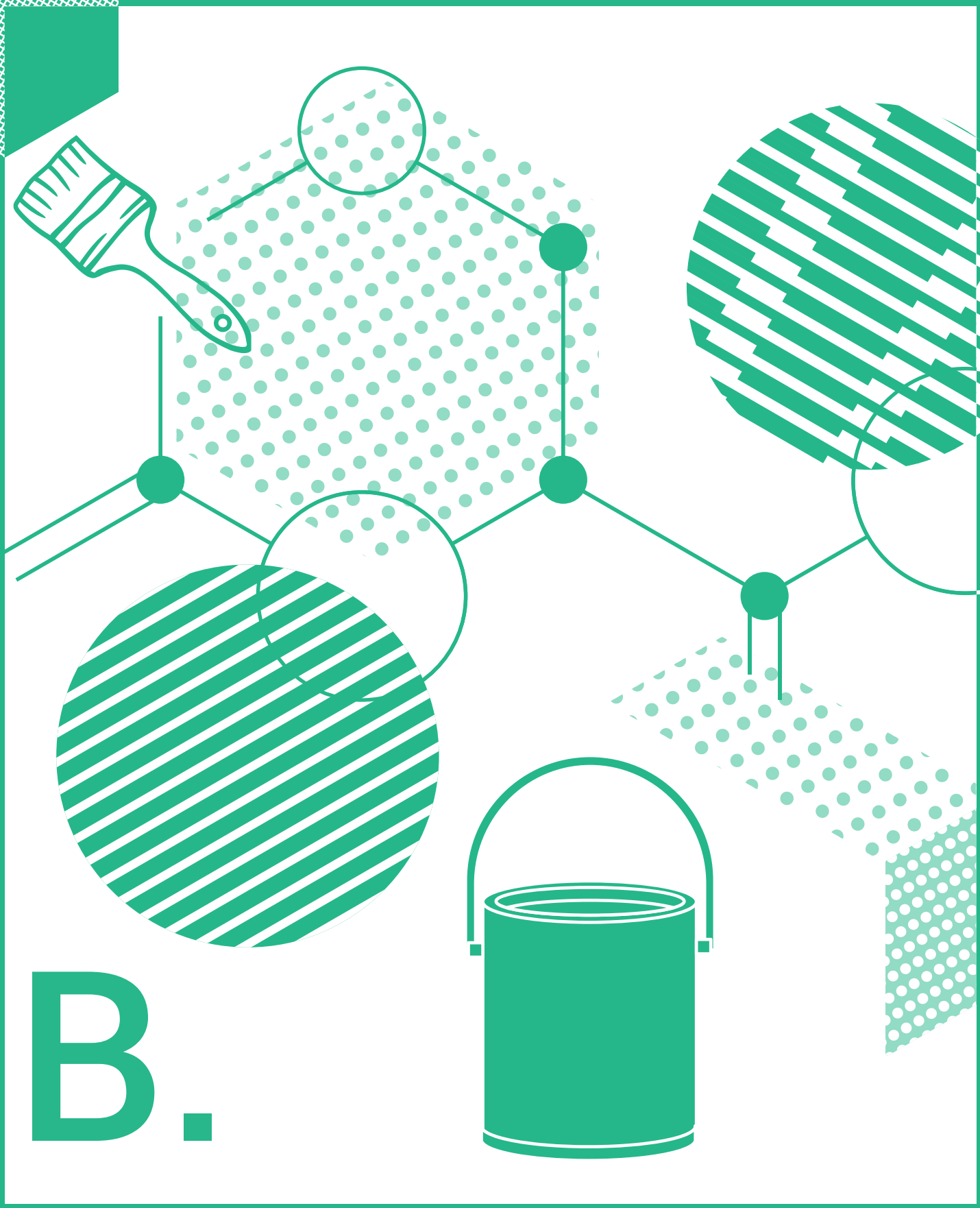
21 United Nations Development Programme. UNDP-GEF Sound Chemicals Management Mainstreaming and UPOPs Reduction in Kenya project

22 S.K. Mutangili (2021). Public Procurement for Sustainable Development in East Africa. Journal of Procurement and Supply Chain. Volume 5, Issue 1

23 A. Bandemehr (2020). Overview of Lead Paint Laws in Africa: Regional meeting for the development of a regional standard on lead in paint in the ECOWAS region

24 Business & Human Rights Resources Centre (2017). A Human Rights Primer for Business: Understanding Risks to Construction Workers in the Middle East

25 International Labour Organization (2001). The construction industry in the twenty first century: Its image, employment prospects and skill requirements



B.

Sustainable management guidelines for procurement

Sustainable Procurement of Building Materials:
A Progressive Approach to Chemicals of Concern

B. SUSTAINABLE MANAGEMENT GUIDELINES FOR PROCUREMENT

1.

The role of procurement in managing chemicals of concern

Public procurement has great potential to address sustainability challenges. Its expenditure on goods, services, and infrastructure accounts on average for 13% of the gross domestic product (GDP) in Organization for Economic Cooperation and Development (OECD) countries[26], and up to 30% in many developing countries[27]. Globally, the public sector accounts for 20-30% of revenues in the construction industry[28].

Additionally, public procurement can act as an instrument of strategic innovation, driving market transformations towards more sustainable products necessary for achieving various sustainable development goals. The challenge is whether governments can use public procurement to develop and drive an effective sustainable transition[11].

> UNEP defines SPP as "*a process whereby public organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life cycle basis in terms of generating benefits not only to the organization, but also to society and the economy, while significantly reducing negative impacts on the environment*"[29].

The most effective way for public procurement to achieve a significantly reduced environmental impact is by supplementing the public authority's own knowledge and in-house data through collaboration and co-operation along the value chain, with sustainability considerations embedded at all contracting stages of a building or infrastructure project.

This involves the life cycle thinking approach introduced in section A4 to ensure that sustainability hotspots are identified and addressed at all stages of the building life cycle, without burden shifting, and are inherently connected to the procurement life cycle.

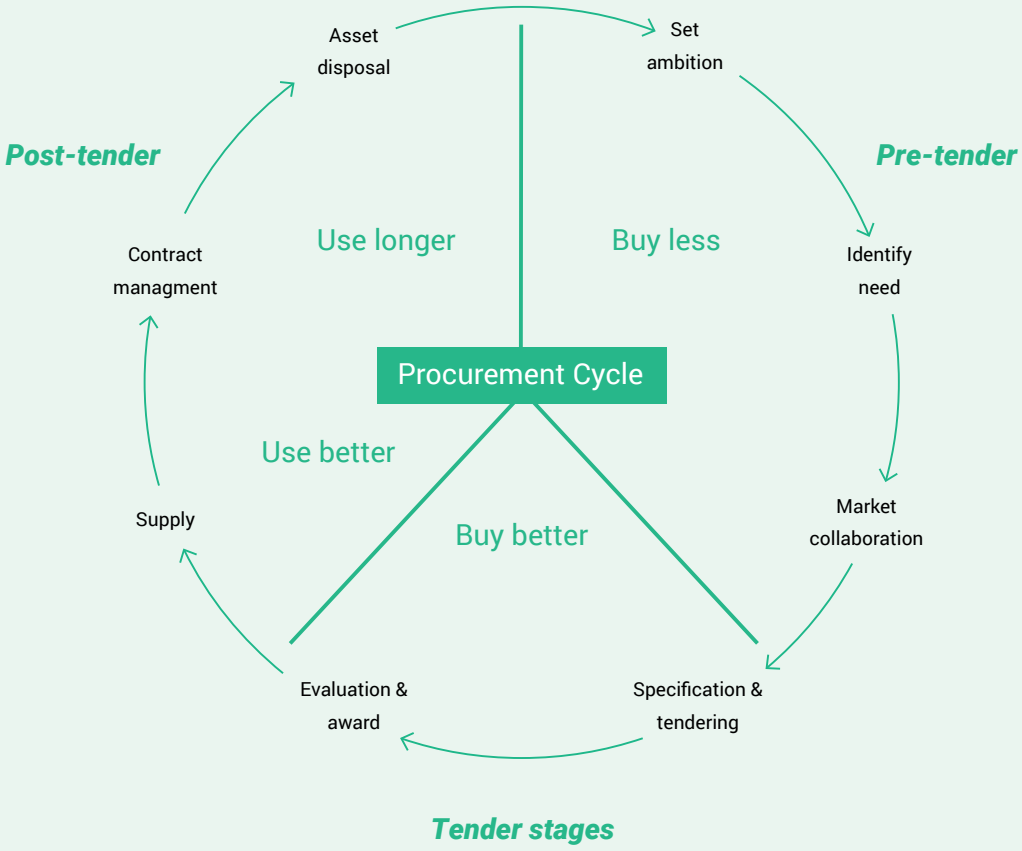
1.1 The procurement cycle

The procurement cycle (Figure 3) follows a similar process to the life cycle of building materials:

- Production (sourcing)
- Use (including repair and maintenance, and reuse)
- End-of-life management (including remanufacture, recycling, and waste disposal)

26 OECD (2016). The Role of Public Procurement in Low-carbon Innovation
27 Global Efficiency Intelligence (2019). Curbing Carbon from Consumption: The Role of Green Public Procurement
28 Mission Possible Partnership (2022). Low-carbon concrete and construction: a review of green public procurement programmes
29 UN Environment Programme (2019). Building Circularity into our Economies through Sustainable Procurement

Figure 3 Simplified procurement cycle and stages



It is essential that in early-stage, pre-tender contracting processes, such as commissioning, design and product procurement, sustainability is written into the brief and put into practice.

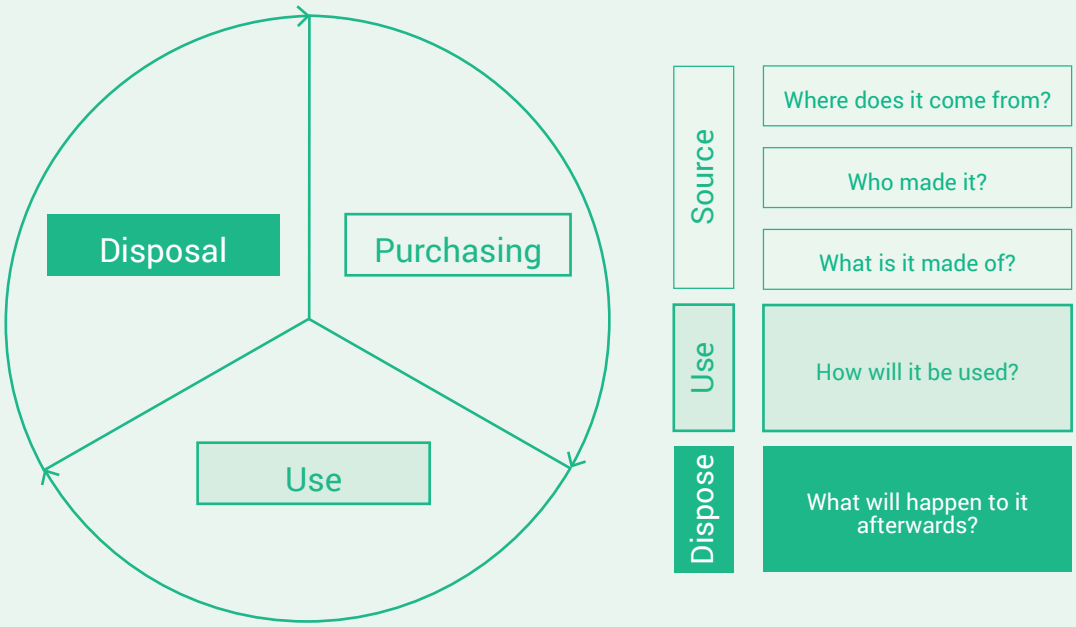
For example, at the pre-tender phase, public procurers can specify required environmental and social performance, ensuring that only bidders with a commitment to and expertise in sustainability can bid for the tender. This may be achieved in practice by developing legal instruments that require the purchase of green products, as shown in the case study below of Korea Land & Housing Corporation's procurement of more sustainable paints for public housing.

Similarly, ensuring that the downstream stages of use, maintenance, retrofit, and end-of-life incorporate sustainability aspects and indicators can maximise the benefits of better material choices, and reduce the impacts of chemical exposure and release to the environment. Again, requiring bidders to demonstrate their sustainability credentials can be applied to the tender and post-tender phases[30].

Public procurers are required to use public funds responsibly, and the traditional linear approach to procurement often places greater focus on the purchasing stage, and may interpret the 'value for money' concept as the lowest price possible.

30 International Institute for Sustainable Development (2016). The Role of Public Procurement in Deploying Sustainable Infrastructure

Figure 4 Circular procurement cycle and key questions to reach it



However, within a circular procurement cycle[31], enabling a longer lifetime of materials, or reuse and recovery can provide better value for money than a linear approach, which does not account for costs from waste disposal or the benefits of further material cycles. A new, free standard, BSI Flex 390 v.2.0:2023, is available that specifies a consistent approach to value-based decision making in built environment projects and can assist with value for money comparisons.

A key consideration for enabling more circular procurement is reducing the use of certain chemicals in building products - for example when this reduces contamination of other building materials installed. Specifying adhesives that enable increased dismantling of materials (e.g. those that are water-based or more biodegradable) can also improve circularity, as can specifying mechanical connections ahead of chemical ones in design briefs where possible. This can provide further value by enabling material reuse or providing revenue for recovered materials on the secondary market, including in remanufacture (raised modular flooring [RMF] is an example of an application). The reuse agenda appears to be growing in the UK, France and the Netherlands, and is explored further in section C2.

Box 1 Case study – Legislation supporting the introduction of SPP in the Republic of Korea

As part of Sustainable Consumption and Production (SCP) initiatives, the Korean government has enforced several acts and regulations to ensure sustainable public procurement can be successfully implemented. This highlights the instrumental role of government initiatives in establishing a supportive environment that can facilitate green production and consumption patterns, and the environmental and economic benefits resulting from a well-established SPP approach.

Improving the Environmental Health of Residents in Public Housing: The Procurement of Paints by Korea Land & Housing Corporation (LH)

LH carries out green purchasing of products intended for construction projects according to the 'Act Promoting the Purchase of Green Products'. In 2014, LH procured 7.4 billion KRW in eco-labelled paint. The monetized environmental benefits generated from LH's purchase of eco-labelled paint were as follows:

31 European Commission (2017). Public Procurement for a Circular Economy: Good practice and guidance brochure

Box 1 *(cont.d)* Case study – Legislation supporting the introduction of SPP in the Republic of Korea

- → Reduction in harmful substances: 1,130,555,250 KRW.
- → Reduction in indoor air pollutants: 10,688,886,000 KRW.

LH's procurement of eco-labelled paints thus amounted to environmental benefits valued at a total of 12 billion KRW. Key success factors for this procurement were the legal mandate for all public organizations and institutions to purchase green products, the establishment of a supplier pool for green products by LH, and the existence of well-established monitoring and reporting processes.

1.2 Management of chemicals of concern in procurement

Improved management of CoC is generally achieved through applying one or more of the four principles of **Avoid**, **Substitute**, **Encourage** and **Prefer**:

Avoid

Avoid focusing on compliance. In practice, this will require processes to identify the chemicals in procured products, assess which are the most problematic, identify the highest priorities for action, and ensure that tender processes exclude these chemicals.

Substitute

Substitute working towards identifying safer substitutes through informed, evidence-based research. This will typically require an ongoing dialogue with suppliers about their processes and chemicals. It may be necessary to request full transparency on substituted chemicals - in some cases suppliers may wish to keep this information confidential, which may require the use of non-disclosure agreements. Suppliers may also need a time period to phase out or substitute a chemical, and it is beneficial to maintain effective communication with them to understand the practicalities of this.

Encourage

Encourage liaising with suppliers to promote the reduction of CoCs in their design and production processes. Tender processes can consider implementing a schedule to enable a phased approach towards a safer substance and incentivize a quicker phase-out.

Prefer

Prefer only selecting products with permitted chemicals. This can involve putting together a preferred list of chemicals or materials that have known, more benign properties – for example, procurement of wood adhesives could specify that the product has to be no-added formaldehyde (NAF) and bio-based (e.g. soy-bean derived adhesives[32]).

More detailed actions to implement these strategies are further explored in section B3.

32 Ghahri and Mohebby (2017). Soybean as Adhesive for Wood Composites: Applications and Properties

2.

Building Products Procurement Taxonomy

The information in this section can be used by procurers to identify which of their activities may require a chemicals management strategy.

Procurers and other stakeholders linked to the management of CoC must be aware that the scope for procuring building products is much broader than just direct purchasing. This may be realised though several routes, cover a wide range of procurement activities, potentially with lifetimes over many years.

1. Manufacturing.
2. Construction activities.
3. Operational activities (e.g., maintenance, repair, renovation, small-scale demolition, etc.).
4. Potentially retail activities through direct purchasing.

Globally used taxonomies for these routes are explored below.

2.1 Taxonomy classifications

The United Nations Standard Products and Services Code (UNSPSC) is a hierarchical system used by the UN Global Marketplace (UNGM) to classify suppliers' products and services[33]. The principal sectors and codes directly and indirectly related to building products are:

- 30000000 - Structures and Building and Construction and Manufacturing Components and Supplies.
- 40000000 - Distribution and Conditioning Systems and Equipment and Components.
- 72000000 - Building and Facility Construction and Maintenance Services.
- 76000000 - Industrial Cleaning Services.

In addition to UNSPSC, the Common Procurement Vocabulary (CPV) is a classification system used in public procurement in the EU[34]. It establishes a single classification system for public procurement, aimed at standardizing references used by contracting authorities and entities to describe the subject of procurement contracts. Like the UNSPSC, there are many categories that include or could potentially include building products.

33 UNGM Help Center. What are UNSPSC codes?
34 European Union. Common Procurement Vocabulary

A sample of the main CPV categories for building products includes:

- 44000000-0 - Construction structures and materials; auxiliary products to construction (except electric apparatus).
- 44110000-4 - Construction materials.
- 44111000-1 - Building materials.
- 45000000-7 - Construction work.
- 79993000-1 - Building and facilities management services.
- 71315000-9 - Building services.
- 45262300-4 - Refurbishment work.
- 44210000-5 - Structures and parts of structures (mainly relating to infrastructure).
- 45200000-9 - Works for complete or part construction and civil engineering work.

North America has its own classification of production through the North American Industrial Classification System (NAICS)[35], based on production rather than procurement. The EU also has a production classification system called NACE[36]. Construction products are covered in NAICS principally by Sector 23 – Construction:

- Subsector 236 - Construction of Buildings.
- Subsector 2361 - Residential Building Construction.
- Subsector 237 - Heavy and Civil Engineering Construction.
- Subsector 2372 - Utility systems in Construction.
- Subsector 238 - Specialty Trade Contractors.
- Subsector 2381 - Foundations, structure and building exterior construction.

Building products also feature in the Manufacturing sector (Sector 31-33), for example, in:

- Subsector 321 - Wood Product Manufacturing.
- Subsector 326 - Plastics and Rubber Products Manufacturing.

35 North American Industry Classification System.
36 Complete list of all NACE Code.

- Subsector 3251 - Basic Chemical Manufacturing.
- Subsector 335 - Electrical Equipment, Appliance, and Component Manufacturing.
- Subsector 337 - Furniture and Related Product Manufacturing.

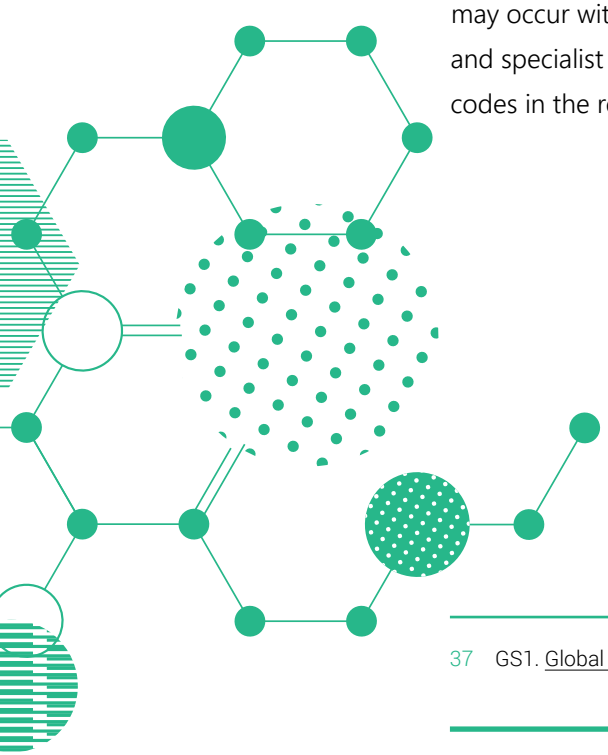
NAICS also covers services including repair and maintenance, for example:

- Subsector 561 - Other Services to Buildings and Dwellings.
- Subsector 562 - Waste Management and Remediation Services.

Other classification systems include the Global Product Classification (GPC) which is maintained and published by GS1[37], an NGO developing global standards and solutions to improve efficiency and visibility in supply chains. The GS1 system comprises Segments, Families, Classes, and Bricks (in this case meaning product types). Building products fall into the Family code 83010000 (Building Products).

Building taxonomy systems vary between regions. However, a summary table for the broad taxonomy of structures, elements and components used within the guidance is shown in Table 3. The purpose of the taxonomy is to highlight the broad range of activities procurers can expect construction products to be found in. It is therefore not sufficient for chemicals management to focus on the procurement codes for specific building products alone, but also consider the associated activities and services likely to use those products.

The codes listed above are not definitive, and procurers should ensure they undertake their own due diligence when assessing where construction products, and associated impacts, may occur within their procurement actions. For example, building services, refurbishment and specialist facilities like medical equipment and installations will have their own separate codes in the respective classifications.



37 GS1. Global Product Classification (GPC)

Table 3 Outline taxonomy for building products

Sector	Elements	Assemblies	Components	Sub-components
Facilitating works				
	Preparatory groundworks			
	Toxic/hazardous/contaminated material treatment			
	Major demolition work			
	Disposal installations			
	Mains water supply			
Building construction components				
	Primary (e.g., Substructure, Walls, Floor slabs, etc.)			
	Supplementary components			
		Roofs and roof trusses		
		Walls (lightweight walls and curtain walls)		
		Doors, windows and floors		
	Prefabricated buildings and building units			
	Building services			
		Internal walls and partitions		
		Ceiling finishes		
		Plumbing		
			Products	
				Sanitary appliances
				Sanitary ancillaries
			Elementary components	

Table 3 *(cont.d)* Outline taxonomy for building products

Sector	Elements	Assemblies	Components	Sub-components
				Pipes
				Fittings
				Terminals
			Services ducts	
		Electrical/electronic assemblies & components		
				Lighting
			Electrical equipment and components and supplies	Security
				IT hardware and telecom systems
		HVAC		
		Fittings, furnishings and equipment		
			Kitchen fittings and equipment	
			Furniture	
			Flooring	
	Work to existing building			
Infrastructure components				
		External Fixtures		
			Site/street furniture and equipment; Eeternal/street lighting systems	
		External drainage		
		External services		

Table 3 *(cont.d)* Outline taxonomy for building products

Sector	Elements	Assemblies	Components	Sub-components
			Water mains supply and distribution	
			Electricity and gas mains supply and distribution	
			Telecommunications and other communication system connections	
			External fuel storage and piped distribution systems	
		Roads and pavements		
		Bridge and tunnel		
		Railways		

3.

Five steps for more sustainable building material procurement

The principles behind managing chemicals of concern (CoC) align with good procurement practices for all forms of public sector procurement – of goods, services and works. They adopt a life cycle approach to procurement (see Figure 3) and should be considered as part of a wider range of sustainability and performance improvement actions that underpin the delivery of public services, including construction, refurbishment, and maintenance projects. Figure 5 provides a generic framework for addressing chemicals of concern in building materials and products and highlights the importance of an integrated approach.

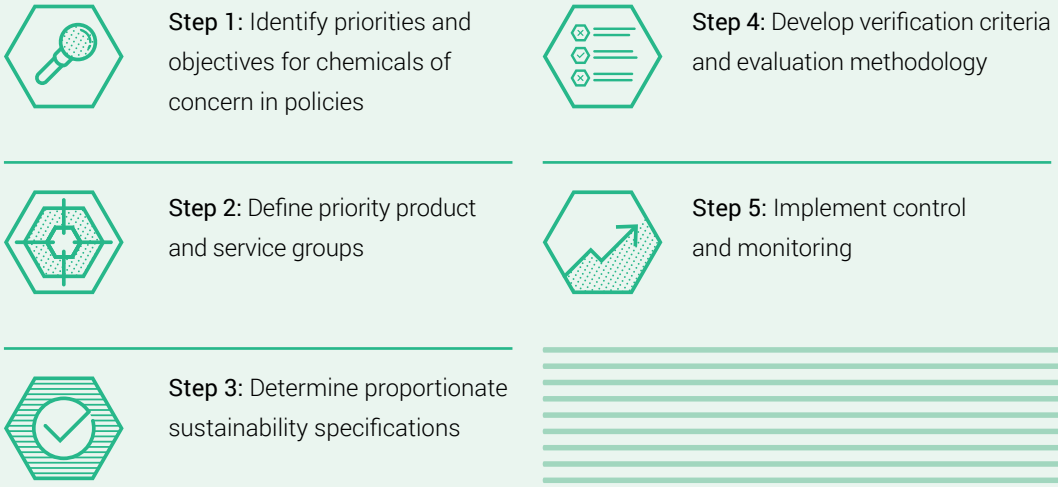


Figure 5 Generic procurement approach to chemicals of concern in building materials

3.1 Step 1: Identify priorities and objectives for chemicals of concern in policies

To have the greatest effect, SPP policies should identify clear priorities and establish targets and timeframes for delivery. A range of departments, decision-makers and stakeholders should be involved in objective setting, alongside procurers. As well as staff directly involved in procurement, finance managers, operational managers and environmental staff are essential to ensuring procurement strategies and objectives are viable and cost-effective.

Sustainable procurement objectives should consider sustainability and health policies in place on the national or local level, to ensure that they are compatible.

For example:

- Could reducing the impact of chemicals of concern - in production, use, or disposal – through procurement contribute to other policy objectives, e.g. water or air quality improvement?
- Are waste management initiatives, for example in construction and demolition waste, a focus area for the public authority? Could reducing the chemical impacts of installed materials contribute to better resource efficiency and more circular outcomes at end-of-life?
- Have existing policies been checked to see if they could go further, or take a different approach? In most countries, the scope of waste management regulations does not include recycling of building materials. Without a life cycle perspective, it is hard to see a connection between the resources needed for new construction and the quantity and quality of materials generated during demolition and de-construction stage. These have benefits in both circularity and chemicals management. Policy development should be encouraged to look at buildings as

a resource, i.e. the Building as a Material Bank (BAMB) concept[38]. Recent noteworthy efforts to develop procurement policy in this area have included the Recycle Colorado Construction, Demolition and Deconstruction Policy Toolkit. A municipal law making recycling mandatory in certain instances is currently in draft for the city of Denver.

Wider deployment of sustainable procurement frameworks can have benefits in driving scale for more sustainable building products and materials. The case study below details how Barcelona developed a city-wide sustainability framework, defining procurement criteria for various goods and services related to buildings and construction.

Lessons can be learned from other countries or municipalities who have implemented procurement strategies and faced similar circumstances. For example, as part of the Switch-Asia project, several countries exchanged knowledge and experiences, resulting in the drafting of safer chemical regulations and regional sustainable public procurement criteria for paint as a project outcome[39].

Box 3 Case Study: Integrating criteria for chemicals in building materials into a city-wide sustainability strategy: Barcelona's +Sustainable City Council Programme

In 2006, Barcelona City Council built upon previous efforts in SPP with the +Sustainable City Council Programme. This programme expanded previous targets to reduce the environmental and social impacts of the institution, including specific commitments and criteria for purchasing, aligned for all council departments.

This covered 12 priority areas, developed through a participatory process with council staff, the public and wider stakeholders. SPP specific policies were introduced in 2001 through the Green Office Programme, focusing on the purchasing of office goods.

Areas of action incorporated in the programme included the procurement of products and services, public events, urban development, construction, and building refurbishment. Internal rules further supported the implementation of this programme, namely the Government Measures on the greening of municipal services (2001), municipal contracts (2006), and responsible procurement (2008 and 2013) which defined the process for including environmental and social criteria in public contracts.

38 BRE. Buildings as materials banks – Enabling a circular way of building
39 Switch Asia Network Facility (2016). Market leaders eliminate lead paint in seven Asian countries

Box 3 *(cont.d)*

Case Study: Integrating criteria for chemicals in building materials into a city-wide sustainability strategy: Barcelona's +Sustainable City Council Programme

Criteria for timber used for furniture and as a building material on urban developments, new buildings, and maintenance, included:

- Sourcing from sustainable forestry or recycled timber – FSC, PEFC or equivalent.
- Legally sourced tropical timber, in line with the EU's FLEGT Action Plan and Timber Regulation (EUTR).
- Species diversification, promoting use of timber as a sustainable building material, the use of local timber from sustainably managed sources, and diversifying species that can be used in urban and municipal projects.
- Formaldehyde content, with chipboard, fibreboard and strand boards classified as class E1.
- Limiting of certain timber treatments, including creosote treatment.

The criteria and verification evidence for office furniture (in addition to timber sourcing) covered:

- Verified LCAs and ecolabels including EU Ecolabel, Nordic Swan, and Blue Angel.
- Formaldehyde content limits, for instance fabric and fibres with below 300ppm content verified by type 1 ecolabels such as Oeko-Tex.
- Limiting toxic substances including certain metals, phthalates, chlorofluorocarbons (CFC) and hydrochlorofluorocarbons (HCFC), verified by ecolabels such as CERTIPUR.
- Useful life and warranty expansion, including technical product warranty, guarantees of offering product in future years, and time availability of functionally compatible replacement parts from wear and tear.
- Packaging from recycled cardboard or plastic.

Step 2: Define priority product and service groups

To target action on CoCs effectively, procurers should identify priority products and services to address within a sustainable procurement framework. The following factors should be considered within the development and implementation of procurement policies:

1. **The environmental impacts, over the full life cycle.** This should consider both the material and building life cycle. Impacts of chemicals of concern should be considered alongside other factors such as embodied carbon, resource efficiency, and reuse and recycling potential, and not in isolation. For example, procurement of water-based paints over solvent-based may reduce the embodied carbon (and hence scope 3[40] emissions) from this product type. Specifying water-based binders and adhesives could improve circularity of procured materials.

40 Carbon Trust. Briefing: What are Scope 3 emissions?

2. **Opportunity to influence the market.** Assessing this aspect may include multiple considerations, such as:

- What is the state of the market for the product, material or service being procured? How saturated is the market? Are new technologies, innovations or business models available that could have an impact? What is the availability and accessibility of affordable, safer alternatives?
- What is the size and visibility of the project? Does it provide a relatively 'easy win' for sustainability improvement that can be monitored, communicated, and championed, such that other projects could replicate the practice?
- Which chemicals or materials should be prioritised in terms of their long-lasting and adverse impacts?

3. **Cost considerations.** How cost competitive are preferred products compared with market average products on a whole life costs basis? Could bulk purchasing make a preferred product more affordable (for example, see the case study on furniture procurement in Denmark, in the case study section)?

4. **Availability of criteria.** Many public authorities do not have documented and harmonised SPP criteria in place – in some cases procurers may research and develop their own. However, as part of prioritisation, using existing criteria can in some cases be used in tender specifications. The climatic region a building is constructed in has a strong bearing in which materials are most appropriate, which should be strongly considered. However, in some cases, use of criteria from another region may be appropriate.

   For example, in a project between UNEP and the Organization of Eastern Caribbean States (OECS) to implement a sustainable public procurement initiative, the OECS Building Code specifies a number of quality standards from the American Society for Testing Materials (ASTM)[41].

   In Kenya, it is reported that the Kenyan Bureau of Standards uses the American Society for Testing and Materials' Standards and European Standards Specification to monitor the quality of gypsum products, due to concerns about chemical hazards from imported synthetic gypsum products[42] .

41 Strengthening Sustainable Public Procurement (SPP) in the OECS. United Nations Environment Programme, 2021.

42 Kenyan firms approved to make gypsum products. Construction Kenya, 2016.

Experiences gathered to inform this guidance also highlighted the instance of placing building materials with different chemical formulations on the market in countries with different regulations. Often, this results in products with higher chemical impacts being sold in emerging economies that have no or less stringent regulations, where more vulnerable populations may be affected. Assessing criteria from other countries has benefited this situation, as knowledge of where regulation is more stringent, and products must meet higher standards, can be used as part of policy development to address production or sale of hazardous products, as well as SPP specifications.

Examples of progressive policies exist in relation to reducing lead in paint, but it remains a problem in Africa. The World Health Organization's report *Chemicals of public health concern and their management in the African region*[43] included profiles of a number of problematic building materials that would not meet regulations in other countries, from lead-based paints to asbestos. Positive examples have been seen from the Switch-Asia project where effective policy for paints has been made and replicated, supported by collaboration and learning shared between countries.

5. **Knowledge and capacity.** Are there particular projects or areas of procurement where teams have stronger knowledge of environmental impacts, including on chemical aspects, that could be harnessed?

A **baseline assessment** is an essential component of a prioritization strategy. This should combine analysis of which products and services have a higher procurement spend, alongside assessment of the chemical and other sustainability hotspots to address. Chemical assessments should always be carried out by individuals with sufficient expertise.

→ As part of identifying priorities for action, compiling and maintaining a central **chemical inventory** of procured materials and chemical ingredients can support better procurement decisions. Information on chemicals of concern in building products and materials can in some cases be found in manufacturers' and suppliers' product data sheets. However, it may be necessary to ask suppliers for more information as full, transparent data on chemical ingredients may not be provided. In some cases, this is due to confidentiality on product formulations, or chemical information may not have been provided in the first place or effectively passed on throughout the supply chain.

43 Chemicals of public health concern and their management in the Africa region. World Health Organization, 2014.

- Conducting a **chemical hazard assessment** can be supported by various tools and restricted substance lists (RSLs). Examples of RSLs include the California Proposition 65 list[44], or the South Korean Ministry of Environment's List of Priority Control Substances[45]. RSLs from independent certification bodies can also be used such as the Cradle-to-Cradle Restricted Substance List[46]. It may be necessary to bring in external expertise on chemicals to support an assessment process. Individual chemicals can be searched in databases such as the ChemSec SIN list, or the GreenScreen Assessment Registry. Other databases such as WINGIS provide hazard information at the product level, enabling search by product codes. Further resources for this task are profiled in section C2. Hazard assessments should consider the full product and/or building life cycle.

- It is recommended to conduct assessment by **chemical family.** Some newly developed chemicals marketed as a substitute for a known chemical of concern may not be subject to regulation, but as part of the same chemical family, may result in a 'regrettable substitution' that is no safer than the replaced chemical. It is important that procurement activities, particularly those deployed on a large scale, do not fail to improve the situation overall when specifying substitutes. The Green Science Policy Institute's Six Classes website gives an overview of the approach of screening and assessing chemicals by family, rather than as individual entities. Other resources provide useful guidance on specific chemical families – for example ChemSec's PFAS Guide. Consideration of other aspects, such as the carbon footprint of substitutes and alternatives, is also recommended.

- Chemical hazard assessments should go into detail on exactly how building materials are manufactured, installed, used, and disposed of. Contracts, service descriptions, method statements, and factory health and safety procedures may be available to understand the typical product life cycle and associated chemical hotspots. For example, for assessment of upstream hazards, assessment can identify if products with chrome plating came from a Cr(VI) or Cr(III) route; or what safety procedures are in place at a plastics manufacturer's factory.

- The next step in prioritizing actions is to align the organization's baseline assessment with national or sub-national governments' or third-party organizations' lists of CoCs. Public procurement strategies and programmes play an important role in prioritization, including providing a mandate to help identify action to take - restrict, avoid, or eliminate, and when. Actions may be supported by a complementary list of

44 The Proposition 65 List. California Office of Environmental Health Hazard Assessment.

45 South Korea Plans Additions to the List of Priority Control Substances. KFT.

46 Cradle to Cradle Certified Restricted Substances List (RSL) – 2021.

labels and certifications that help in verification. These should be easily accessible for consultation by both initiators (e.g. budget holders, users etc) and procurers. Actions should be embedded within the wider framework of sustainable procurement strategies and apply a precautionary approach as guided by the Rio Declaration on Environment and Development[47].

Other more advanced tools are available to allow assessment against usage patterns and exposure profiles of building materials, such as USEtox, as explored in the case study below.

Box 4 Case study: Using the USEtox tool to assess chemical exposure risks in building materials

USEtox enables assessment of the human and ecotoxicological impacts of chemicals using a detailed model that considers both the effects of certain chemicals and typical human exposure in different scenarios. It can be used for assessing and replacing chemicals in building materials and other products, covering thousands of chemical emission profiles and product applications.

Using four variables as inputs – Chemical, Product, Indoor settings and Outdoor region – the outputs of assessments give an exposure and risk results summary, as well as cumulative impact results. The **tool** and **web-manual** can be accessed here.

USEtox has been used effectively in Sri Lanka – in 2019 the National Cleaner Production Centre of Sri Lanka organized training on the tool for industry representatives from science and engineering backgrounds.

The training took a practical approach, enabling delegates to consider the products they work with (building materials and cleaning chemicals) and raise awareness on available chemical exposure assessment methods. Watch the testimonial of how companies in the Sri Lankan industry have used USEtox to inform their operations and product development.

As part of paint assessments conducted with USEtox, health impacts on installers and occupants were able to be assessed, strengthening the case for suppliers to shift to water-based paints. Data interpretation using USEtox can feed into procurement specifications and help make a financial case for developing and using SPP criteria.

Source: *USEtox training in Sri Lanka*

47 United Nations Environment Programme (UNEP). (1992) Rio Declaration on Environment and Development

From the information gathered above, a **procurement prioritization matrix** can be created that considers the extent of the chemical risk against procurement spend and other factors, such as strategic priorities and internal capacity.

While there is no standardized procurement prioritization matrix, an example of a procurement matrix is shown in Table 4.

Table 4 Example procurement matrix

Assessment	Scoring
What is the share of procurement spend assigned to this product category?	1. Low 2. Medium 3. High
Are chemicals of concern from RSLs present in this product type?	1. No 2. Yes, in restricted amounts or unknown 3. Yes, with no regulation in place
What is the extent of the exposure risk?	1. Low – exposure may only occur at few life cycle stages and controls are in place 2. Medium – more than one exposure route, controls are not fully in place 3. High – multiple exposure pathways and limited controls in place
How developed are markets for alternatives or products using safer substitutes?	1. Alternatives and substitutes are not yet at market 2. Alternatives and substitutes are at market but not yet cost-competitive 3. Alternatives and substitutes are established
Is there an opportunity to influence the market towards more sustainable products?	1. Low opportunity 2. Medium opportunity 3. High opportunity
Does SPP provide economic opportunities in this product market?	1. Low value 2. Medium value 3. High value
Does SPP in this product market provide social benefits?	1. Low benefit 2. Medium benefit 3. High benefit

Step 3: Determine proportionate sustainability specifications

After completing the procurement matrix and identifying priority areas for action, information on safer and more sustainable alternatives should be gathered, evaluated and specifications can be developed accordingly. The type of procurement criteria relating to CoCs used will depend on the organizational goals and the requirements for products and/or services (Step 1). These should relate, and be proportionate, to the subject matter of the tender.

If no sustainability criteria are in place within existing procurement specifications, development of sustainability criteria that include the management of CoCs can be informed by criteria used elsewhere, however, it should be noted that these may not be directly replicable.

Criteria development may also require a high-level assessment of the split of product types and technologies on the market to determine which are the more sustainable options. For example, in the 'sustainability criteria of lumber for public tendering' produced through the project Strengthening Sustainable Public Procurement in the OECS[7], criteria addressing human health and the environment specifies newer wood preservatives, citing alkaline copper quaternary (ACQ) as a preferred type and requiring suppliers to provide a producer's declaration of chemicals used.

Requirements are the specifications that are placed on the offer and are either design- or performance-based. Addressing CoCs is likely to include a combination of design and performance specifications. Examples are provided in Part C (Toolbox). Performance specifications may be addressed through functional questions which describe the need, desired outcome or intended use. Developing specifications can also lead to a product-level assessment that may include reviewing safety and product data sheets, gathering more information from suppliers, and determining sustainability benchmarks from standards and ecolabel schemes.

An important aspect of developing sustainability specifications is ensuring **full stakeholder involvement** in the process, as is strongly recommended for the objective and target setting aspect of procurement. Interviews from the Turku University of Applied Sciences as part of the NonHazCity project in 2017 found that a lack of information and expertise were a main barrier to addressing chemicals of concern in public procurement, and identified all stakeholders, from policymakers to end users, who should be targeted with information and key messaging[48].

48 NonHazCity Project, (2018). Guide for Chemical Smart Public Procurement

Supplementary actions that can strengthen the effectiveness of procurement specifications are as follows:

- **Involving internal and external stakeholders in specification development.** Internal engagement can feed into the specification to ensure it provides maximum benefits. For example, setting a specification for insulation that considers CoC provision should involve procurers working on retrofit, maintenance, demolition, or deconstruction services, to ensure any chemical risks can also be mitigated at this stage of the building life cycle.
- **Raising awareness, knowledge, and capacity building for all the stakeholders within the value chain.** Training, capacity-building, and awareness raising activities aimed at architects, procurers, suppliers, and operatives involved at the manufacturing, construction, and end-of-life phases can ensure that stakeholders across the full life cycle of the procurement process are informed and educated.
- **Developing partnerships with other public authorities.** Public authorities may be able to work alongside other organizations that have similar aims in building material procurement. Partnerships in this area can be beneficial, including potential cost reductions from scale, and sharing tasks such as research, market analysis, supplier engagement, compliance, and performance monitoring.
- **Developing public-private alliances.** These can bring together procurers and public authorities with construction companies, material producers and architects. An example of this is the CAMACOL (Colombian Construction Chamber), a public-private association that supports regulation, chemical registration and compliance with sustainability targets.
- **Establishing an official registration system for material producers.** This enables more coordinated data collection throughout the value chain, reducing administrative burdens. Platforms should comprehensively and consistently capture data on materials and chemicals produced, including safety information.

Step 4: Determine proportionate sustainability specifications

Verifying the performance of procured products or services is critical in the evaluation of any tender, and the evaluation methodology must reflect this. It is imperative to ensure transparency and consistency when spending public funds, but also to demonstrate that procurement is delivering continual improvement and achieving sustainability objectives, both at the public authority level, as well as feeding into higher level sustainability targets.

Robust verification processes should be in place to ensure all aspects of products and services comply with minimum legislation such as MEAs and national legislation (as explored in Section C1), as well as validate other aspects of the criteria that are aiming at a higher level of sustainability performance. In some jurisdictions, such as the EU, the ability to verify information is a legal requirement before an environmental criterion can be included in the tender evaluation methodology.

A documented methodology for supplier verification should be in place. This may require suppliers to submit to periodic checks and requests for information, or verify they have up-to-date certifications and ecolabels, or have not changed a product formulation and failed to inform the procurer. Some standards are in place to support this, such as the Eco Platform.

Step 5: Implement controls and monitoring in contracts

Addressing CoCs, and wider sustainability aspects does not end at the point of contract award.

Contracting arrangements may have a 'dynamic' aspect to them – for example as well as achieving criteria for product performance, selected suppliers may also be required to demonstrate ongoing procedures and controls, and targets and progress achieved for phasing out certain CoCs or specifying alternatives. Tenders can also include clauses to reward future performance improvement.

In practice for building products and materials, this could include:

- Phasing out a chemical of concern, such as certain PFAS in waterproofing chemicals, with safer alternatives used according to a schedule, as part of a future performance clause.
- Achieving a lower level of VOC content in a paint, as part of an incentive-based contract that specifies a longer-term arrangement if performance is exceeded.
- Incorporating employee health and safety certifications and reporting against metrics as part of criteria for inclusion in a framework.

Setting key performance indicators (KPIs) is recommended to link performance improvement to the overarching policy and impact reduction goals. As well as monitoring improved product performance and spend on products meeting SPP criteria, other indicators for health, social value and environmental performance should be considered.

For example, the level of absenteeism due to illness is a useful metric for procurement of materials in an office refurbishment – this could be measured for occupants, or operatives installing the materials. This type of health-based metric, alongside the financial benefits of greater productivity, can provide a compelling case for a wider use of SPP criteria.

The future impact of SPP can also be estimated and reported – the Lead Exposure Elimination Project's assessment[49] of its lead paint elimination programme in Malawi estimated that by 2041, the programme would result in exposing 215,000 fewer children to lead and avoiding $180 million in lost earnings. Publicizing success stories can also further incentivize the market to meet SPP criteria.

Box 4 Case studies: developing procurement strategies, policies and action plans

City of Cape Town's Green Procurement Action Plan identifies seven key objectives, and 19 outcomes, drawing on aspects of the 5-step process.

- Health aspects are included in the Preventing, Minimising, and Mitigating Impacts section, allowing for the consideration of CoC in specifications.
- Priority product and service groups for criteria development are identified, laying out the relevant procurement codes, which include chemicals, paints and solvents, plumbing, civil engineering, building and hardware.
- Alignment is made with other policies, such as the city's Environmental Strategy.
- A focus on large projects is included, providing an opportunity to influence the market.
- Compliance monitoring of goods and services is incorporated.
- Monitoring the implementation of the plan, updating where necessary, and progressively setting targets is included.

The City of Portland updated its Sustainable Procurement Policy in 2020. This includes:

- Priorities for SPP, of which reducing exposures to SVHC is the second highest priority.
- An assessment of baseline and emerging best practices for sustainability, that go further than standard practices.
- An approach for harmful chemicals reduction.
- Establishment of SPP metrics and reporting, policy update and continuous maintenance.

49 Lead Exposure Elimination Project. How Cost-Effective Is LEEP's Malawi Program?

4.

Key principles of sustainable building material procurement

4.1
Due diligence

Due diligence is a fundamental aspect of procurement of goods, services and works. The concept of due diligence to "identify, prevent, mitigate and account for" adverse corporate impacts on human rights and the environment was introduced by the UN Guiding Principles on Business and Human Rights[50].

Due diligence is widely adopted in national regulations, for instance through mandatory legal compliance and reporting, and in the terminology of standards and ecolabels. It is also evident in good and best practice such as the adoption of voluntary initiatives, guidelines and KPIs, typically by sector.

4.2
ISO 20400 principles

ISO 20400 is an international standard for sustainable procurement that can be applied to SPP for building materials in all regions. The core principles of ISO 20400 are[51]:

- **Accountability** - for an organization's own impacts on society, the economy and the environment, including for impacts within the organization's supply chains, with a life cycle perspective on goods or services.
- **Transparency** - in decisions and activities that impact the environment, society and the economy, including procurement and encouraging suppliers to be transparent. Transparency is the basis for stakeholder dialogue and collaboration.
- **Integration** - ensuring sustainability is into all existing procurement practices to maximize sustainable outcomes.
- **Ethical behaviour** - behaving ethically and promoting ethical behaviour throughout supply chains.
- **Respect for the rule of law and international norms of behaviour** - striving to be aware of any violations throughout supply chains. Organizations should actively encourage their suppliers to abide by these rules and assess and address compliance as situations require.
- **Respect for human rights** - respecting internationally recognized human rights.
- **Respect for stakeholders** - respecting, considering, and responding to the interests of stakeholders impacted by procurement activities.
- **Focus on needs** - reviewing demand, buying only what is needed and seeking more sustainable alternatives.

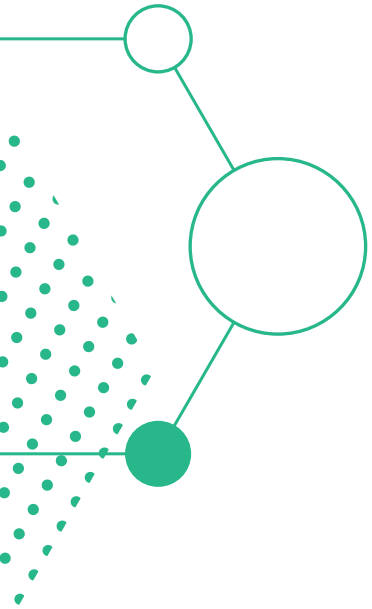
50 UN Office of the High Commissioner for Human Rights. Guiding Principles on Business and Human Rights: Implementing the 'Protect, Respect and Remedy' Framework, HR/PUB/11/04, 2011.
51 What is sustainable procurement?

- **Fair opportunity -** avoiding bias and prejudice in all procurement decision-making. All suppliers, including local suppliers and small and medium-sized organizations (SMEs) should have a full and fair opportunity to compete.
- **Analysis of all costs -** considering the whole life cycle cost, value for money, and the costs and benefits for society, the environment and the economy resulting from procurement activities.
- **Innovative solutions -** seeking solutions to address sustainability objectives and encouraging innovative procurement practices to promote more sustainable outcomes throughout the supply chain.
- **Continual improvement -** an organization should work towards continually improving its sustainability practices and outcomes and encouraging organizations in its supply chains to do the same.

Key aspects of implementing the principles include:

- **Transparent commitments in policy and strategies -** sustainability needs to be part of the shared organizational vision, strategy, and implementation plans. This includes setting relevant goals, targets, and determining material impacts.
- **Data management –** ensure robust processes and workable KPIs, metrics, monitoring and reporting systems are in place with relevant accountability throughout the organization.
- **Engagement –** requires senior management buy-in and engagement with internal and external stakeholders to identify material impacts, key risks, and ownership. This includes relevant training and capacity building for stakeholders across the full procurement cycle.

4.3
Supplier engagement and information flow



Circular supply chains, or supply chain stewardship, is where used products or their parts are returned or processed so they can be reused, repaired, refurbished, resold, or recycled. A circular value chain focuses on optimising the life cycle of a product, addressing impacts at all life cycle stages, and reducing waste. Another key principle is where buildings are designed for adaptive reuse, where a Building as Material Bank (BAMB) approach[52] is integrated into the design activity.

Developing circular supply chains is also heavily dependent on the composition of products, including chemical ingredients, and ensuring these do not inhibit closed loop activities from occurring.

52 Buildings as Material Banks project.

Box 5

UNEP's Eco-innovation Manual

Eco-innovation is a process developed by UNEP to embed sustainability in the business strategies of SMEs. It has strong relevance to SPP, as it helps SMEs access this market by improving their goods and services to meet criteria, while also identifying opportunities to increase productivity and profitability, attract new investment, and stay ahead of regulations and standards.

A key pillar of the Eco-innovation process is to assess sustainability hotspots - using a full value chain approach - and how these may be a threat or opportunity to the business, alongside consideration of the business' strengths and weaknesses. This informs the development of new strategies and sustainable business models, with circularity and chemicals management being key aspects to consider within this.

Procurers can encourage companies in their supply chain to implement the Eco-innovation process. A supplement on Building Materials is available, which applies the Eco-innovation methodology for this sector[53].

Information flows from the production and procurement processes are critical to fully recognising the potential impacts across the use and end-of-life phases. Supply chains in construction are highly fragmented and complex, and are often spread across countries and regions with different chemicals management legislation and regulation, and procurement approaches. As such, the final product can often be of different composition than originally specified when the supplier of a component changes. Additionally, where RSLs are updated, without a dynamic means for flow of information, chemical information provided may point to previous versions of the RSL and not capture newer chemical evaluations.

Information flows therefore need to be actively managed, which may include developing a chemicals management plan, communications strategy and procedures, or effective IT systems to capture data. Information sharing should take place throughout the whole procurement cycle and not only the tendering stages (see Figure 3).

Provision of chemicals information at the end-of-life is particularly important to improve circularity, as without up-to-date information there is no way to accurately determine a product's recyclability. Chemicals information must also be adaptable to the functionality of waste streams to improve circularity. The EU has produced a feasibility study assessing methods to support the flow of information of CoC along the value chain[54].

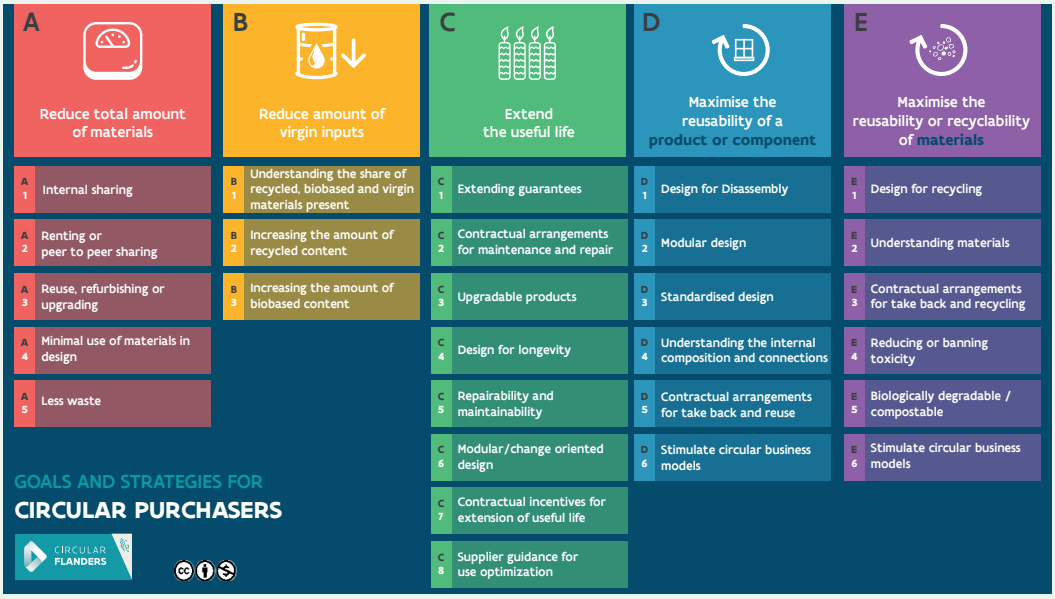
Managing chemicals information forms part of wider circularity strategies for building

53 Eco-innovation Manual – Resources. United Nations Environment Programme.

54 Information flows on substances of concern in products from supply chains to waste operators – European Union, 2020.

products and construction (Figure 6). This contributes to material reduction strategies (columns A & B), reducing or banning toxic chemicals (column E4), and enabling reuse and recycling of materials, products and components (columns D & E).

Figure 6 Circular principles for building materials procurement



Source: Circular Flanders

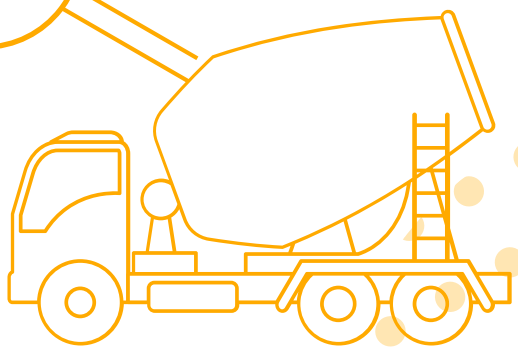
4.4
Building sustainability into organizational culture, training and development

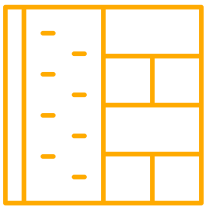
It is recommended to build wider knowledge within public authorities on SPP, to improve practices and increase support for programmes.

Top management buy-in is essential. A study of effective SPP approaches to reduce carbon emissions[55] suggested that appointing and empowering individuals as internal change agents and SPP champions also improved effectiveness, alongside training courses and knowledge sharing events. Initiatives have included:

- In India, as part of the Final Strategic Plan on Construction, a Sustainable Procurement of Works Knowledge Platform for construction has been developed, alongside regional workshops to understand the needs of procurers.
- Online courses available include the EU's GPP Training Toolkit.
- In Ghana, the national Public Procurement Authority has run training programmes for procurement practitioners on operationalizing SPP.

55 Lingegård et al. Sustainable Public Procurement in Large Infrastructure Projects—Policy Implementation for Carbon Emission Reductions





C.

Toolbox for Procurers

Sustainable Procurement of Building Materials:
A Progressive Approach to Chemicals of Concern

C. TOOLBOX FOR PROCURERS

C. TOOLBOX FOR PROCURERS

How to navigate the chapter

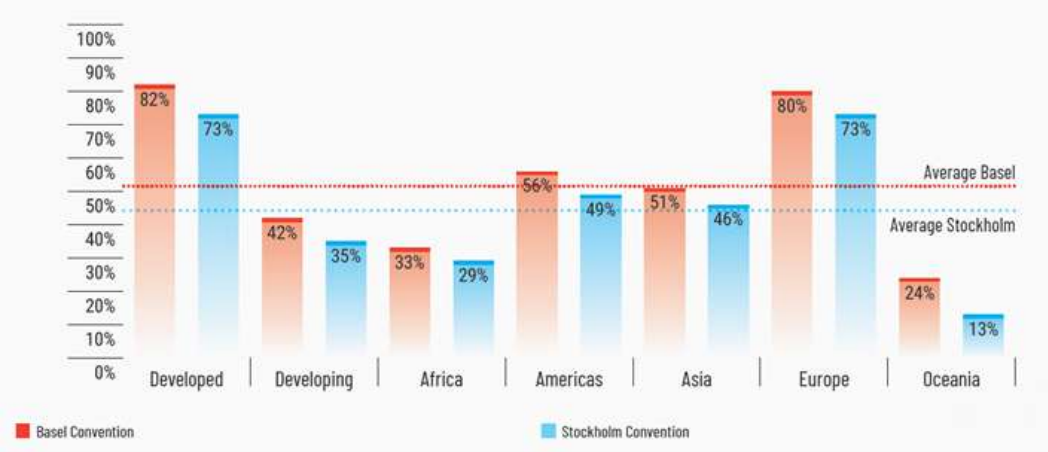
This section includes guidance and practical tools for procurers to use at three levels:

Level 1. Procurers in countries with limited or no support for meeting minimum chemical regulations or conducting chemicals management may encounter some of the following issues:

- Public authorities may not have systems in place to track and report compliance against MEAs (see Figure 7).
- Support may be needed to engage suppliers who cannot provide any information on chemicals contained in their building materials and products.
- Procurers may not have standards in place in their country or building codes that specify chemical requirements.

FIgure 7 Average national reporting rate 2001-2016, by category of countries (developed/developing) and by regions: Basel and Stockholm Conventions.

Source: *Global Chemicals Outlook (II)*



Level 2. For procurers aiming to achieve improved chemicals management and impact reduction. Situations encountered may include:

- Procurers wish to raise the ambition of sustainability criteria but require support to implement this practically, verify suppliers' performance declarations and ensure fair competition in tenders.

Level 3. To achieve best practice in chemicals management, and contribute to market transformation for safer building materials, procurers at this level may seek to:

- Improve data flow across the full supply chain – this may involve developing their own data systems and using these with suppliers, but also taking advantages of other data tools in the marketplace – e.g., product databases, material passports, Health Product Declarations and Material Health Statements. Ensuring supplier confidentiality may be needed, but tools are available to apply this digitally.

- Specify exemplar, safer building products. However, these may not yet be cost competitive with conventional products on the market, or there may be issues with market acceptance of new technologies. In some cases, quality standards may not yet be fully developed.

1. Level 1

Guidelines for general practice

1.1 Compliance with national legislation and multilateral agreements

Background

The regulatory landscape around chemicals of concern, impacting the procurement of building products, is presented in Section A5. This section supports a basic and consistent level of compliance with these regulations.

1.2 Procurement procedures

Construction projects may be delivered through a variety of procurement methods and contract types. Different contract types will affect the levels in transparency of building material choices and their environmental impacts, which dictates approaches to chemicals management, reduction strategies, and criteria development. Different stakeholders will also be responsible for decision making, depending on the procurement method or contract, which can affect how chemicals management is integrated.

Where a **project management team** (which may be in-house or external, and potentially includes architects, quantity surveyors, and engineers) represents the client's requirements, they will often both plan the project and identify the procurement procedure. The project management team should therefore be responsible for addressing the impact of chemicals of concern as part of project requirements, expected quality and risks.

Similarly, where the **commissioning client** chooses to use a **management contractor approach** or **design and build approach**, requirements addressing chemicals of concern need to be communicated explicitly to clarify objectives around material choices, chemical use and data management across the whole project - from design through to construction, and commissioning into operation. In this instance, there may be issues related to decision making on CoC requirements where an array of subcontractors are involved, who may further commission material choices through other subcontractors. Contract management should ensure that the contractor's proposal and delivery reflects the requirements originally set for managing chemicals of concern, and that there is effective control over the process.

Addressing chemicals at the pre-tender stage of the procurement cycle is crucial, as these requirements will inform the procurement approach the contractor's logistics professional or procurement manager adopts when purchasing materials.

Box 6 Use of a compliance matrix

A compliance matrix can help identify, track, and monitor fulfilment of all national compliance regulations and all the technical requirements, including management of CoCs. It helps project and contract managers as well as procurers to verify they have completely satisfied complex scopes of work, typically found in large-scale construction and building maintenance projects. The matrix may also assist in identifying project risks.

Having a line-by-line body of evidence that demonstrates how a contract or work scope has been fulfilled can also reduce or avoid disputes during contract management. It will also help in auditing projects, e.g., through ISO19011 auditing principles[56] that can be applied to contract management to ensure compliance.

A simple structure (for example spreadsheet format) can cover requirement, compliance status, risk level, justification, and mitigating actions required. Evidence from the original bid (tender) can be used to populate the matrix initially and highlight any risks in potential non-compliance. The compliance matrix may also be tied into broader project risk management as required.

Example of compliance matrix

Project Title	TRS Treadmill Motor		
Customer / Stakeholder	Prime Fitness	Total # of Requirements	15 (100%)
Reference Document	Statement of Work #592	Total # (%) Compliant	6 (40%)
Project Kickoff Date	January 19th	Total # (%) Intend to Comply	5 (33%)
Project Completion Date	September 1st	Total # (%) Partial Compliant	2 (13%)
Date of Last Evaluation	March 9th.	Total # (%) Non-Compliant	2 (13%)

Reference Number	Requirement	Compliance Status	Risk Level	Justification	Action
SOW-01	Supplier shall provide a weekly progress report	Compliant	Low	Reference Weekly report log	None
SOW-02	Supplier shall deliver product within 8 month of contract	Compliant	Low	Current schedule shows delivery in 6 months.	None
SOW-03	Product shall be shipped in fully recyclable materials	Intend to Comply	Medium	TBD	Review standad packaging processes
SOW-04	Product must be guaranteed for a 2 year warranty	Non-Compliant	High	Standard warranty is 1-year	Negotiate with customer
SOW-05	Supplier shall establish a redunant supply chain for all parts	Compliant	Low	See Standard procedure document SP96	None
SOW-06	Supplier must provide a user guide and parts list for product	Compliant	Low	Provided in Program Memo 52	None
SOW-07	Supplier shall provide a blueprint to illustrate specific bolt patterns	Partial Compliant	Medium	Must add 4th bolt hole per TS-11, and will create blueprint	
SOW-08	Supplier shall permit a factory inspection if requested by customer	Intend to Comply	Low	TBD	Plan a visit for customer.
SOW-09	Supplier shall provide biographies and CV of project team members	Intend to Comply	Low	TBD	Understand from customer what bio must contain.
SOW-10	Supplier shall provide 5 year pricing breakdown	Compliant	Low	See Program Memo 42 for pricing breakdown	None
SOW-11	All supply chain changes shall be identified 60 days prior to implementation.	Non-Compliant	High	To be removed	Negotiate with customer to remove. Cannot guarantee this.
SOW-12	Supplier shall include 10 intial motors free of charge for test purposes	Intend to Comply	Medium	TBD	Need to evaluate impact on business case.
SOW-13	Supplier shall bear cost of any rejected or defective motors	Partial Compliant	Medium	Accept returns for defective parts	Send contract letter saying part must be verified to be defective through diagnostic tests
SOW-14	Product shall be delivered in lot quantities of no less than 20 units	Intend to Comply	Low	Will reference shipment lot quantity plan	Issue shipment lot quantity plan
SOW-15	Supplier shall notify customer of any prorotype test failures with 48 hours	Compliant	Low	See Standard procedure document SP32	None

 www.ManagersResourceHandbook.com v1

Source: MRH

56 ISO 19011:2018(en) Guidelines for auditing management systems

Tender
Specification

1.3
Supplier selection

Sustainability is considered a key factor of supply chain management and, as a result, Sustainable Supplier Selection (SSS) is of strategic importance, including in construction[57]. One of the challenges in selecting a sustainable supplier is establishing appropriate economic, environmental, and social criteria.

From research undertaken of procurement practises for this guidance, chemicals of concern are rarely a deciding factor in supplier selection but have been seen as a sub-criterion typically under an 'Environmental Competencies' criterion. This criterion requires suppliers to use environmentally friendly materials, apply clean technologies, and reduce pollution impacts.

A study surveying 101 construction professionals and experts found that ecological awareness and technically acceptable materials were considered to be of similar importance with a list of ten selection criteria[58]. However, CoC were not explicitly mentioned in the ten most common ecological criteria or sub-criteria researched. Therefore, there is scope for CoC to be further considered but, at present, there is little evidence that criteria is used explicitly.

However, evidencing chemicals management also has the potential to influence outcomes in other supplier selection criteria including, but not limited to, sustainable management, sustainable design and purchasing, pollution control and sustainable innovation.

1.4
Standard Selection Questionnaires

Depending on the procurement approach, supplier selection can be part of a **single procurement document** or the **first stage in a two-stage selection process** for a specific works project or a framework contract. Depending on the buyer, Standard Selection Questionnaires (SSQ) - also called selection questionnaires (SQs) or Pre-qualification Questionnaires (PQQs) - may be used in the initial stages of construction procurement.

57 Hoseini, S.A.; Fallahpour, A.; Wong, K.Y.; Mahdiyar, A.; Saberi, M.; Durdyev, S. Sustainable Supplier Selection in Construction Industry through Hybrid Fuzzy-Based Approaches. Sustainability 2021, 13, 1413.

58 A.E. Cengiz, O. Aytekin, I. Ozdemir, H. Kusan, A. Cabuk (2017). A Multi-criteria Decision Model for Construction Material Supplier Selection, Procedia Engineering, Volume 196.

These will typically include a review of the bidder's competencies in delivering the contract, which may also include assessment of their sustainability policies and how they comply with specific environmental questions. Consideration of chemicals management plans may therefore form part of this assessment, e.g., through selected questions requiring a method statement[59].

Selection criteria set at this stage can identify minimum standards, capacities, and experience a potential contractor must have to be considered in a procurement. Criteria can also evaluate a tenderer's ability and experience delivering contracts, for example without using CoCs, on similar projects.

Procurers should carefully ensure that criteria are proportionate to the size and subject matter of the tender and that they can receive adequate responses to the tender call. Ideally, they should be tested during pre-tender market engagement but, if procurers are unsure whether the market can meet selection criteria, they can consider using non-mandatory selection criteria.

Understanding suppliers' procedures to verify their claims against criteria is also a key consideration to capture in SSQs or PQQs. This is relevant for compliance at all levels, from the minimum standards explored in Level 1 to best practice at Level 3.

Ultimately, the contract is a partnership on which performance improvement can be agreed, implemented, and monitored. An ongoing working relationship with suppliers is particularly relevant where the procurer is seeking to encourage shifts within the wider sustainable construction sector as well as addressing the performance of individual suppliers. Box 7 sets out some example questions to consider as part of supplier selection.

59 Method statements are questions or required statements requested in the tender documentation as part of the response. They are usually open questions that require a freeform response typically limited to a certain number of words.

Box 7 Examples of questions for chemicals of concern for consideration in supplier selection method statements[60]

1. **How does your organization address chemicals of concern across the manufacturing supply chain, product use and disposal of the products? For example, a written Supplier Code of Conduct/Supplier policy.**

This evaluates whether, and how, a company is explicitly addressing CoCs across the full life cycle of the products they produce or supply as part of their corporate social responsibility.

2. **Has your organization developed a process to identify risks in your supply chain associated with Chemicals of Concern?**

This evaluates to what degree companies are actively seeking to identify risks in their supply chain associated with CoCs.

3. **How is your company evaluating your suppliers' performance against your Supplier Code of Conduct or Supplier Policy on CoC impacts?**

Evaluates how companies assess whether suppliers are implementing Code of Conduct or Supplier Policies for CoCs.

4. **How does performance of suppliers, regarding CoCs, integrate into the direct spend sourcing decisions of your organization?**

This will help purchasers to understand the actions companies are taking to integrate due diligence processes around CoCs into decisions to source from a particular supplier.

5. **How is your company using the outcomes of the assessment process to ensure suppliers are implementing corrective actions in a timely manner?**

This assesses how companies use supplier risk screening and assessment outcomes to engage suppliers when corrective action is needed to address CoC impacts.

6. **How is your company engaging with suppliers to ensure continuous improvement in supplier performance against your Code of Conduct or Supplier Policy?**

This assesses how companies engage with suppliers to support continuous improvement to meet, or exceed, the Company Code of Conduct or Supplier Policy.

60 Adapted from the GEC Labor and Human Right's Purchaser Guide, 2018.

Box 7 *(cont.d)*

Examples of questions for chemicals of concern for consideration in supplier selection method statements

7. **How is your company engaging with suppliers to build their capacity for addressing CoC impacts?**

This evaluates how companies engage with suppliers to build capacity to continually comply with the Supplier Policies and/or Codes of Conduct and create a reduction in CoC across the supply chain.

Box 8 Collaboration through suppliers' engagement and competitive dialogue is key to success

- Suppliers can propose more innovative solutions when tenders are based on performance or functional specifications rather than prescriptive specifications.
- Procurers should engage a wide range of stakeholders, including public and private buyers, suppliers, manufacturers, distributors, retailers, as well as consumers, which will also help to build buy-in and foster new habits and processes. In addition, reaching out to private sector suppliers early not only helps to stimulate innovation, but also encourages them to influence the market through their own procurement practices as part of a larger cooperative effort to transform supply chains and consumption patterns at the global scale.

Source: adapted from Building Circularity into our Economies through Sustainable Procurement. 2018, UN Environment

Tender Specification

1.5 Social value

International Labour Organization conventions

The ILO Governing Body has identified 11 fundamental conventions describing principles and rights at work, including: freedom of association and the effective recognition of the right to collective bargaining; the elimination of all forms of forced or compulsory labour; the effective abolition of child labour; the elimination of discrimination in respect of employment and occupation; and occupational safety and health[61].

Where national standards follow these core ILO conventions, and any other relevant ILO conventions and recommendations, compliance against these should be verified during supplier selection.

61 Conventions and Recommendations (ilo.org).

Modern slavery statement

Some countries, for example the United Kingdom and Australia, have already introduced Modern Slavery Acts while others have pledged to eradicate modern slavery. Asking potential suppliers who meet certain eligibility criteria (e.g., size, turnover, etc.[62]) to publish and annually maintain a modern slavery statement, setting out the steps they take to prevent modern slavery in their business and supply chains, is recommended to ensure compliance with existing legislation. Where legislation or commitments don't yet exist, the requirement for a modern slavery statement should still be considered as good practice.

Tender
Specification

1.6
Criteria and verification for general practice

Criteria

Criteria within tenders for building products should **explicitly reflect the harmonised procurement policies in national legislation** (where in place). For example, according to Article 33 of the EU chemicals legislation REACH, each supplier is required to inform the receiver if the product contains SVHC in the REACH Candidate list above a certain limit. Criteria should also explicitly reference relevant multilateral agreements, as well as defined organizational objectives for chemical management.

Setting minimum requirements for CoCs is an important first step at Level 1. For newbuild or major refurbishment projects, criteria are typically developed within a multi-criteria framework for the project.

However, research[63] suggests that CoC criteria are currently a low priority for procurers – from assessed sources of environmental criteria, of 23 main sub-criteria for sustainable materials in building projects, only five were related to chemicals of concern (covering indoor air quality and substance control).

In terms of importance, low or non-toxicity criteria ranked fourth highest out of the 23 criteria and low VOC emission in assembly ranked sixth. Although this appears to be a reasonable recognition of the importance of CoCs and their impacts, evidence does not support a widespread use of specific CoC criteria.

62 See for example: Publish an annual modern slavery statement - GOV.UK.

63 S.M. Khoshnava et al. 2018. Rank of green building material criteria based on the three pillars of sustainability using the hybrid multi criteria decision making method. Journal of Cleaner Production 173.

Further analysis by the authors of 24 different building product criteria sources has identified 145 different criteria relating to chemicals of concern. Over 60% of these only cover minimum requirements. Criteria addressing impacts in production (e.g., solvents, curing, discharge, emissions, etc.) were referenced less frequently (6% of all criteria identified) but should be considered equally important to the other criteria relating to the use phase of building products.

Criteria relating to CoCs can also be found in various regional criteria sets such as the EU Green Public Procurement (GPP) criteria, and in product specifications such as the GreenNY Specification for Floor Coverings.

Tools that provide 'model' clauses on a voluntary basis, along with standard methods for verification (e.g., reference to relevant international conformance standards), include the Government of the Netherlands MVI tool, Swedish criteria wizard and the Flanders criteria tool.

Tender
Evaluation

1.7 Verification

Verification is principally obtained through one or more of the following routes:

- Self-declaration by bidders and contractors (e.g., for Type 1 or Type 2 Ecolabels). This was the most observed form in the analyzed sources. This can range from the production of SDS[64] and Materials Declaration Data Sheets (MDDS), to signed declarations of conformity. Obtaining signed affidavits or declarations by senior management within the bidding organization is one way of further strengthening the validity of self-declared conformance.
- Evidence of conformity with relevant industry, national and international standards through submitting data, for example test data or compliance certificates.
- Third party auditing and /or certification (usually Type 1 ecolabels that include CoC criteria), provide lower risk but are also likely to incur additional costs (see Section C2 – Level 2 / Tools).
- Direct auditing by the contracting body either at pre-tender stage or ongoing as part of contract management.

64 See for example: Health & Safety Agency, Ireland (2021) Information Safety Data Sheets.

Typically, supplier declarations are the cheapest, easiest option but are potentially the least robust. Where they exist, standards (See Section C2 – Level 2 / Tools) represent a robust alternative. A balanced and proportionate approach to verification should be agreed at the tender specification development stage and communicated clearly and simply within the tender documentation.

Tender
Specification

1.8
Model wording for chemicals of concern

Where specific criteria relating to CoCs in construction products do not already exist, for example in Type 1 ecolabels and standards, the following model wording may be adapted, where relevant. The model wording provides two general clauses addressing environmental and human impacts of CoCs in construction products.

Table 5 Model wording

Model Wording: Compliance with authoritative lists

The model wording has annotations in brackets, bold and italics to highlight where the wording may need either review and/or adaption, depending on the particular project circumstances, as follows:

- **(where applicable) - text that should be deleted if not applicable; and,**
- **[text that may need amending to suit the project].**

External references (e.g. to regulations and international agreements) should be made available or linked as appropriate.

Procurement advertising

Chemicals of concern should form a core sustainability requirement in the procurement of all construction products and hence, a key element of the subject matter of the contract. Highlighting this through the wording of the contract title, for example, 'Sustainable Construction', will alert suppliers to look at the contract performance requirements during the procurement advertisement and therefore take an early view on whether they can satisfy the requirements. Wording may include:

'The Contracting Authority has included obligations within the specification and contract conditions relating to social and environmental outcomes with respect to chemicals of concern, which are relevant to [the product and/or service to be delivered].'

Table 5 *(cont.d)*
Model wording

Procurement advertising *(cont.d)*	It is also good practice to notify suppliers early in the process of conditions of the contract and, as such, obligations should also be included in the procurement advertising (e.g., Contract Notice) as well as in the specification. For example: '*A requirement of this contract is that impacts related to chemicals of concern within the product life cycle will be mitigated to the maximum degree feasible.*'
Specification	Sustainability requirements should be incorporated into the specification and must be relevant to the product(s) or service(s) being procured. To ensure that suppliers provide the intended outcomes of the contracting authority, it may be appropriate to include the following in the tender: '*[XYZ public body] is committed to procuring sustainable products and services which facilitate the delivery of national policies, legislation, and wider priorities, including:* *[list relevant documents relating to chemicals of concern]* *[list other relevant documents]* *In the context of this specification, reducing the impact of various issues such as chemicals of concern, greenhouse gas emissions, single-use and problematic plastics are of particular importance. Further information on chemicals of concern can be found at:* *UNEP Global Chemicals Outlook II (2019)* *[……other national sources]* *Bidders are required to demonstrate in a method statement how they will deliver the relevant goods and services in a manner which mitigates life cycle environmental and social impacts relating to chemicals of concern, and in accordance with the principles of the Waste Hierarchy, with waste prevention and avoidance, reuse, and recycling as particular priorities. This should include how you would seek to ensure cost effective and practical sustainable outcomes are delivered.*'
Selection Criterion	*'Ability to submit the relevant technical documentation to demonstrate compliance with the relevant regulation.'* *'Ability to supply the relevant technical documentation required to demonstrate compliance with […Insert regulation(s)….] for all construction products prior to purchase.'*

Table 5 *(cont.d)*
Model wording

Selection Criterion *(cont.d)*	Also consider extending eligibility criterion to include relevant technical documentation for substances on relevant declarable substance lists (e.g., Substances of Very High Concern list – SVHC). Verification Evidence of documenting the process for collecting the requested information in accordance with this criterion and/or Examples of SDS, MDDS or relevant technical documentation submitted for presence of substances on relevant list(s).
Technical Criterion	*'Submission of relevant SDS, MSDS or appropriate Product Data Sheets for all chemicals and material declarations for building products prior to purchase.'* (Where relevant) Consider extending selection criterion to include relevant technical documentation for substances on national RSLs or SVHC lists. Verification Safety Data Sheet, Material Declaration Data Sheet, or Product Data Sheet, *or* Declaration that all chemicals used within products do not contain classifiable or hazardous substances that would trigger the issuing of an SDS, *or* Evidence of testing and /or compliance with recognized or referenced standards.
Award Criterion	Additional marks to be awarded for construction products without substances on the *[relevant authoritative list(s)].* **Also consider extending award criteria to include chemicals on candidate lists.** Verification Safety Data Sheet and/or Material Declaration Data Sheet, *or* Declaration that all chemicals used within products do not contain classifiable or hazardous substances that would trigger the issuing of an SDS, *or*

Table 5 *(cont.d)*
Model wording

Award Criterion *(cont.d)*	Evidence of testing and /or compliance with recognized or referenced standards.
Performance	Upon any changes or additions to **[relevant authoritative list(s)]**, the supplier must submit a renewed version of SDS or new SDS to the client for any product supplied within two years. Also consider: 1. *Perform random sample checks on technical documentation from manufacturers and suppliers of materials. If necessary, perform analytical testing.* 2. *Supplier liability for the damage caused to the recipient and downstream recipients due to the improperly communicated hazard information or in compliance with quality /legal requirements.'* Verification A formalized process to manage, maintain, and update all data received on declarable substances.

Table 6 Model wording

Model Wording: Compliance with labour and human rights	The model wording has annotations in brackets, bold and italics to highlight where the wording may need either review and/or adaption, depending on the particular project circumstances, as follows: → **(where applicable) - text that should be deleted if not applicable; and,** → **[text that may need amending to suit the project].** External references (e.g. to regulations and international agreements) should be made available or linked as appropriate.

Table 6 *(cont.d)*

Model wording	
Selection Criterion	**[Manufacturers, suppliers and /or Contractors]** shall meet or exceed the provisions of the ILO Chemical Convention 1990 (C. 170) in all areas of the subject matter related to the tender. Also consider: 1. *Broader Corporate Social Responsibility (CSR) labour rights e.g.,* → *Freedom of association and collective bargaining (C. 87 and C. 98),* → *Forced labour (C. 29 and C. 105),* → *Child labour and the worst forms of child labour (C. 138 and C. 182),* → *Discrimination (employment and occupation) (C. 111).* 2. *Compliance with relevant domestic law in the legal jurisdiction regulating:* → *Minimum wages,* → *Working hours,* → *Overtime compensation,* → *Employment contractual relationships.* **Verification** Provision of publicly available supplier requirements document(s) (e.g., manufacturer or Responsible Business Alliance Supplier Code of Conduct [B14]) outlining supplier requirements.
Performance Criterion #1	Throughout the entire contract period, the **[Manufacturer(s), supplier(s) and /or Contractor(s)]** shall apply the contract terms [relating to ILO c.170]. Also consider: *Extending to broader CSR terms, e.g., the eight core conventions of ILO regarding forced labour, child labour, discrimination, freedom of association, and the right to collective bargaining (no. 29, 87, 98, 100, 105, 111, 138, and 182).*

Table 6 *(cont.d)*

Model wording	
Performance Criterion #1 *(cont.d)*	Verification The contract shall be fulfilled in accordance with the following: → In the event of the core conventions of the ILO conflicting with national law, the supplier shall take reasonable measures to ensure compliancy with the international regulations. → The obligations concern workers when they perform work within the frame of the contract.
Performance Criterion #2	The **[Manufacturer(s), supplier(s) and /or Contractor(s)]** shall implement or participate in a program that audits suppliers and have a process in place for evaluating the risk for negative environmental and social impacts and a methodology for determining which ('at risk') **[Manufacturer(s), supplier(s) and /or Contractor(s)]** must undergo onsite audits based on agreed environmental and social criteria. 'At risk' **[Manufacturer(s), supplier(s) and /or Contractor(s)]** shall undergo onsite audits at least every three years[65]. Verification A program that audits all facilities of 'at risk' **[Manufacturer(s), supplier(s) and /or Contractor(s)]**, at a minimum, against internationally recognized standards including, but not limited to, the ILO Declaration on Fundamental Principles and Rights at Work and the UN Universal Declaration of Human Rights.

65 Adapted from NSF/ANSI Sustainability Leadership Standard e.g., NSF/ANSI 457 – 2019.

1.9 Summary of Level 1 actions

Table 7 Summary of Level 1 actions

Core actions	→ Ensure tender specifications explicitly reflect limits and requirements for phased-out chemicals in accordance with Multilateral Environmental Agreements referenced in section A5. Information on limits and phased-out substances can be taken from the relevant MEA websites and incorporated into a compliance matrix. **This could include providing evidence of corrective action if suppliers fail to comply with relevant requirements on CoCs over the lifetime of the contract**. → Ensure tenders require verification information on the presence of chemicals of concern (for example within product data sheets), where Type 1 ecolabels and relevant standards are not specified.
Supplier selection	→ Ensure suppliers are fully compliant with all legal requirements for managing chemicals of concern as part of the tender evaluation process. → Consider making ongoing compliance with relevant Multilateral Environmental Agreements a supplier selection criterion. *This could include providing evidence of corrective action if suppliers fail to comply with relevant requirements on CoCs over the lifetime of the contract*. → Consider asking supplier selection questions that require evidence of potential suppliers' approach to managing: a. chemicals of concern within their construction products, services, and supply chains. This should include evidence of their assessment and remediation process. b. the chemicals management information flow within their supply chains.
Specifications and criteria	The procurement procedure should ensure standard sustainable public procurement criteria meet or exceed the main areas identified below.

Table 7 *(cont.d)* Summary of Level 1 actions

Specifications and criteria *(cont.d)*	→ Ensure ILO compliance is included in tender criteria and includes specific reference to the ILO Chemicals Convention (C.170). The analysis of criteria highlighted that, where referenced, compliance with labour conventions typically referred to the eight core conventions which do not include the Chemicals Convention (C.170) where building products are part of the subject matter. Consider exclusion of, or corrective actions for, bidders for violation of international conventions, e.g., ILO Chemical Convention (C. 170), Vienna Convention, Basel Convention, and Stockholm Convention, alongside other exclusion criteria. → Ensure that compliance with chemicals of concern criteria is included in evaluation of bids. Criteria should aim to: a. Mitigate impacts of CoCs in production and application (e.g., solvents, curing, discharge, emissions etc.), as well as indoor air quality. b. Comply with relevant restrictions for chemicals in construction products. Such restrictions can include provisions on certain metals, certain phthalates (plasticizers) or flame retardants. c. Minimise the adverse effects that result from end-of-life of the construction product and/or structure in which it is incorporated (e.g., waste) with a strong emphasis on reduction, reuse, and recycling. This should include consideration of disposal options with the initial (purchasing) tender.

2. Level 2

Adopting good practice

Progressing to Level 2 encourages good practice beyond compliance, through active management of CoCs throughout procurement processes. As well influencing products and projects, various tools and approaches can drive wider market shifts towards safer and more sustainable products.

2.1 Supplier selection

Tender
Specification

It is important to remember that building products are more likely to be sourced through the procurement of larger, complex building, refurbishment, maintenance, and service contracts, than to be procured directly. Supplier selection - whether through construction frameworks, design and build, design, build and operate, refurbishment or facilities management service contracts - is therefore key to ensuring proactive management and reduction of chemicals of concern in building products.

Good practice should ideally start with early market engagement to communicate ambitions regarding better chemical management and determine the supplier's level of commitment to delivering this, while also considering their extended supply chains. This should be supported by accurate and timely monitoring and reporting through the selection and contract process.

2.2 Reuse of building materials and products

Pre-Tender
Develop strategy

Before purchasing new products or materials, a circular option is to consider the potential for reuse in procurement. This can be either through the purchase of recovered building components, products and materials (where applicable and suitable) or reuse of building products from within existing building stock (including the organization's own estate portfolio and other available buildings).

This product life extension creates a more optimal use of environmental and economic resources and can mitigate the environmental and health risks from demolition and disposal. Generally, it also involves a combination of specific after-use services such as environmental compliance certification to ensure CoCs are not being reintroduced. Arup has produced a useful guide on the reuse potential of various construction materials[66].

While recovery and reuse does not constitute a direct, upstream solution to the construction and demolition waste problem, the practice can indirectly contribute to reducing the amount of waste generated and embodied carbon impacts, by avoiding the

66 Arup. Evaluating re-use potential: Material profiles and vision for project workflow

use of virgin raw materials in new building products.

A further upstream option relates to reducing waste for excess building products by better procurement practice and planning, as is often seen with products such as gypsum board and concrete. Effective use of building information modelling (BIM) can assist with more accurate material specification and ordering. This can help address the historically high wastage rates often still found in construction. Where wastage is unavoidable, consider reuse rather than recycling. These actions will also contribute to the UN Sustainable Development Goal 12 for Sustainable Consumption & Production (SDG12).

Pre-Tender
Planning

2.3 Tools

Role of ecolabels and standards

Certification, standards, and ecolabels can play a significant role in improving the management of CoCs within building products. They do this in two main ways:

1. By providing a well-established process to help buyers make decisions without being experts in the evolving detail of the industry.
2. By providing consistency within chemicals management, through organizations asking the market for the same thing. This consistency leverages purchasing power and creates a stronger demand-pull for specific positive changes. Manufacturers and supply chains are also able to respond more consistently and transparently, therefore reducing risk to both themselves and their customers through, for example, confusing information and additional costs.

The International Standards Organization (ISO) has developed standards for three types of environmental product claims, termed ISO Type I, II and III:

- Type I (ISO 14024) claims are based on criteria set by a third party and are multi-issue, being based on the product's life cycle impacts. The awarding body may be either a governmental organization or a private non-commercial entity. Examples include the EU Eco-label, Nordic Swan, and German Blue Angel.
- Type II (ISO 14021) claims are based on self-declarations by manufacturers or retailers. There are numerous examples of such claims (e.g., 'contains no mercury').
- Type III (ISO/TR 14025) claims consist of quantified product information based on life cycle impacts.

In terms of verification, Type I ecolabels (third party certified) are the most robust of the three levels. There are several benefits from using Type I ecolabels[67] as part of the procurement process:

- Third-party, independently verified audits of manufacturing sites and products.
- Peer-reviewed and scientifically based criteria comprehensive across social and environmental matters.
- Continuous revision of criteria to stay abreast of changes.
- Procurers can efficiently combine their demand for change.
- Brands can combine their leverage for change in complex component supply chains.

CoCs form part of the subject matter of many multi-criteria ecolabel and certification schemes. A non-exhaustive list is presented in Box 9. However, the treatment of CoCs varies between different ecolabels and certification schemes. It is therefore important to ensure that any ecolabels specified – or referred to by suppliers in their tender responses – meet the requirements of national, local, and organizational agreements and policies and achieve the good practice outcomes required.

Adopting ecolabels or certification schemes can form part of performance improvement and the transition pathway for managing CoCs. Building rating schemes like BREEAM[68], LEED[69] and CASBEE[70] are flexible, in that they enable different levels of achievement. For example, BREEAM has five levels from Pass through to Outstanding. Credits relating to CoCs focus on impacts regarding VOC emissions in relation to the product and post-construction, ventilation, migration of certain metals, and the absence of prohibited wood preservatives.

LEED has four levels from Certified through to Platinum. It also focuses on VOC emissions evaluation, VOC content evaluation, and ventilation (e.g., ASHRAE 62.1-2010 standards in achieving credits). CASBEE has a specific section (3.2 use of materials without harmful substances) that also addresses emissions and ventilation and includes VOCs, organochlorines, agrochemicals, and metallic compounds (along with CFCs and HCFCs) as examples of Class I and Class II designated substances.

67 Transform Together (2019). Eco-labels: how to demand comprehensive change with a single procurement choice
68 BREEAM - UK Building Research Establishment
69 LEED - US Green Building Council
70 CASBEE

Box 9 Ecolabel Examples

There are an extensive number of Type I ecolabels (third-party certified) that address building and construction products and include life cycle impacts directly or indirectly related to the effects of chemical substances. Note that chemicals are not always addressed consistently within a given scheme or between labelling schemes - you should check each scheme for details.

Blue Angel

Blue Angel has been the ecolabel of the federal government of Germany since 1978 but also operates internationally. It provides basic criteria (linked to European limits) across a range of building products across 17 product categories including flooring, panels, finishing, coatings, paints, varnishes, and sealants.

BRE Global Certified Environmental Profile

Environmental profiles measure the impacts of a construction material, product or building system throughout its life (extraction, processing, use and maintenance and disposal) using an Environmental Profiles Methodology that assesses environmental indicators including human and eco-toxicity. The scheme is scheduled for closure in December 2023.

Cradle to Cradle Certification

A third-party sustainability label that requires achievement across multiple attributes including materials health and clean air (emissions). It includes a comprehensive RSL based on several MEA and international sources, with a separate materials health certificate covering 193 building products based on a contextual assessment of chemical hazard identification and qualitative exposure considerations during a product's final manufacture, use, and end-of-use.

ECOLOGO

A North American Type I (ISO14024) life cycle-based eco-label standard, covering eight types of building products including adhesives, panels, coatings, and sealants.

Box 9 *(cont.d)*
Ecolabel Examples

ECOproduct

A Norwegian method by the Norwegian Building Centre, developed in collaboration with several building industry organizations and contractors, to choose environmentally friendly building materials and chemicals based on information in an Environmental Product Declaration (EPD) or a safety data sheet.

EcoMark Japan

The EcoMark program serves to promote environmentally friendly lifestyles through wise product choices. It is managed by the Japanese Environment Association and covers, among other things, materials for interior and exterior work (e.g., wood, and coatings), building supplies, building equipment, paints, plastic products, and civil engineering products.

Good Environmental Choice Australia (GECA)

GECA is an ISO 14024 Type I, not-for-profit scheme that includes certification for adhesives, sealants, insulation materials, floor coverings, cement, concrete, paints, coatings, steel products, and panels.

Nordic Swan

The Nordic Swan Ecolabel sets strict environmental requirements in all relevant phases of a product's life cycle and also sets strict requirements for chemicals used in over 60 product groups. Electronic products covered include computers, audiovisual, imaging and charging devices.

Korea ecolabel

The Korea Environmental Industry & Technology Institute (KEITI) has developed a range of eco-product standards. A number relate to general categories such as adhesives, sealants, floor coverings, and finishing materials. It also has specific sustainability standards relating to less commonly addressed products including heating systems, heat recovery and ventilation.

Nordic Swan

The Nordic Swan Ecolabel sets strict environmental requirements in all relevant phases of a product's life cycle and sets strict requirements for chemicals used in over 60 product groups. Building materials are addressed in construction facades and panels, doors and windows, floor coverings, and renovation.

Box 9 *(cont.d)*
Ecolabel Examples

EcoLabel Sri Lanka

Developed through the GEF/SAICM project by the National Cleaner Production Centre of Sri Lanka, this Type 1, ISO 14024 aligned scheme includes a category on 'Construction Chemicals and Products' covering paint, wall pre-coatings, floor polish, roof waterproofing chemicals, wood and metal coatings, and tile adhesives. Chemical-related criteria cover a range of aspects, such as limits for CoC in the product and raw materials; presence of chemicals management plans and systems in manufacturing; and optional criteria for innovations such as chemical leasing and green chemistry application. Conformity verification is specified through evidence such as supplier agreements and safety data sheets.

Further information on Ecolabels can be found at the Global Ecolabelling Network (GEN).

There is a growing number of ecolabels on a national, international, and global level. From a procurement perspective, ecolabels should ideally have the following characteristics[71]:

- They only concern criteria which are linked to the subject matter of the contract.
- The criteria for the label are verifiable, reviewed and updated frequently, and are non-discriminatory.
- They are established using an open and transparent procedure in which all relevant stakeholders, including government bodies, consumers, social partners, manufacturers, distributors and non-governmental organizations, may participate.
- They are accessible to all interested parties.
- They are set by a third party over which the economic operator applying for the label cannot exercise a decisive influence.

There are several ways to introduce ecolabels into tenders:

1. Specifying the ecolabel as a minimum requirement in the description of the object of procurement, with verification demonstrating their compliance, for example, through a copy of the valid license.
2. Using an ecolabel as optional award criteria to encourage potential suppliers to take environmental concerns into account in their products and services. Tenderers may be awarded more points by offering ecolabelled products or services.

71 Article 43.1 of the EU Procurement Directive on public procurement (2014/24/EU).

However, to avoid restricting competition (e.g., if bidders cannot obtain the relevant label within a reasonable time limit relative to the tender exercise), criteria cannot exclude a bidder if they can prove equivalency. Criteria should therefore enable them to:

- Obtain equivalent means of verification (e.g., provision of a verifiable technical dossier will be accepted) or,
- Accept other labels which meet equivalent label requirements – this will require the evaluation team to ensure alternatives meet the same specific conditions required for chemicals of concern as the label referred to in the tender.

Box 10
Use of ecolabels in tenders

Note some ecolabels have different levels and these can also be used to differentiate quality within tender responses. For example, building certification schemes like LEED, BREEAM and CASBEE all have different levels depending upon the number of environmental criteria they meet. Where this is the case, ensure that the chemicals of concern are covered within the levels and ecolabels being offered.

Evaluation criteria may be used to recognize different levels of achievement. For example, the following suggestions are from the *Guide for Chemical Smart Public Procurement*[72]:

- The tendered products/services [are certified / meet the requirements] according to the [x] ecolabel = [yy] points.
- The tendered products/services will [be certified / meet the requirements] the [x] ecolabel by the start of the contract period = [yy] points.
- The tendered products/services will achieve meet the requirements of the [x] ecolabel at the latest six months after the start of the contract period = [yy] points.

72 Kontturi, K., S. Lankiniemi and H. Yliruusi (2018). Guide for Chemical Smart Public Procurement

Pre-Tender
Planning

2.4
Other procurement tools

In addition to certification and standards (Section 4.3.1), there are a wide variety of tools available for procurers to assess the management of CoCs. These include, but are not limited to:

- Information on CoC and associated regulatory frameworks for building materials and products is widely presented in the UNEP report *Chemicals of Concern in the Building and Construction Sector*[13].
- GreenScreen List Translator™ – GreenScreen for Chemicals has a suite of tools including the list translator which also provides a 'list of lists' approach to quickly identify chemicals of high concern. It does this by scoring chemicals based on information from over 40 hazard lists developed by authoritative scientific bodies convened by international, national, and state governmental agencies, intergovernmental agencies, and NGOs.
- Restricted Substance Lists (RSLs) – these include, but are not limited to, lists of regulated/legally restricted substances, RSLs by manufacturers/assemblers, lists of substances of concern ('deny lists'), and other lists (such as lists of endocrine disrupting substances).
- Safer Choice – a US Environmental Protection Agency programme that allows buyers to find certified products that are safer for human health and the environment. It includes the Safer Chemical Ingredients List (SCIL). The listed chemicals are safer alternatives grouped by their functional-use class and includes many chemicals evaluated through the EPA's Safer Choice programme.
- The SIN (Substitute it Now!) List – developed by the not-for-profit ChemSec, a list of hazardous chemicals that are used in a wide variety of products and manufacturing processes around the globe. The SIN abbreviation implies that these chemicals should be removed as soon as possible as they pose a threat to human health and the environment.
- Chemical Footprint Project (CFP) Assessment Tool – co-founded by Clean Production Action which rates companies through measuring and disclosing data on business progress to safer chemicals.
- BOMCheck – generates Regulatory-Compliance-Declarations (RCD) and/or Full Materials-Declarations (FMD) and is used by a variety of large-scale manufacturers.
- chemSHERPA – information transfer scheme for chemicals in products throughout supply chains, developed by the initiative of Ministry of Economy, Trade, and Industry (METI) in Japan and incorporating JAMP AIS (Composition Information) and JGPSSI (Compliance Assessment information).
- Pharos – operated by the Healthy Building Network, it provides resources to assess human and environmental health hazards of chemicals, with a main focus on building products.
- WINGIS – a German database comprising product codes for common building materials and chemicals outlining chemical hazards.
- Chemical Management Databases (CMD) – there are a variety of CMD systems offered

commercially for managing and distributing Material Safety Data Sheets (MSDS) and connecting buyers to sellers on collection and verification of Bills of Substances (see Box 11).

Box 11
Bill of Substances

The Bill of Substances (BOS) is a way to manage compliance information-gathering regarding the parts and materials used in the manufacturing process. It is a hierarchical list of substances that are contained in the parts and assemblies that make up a Bill of Materials (BOM) of the manufactured product.

The BOS contains a series of hierarchical levels from any composition of a part, part group, subassembly or top-level assembly:

- First or top level: Composition of a part or assembly
- Second level: Subpart
- Third level: Homogeneous Material
- Fourth level: Substance Group
- Fifth level: Substance

Source: Agile Product Life cycle Management Product Governance and Compliance User Guide Release 9.3.3. 2014 Oracle.

Pre-Tender
Market Dialogue

2.5 Encouraging substitution

An important element of good practice is working towards safer substitutes in building materials. This can be done either through a proactive choice of more sustainable alternative products in the current marketplace and/or specification of substances to be avoided. This is a particularly important procurement decision where the end-of-life fate of building products is either not certain, many years down the road, or potentially unregulated.

Step 2 of the CoC management approach in section B3 refers to the identification of priority products and areas for action. This can inform where to target substitution efforts, by addressing where CoCs are potentially an issue and there is significant impact. Once a specific set of products has been identified for potential substitution, the next step is to identify safer and more sustainable substitute chemicals or alternatives.

This will likely involve internal dialogue with technical managers (considering both chemical and toxicological aspects), sustainability and carbon management teams, and end-users. This should be conducted alongside a more general market dialogue, to understand barriers to substitution. Varying practice has been observed regarding substituting flame retardants, PFAS and ortho-phthalates in a range of building materials, with different degrees of transparency on substitute chemicals used. It is essential that care is taken in evaluating substitutes. In some cases, markets face various challenges in finding market-ready, cost-competitive substitutes. Some resources are available providing guidance alternatives to PFAS in carpets[73], and assessment of organophosphate ester flame retardants (OPFR) as a substitute for polybrominated diphenyl ethers (PBDE)[74]. A chemicals information hub relevant to building products available on the SAICM knowledge website includes a page on substitution, containing recommended processes and various product- and chemical-specific support resources.

BizNGO, has developed a set of alternatives assessment principles[75]. The assessment is a process for identifying, comparing, and selecting safer alternatives to chemicals of concern (including those in materials, processes, or technologies) based on their hazards, performance, and economic viability. These principles are set out in box 12 below.

A primary goal of the US EPA Safer Choice[76] program is to reduce risk to humans and the environment by identifying safer choices and alternatives through the Design for the Environment alternative assessments. These include alternatives for certain phthalates, flame retardants in flexible PU foam, and flame-retardant alternatives to HBCD and DecaBDE found in some building products.

73 European Commission – DG Environment (2020). The use of PFAS and fluorine-free alternatives in textiles, upholstery, carpets, leather and apparel

74 Blum et al (2019). Organophosphate Ester Flame Retardants: Are They a Regrettable Substitution for Polybrominated Diphenyl Ethers?

75 BizNGO Chemical Alternatives Assessment Protocol

76 United States Environmental Protection Agency Safer Choice.

Box 12

BizNGO Alternative Assessment Principles

Alternatives Assessment is a process for identifying, comparing, and selecting safer alternatives to chemicals of concern (including those in materials, processes, or technologies) based on their hazards, performance, and economic viability.

- Reduce the hazard by replacing a chemical of concern with a less hazardous alternative. This approach provides an effective means to reduce risk associated with a product or process if the potential for exposure remains the same or lower. Consider reformulation to avoid use of the chemical of concern altogether.
- Assess use patterns and exposure pathways to minimise exposure to alternatives that may also present risks.
- Obtain access to and use the best available information that assists in distinguishing between possible choices. Before selecting preferred options, characterize the product and process sufficiently to avoid choosing alternatives that may result in unintended adverse consequences.
- Require disclosure and transparency across the supply chain regarding key chemical and technical information. Engage stakeholders throughout the assessment process to promote transparency regarding employed methodologies of alternatives assessment, data used to characterise alternatives, assumptions, and applied decision-making rules.
- Use product life cycle information to better understand potential benefits, impacts, and mitigation options associated with different alternatives. When substitution options do not provide a clearly preferable solution, consider organizational goals and values to determine appropriate weighting of decision criteria and identify acceptable trade-offs.
- Act to eliminate or substitute potentially hazardous chemicals. Choose safer alternatives that are commercially available, technically and economically feasible, and satisfy the performance requirements of the process/product. Collaborate with supply chain partners to drive innovation in the development and adoption of safer substitutes. Review new information to ensure that the selected option remains a safer choice.

Source: BizNGO The Commons Principles for Alternatives Assessment (2013).

Substitution can be addressed by including explicit requirements in tenders that CoCs identified in relevant authoritative lists are not being used in any activities specified in the contract (see criteria example below). Ensuring that substitute chemicals are also identified where possible (even if confidentiality measures such as the signing of non-disclosure agreements are needed) to avoid the risk of 'regrettable substitution' is also an important consideration in tender verification procedures. See the good practice examples section for the approach taken by the flooring manufacturer Tarkett on substitute chemical identification.

Box 13
Criteria example - Chemical substitution

The contractor ensures that none of the following chemicals (e.g. the ten phthalates profiled in the European Chemicals Agency Assessment Report for 10 Phthalates) are used in the factories linked to the subject matter of the contract.

Verification

- The contractor states which of the ten phthalates to be discontinued have been eliminated, which chemicals are used instead and why these chemicals are less toxic
- Confirmation from an independent union
- Confirmation from an independent audit

Tender Specification

2.6 Criteria for good practice

Action at Level 2 should always seek to require performance beyond minimum requirements by setting more stringent and comprehensive criteria on CoC in technical requirements. The analysis by the authors of 24 different criteria sources covering 145 separate criteria, found that 42 criteria (29%) could be considered good practice because they go beyond regulatory compliance or basic requirements. Within the EU GPP criteria, these equate to comprehensive criteria requirements.

The key to good practice is moving beyond reacting to CoCs within goods and services through compliance, to actively encouraging better chemicals management for building products and services and rewarding better supply chain practice.

Use of award criteria

As well as requirements for chemicals management practices in building products, procurers should also consider encouraging better supplier practice through **award criteria** as part of selection. This can be through the award of additional points for good practice in actively developing, implementing or participating in chemicals management processes within the supply chain. This helps increase transparency on chemicals information and can help inform and improve end-of-life options for building products, as

well as building capacity and knowledge on CoCs across the supply chain. Award criteria in tenders can also incentivize and reward suppliers whose products achieve more stringent limits on CoC, or who can demonstrate improved safety measures in production or installation processes, beyond minimum levels.

Processes for evaluation and award criteria should effectively support and prioritize the most important chemical impacts, as defined in the organizational strategy. Within the publicly available criteria reviewed by the authors, CoCs were referenced as award criteria in 23% of criteria examined, with around half of these being linked to major building certification schemes such as LEED, BREEAM and CASBEE, suggesting there is some use of the award criteria mechanism in place to address CoC, but there is potential for further use by public authorities.

Ensuring consistency and validity of criteria

Most criteria related to CoCs focuses on specific building products. There can be notable variations in CoC criteria between schemes relating to same subject (e.g., VOCs, phthalates in plastics, etc.). This might be partly due to the date criteria were published, as well as different regulatory frameworks – so checking publication dates of 'model' criteria is always recommended.

Procurement will also typically (but not exclusively) include a variety of building products (e.g., flooring, sealants, and adhesives) sourced together along with a mix of services, for example in an office fit-out contract. Reference in tenders to only one type of product could potentially overlook the same potential CoCs in others. This could lead to a scenario where one product type is specifying a restriction on use (e.g. within an adhesive compound) whereas another product type (such as a paint or a carpet tile), within the same tender may not. Therefore:

- Either ensure that the procurement policy specifically identifies CoC relevant to the organization and that these restrictions are applied consistently to all building products (and accessories) likely to contain them, or
- Specify requirements relating to impacts (e.g., must not contain carcinogenic, mutagenic or reprotoxic substances. See Box 14 and Box 15).

Box 14

Criteria example – plastics in energy meters

Material requirements for plastics used in casings and parts thereof

The plastics must not contain as constituent parts any substances classified as:

- carcinogenic in categories 1 or 2 according to Table 3.2 of Annex VI to EC Regulation 1272/2008,
- mutagenic in categories 1 or 2 according to Table 3.2 of Annex VI to EC Regulation 1272/2008,
- reprotoxic in categories 1 and 2 according to Table 3.2 of Annex VI to EC Regulation 1272/2008,
- persistent, bio accumulative and toxic (PBT substances) or very persistent and very bio accumulative (vPvB substances) according to the criteria of Annex XIII to the REACH Regulation or particularly alarming for other reasons and included into the List (so-called list of candidates) set up in accordance with REACH, Article 59, paragraph 1.

Halogenated polymers shall not be permitted. Neither may halogenated organic compounds be added as flame retardants.

Additions of flame retardants labelled with the Risk Phrase R50/53 pursuant to Table 3.2 of Annex VI to EC Regulation 1272/2008 shall not be permitted.

Verification

The applicant shall declare compliance with the requirements in [Annex 1] to the Contract and present a list of the housing plastics used according to [Annex P-L 10] for all housing parts weighing more than 10 grams. Also, the applicant shall submit a written declaration from the plastic manufacturers or ensure the submission of such declaration to [RAL gGmbH] for all parts appearing on said list. Such declaration shall confirm that the banned substances have not been added to the plastics and give the chemical designation of the flame retardants used, including CAS No. and classifications ([H statements] [Annex P-M to the Contract]). When first applying for the Blue Angel eco-label, the declaration submitted must not be older than six months. If one applicant files additional applications for the eco-labelling of products containing the same plastics, the declarations submitted may be presented unchanged during the term of the basic criteria. Notwithstanding this, RAL shall be entitled to ask for an updated version of the declarations if the Umweltbundesamt (Federal Environmental Agency) finds that product relevant substances have been added to the Candidate List.

Source: Environmentally Friendly Energy Meters (DE-UZ 142) (2017) Blue Angel - The German Ecolabel.

Box 15
Criteria example - Cradle to Cradle

- Cradle to Cradle Certified™ Banned List compliant - The product's materials are not known to contain chemicals on the Banned Lists of Chemicals above permitted thresholds.
- Material Health optimization strategy developed - Plan developed to phase out x assessed chemicals and assess GREY* content.
- No exposure from carcinogens, mutagens, or reproductive toxicants - Assessed materials do not contain carcinogens, mutagens, or reproductive toxicants with plausible exposure routes.
- Meets VOC emissions testing requirements - The product meets the volatile organic compound (VOC) emissions testing requirements described in the Standard.

*Considered unassessed due to unknown identity or lack of toxicity information.

Source: Cradle to Cradle Material Health Certificate.

Tender
Evaluation

2.7 Verification tools

Aside from using ecolabels and standards as verification tools, EPDs can transparently communicate the environmental performance or impact of products or materials over their lifetime. EPDs can assist procurers and designers in setting criteria for environmental compliance and determining market benchmarks. They can also be used for verification of various criteria, including in building ratings schemes such as LEED and BREEAM.

Within the construction industry, EPDs support carbon emission reduction by making it possible to compare the impacts of materials and products in a standardized way. The European Standard EN 15804 is globally the most common standard for construction product EPDs (some are based on ISO 21930).

The European Commission has developed a new approach to quantifying the environmental performance of products called Product Environmental Footprint (PEF), covered by the standard EN 15804:2012+A2:2019[77]. The new PEF methodology[78] contains additional indicators relating to toxicity, including eco-toxicity (freshwater) and human toxicity - cancer effects which can be used as part of tender evaluation. Also, of relevance to CoCs is the inclusion of end-of-life impacts.

The French FDES format can also be used in this capacity and covers further health indicators beyond those specified in EN 15804, related to indoor air and soil and water.

77 European Standards. BS EN 15804:2012+A2:2019 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products
78 European Commission (2021). Understanding Product Environmental Footprint and Organization Environmental Footprint methods

Box 16
Environmental Product Declaration example

Key values for the environmental impact

The applicant must publish at least the key indicators for the environmental impact of the product according to Section 5.2 of DIN EN 15804:2012+A2:2019, including e.g., the global warming potential (GWP) and parameters on the use of resources – for the life cycle stages "from the cradle to the gate, as well as Module A4". The results for all modules must be stated separately.

Compliance verification

- The applicant shall have a valid product-specific environmental product declaration (EPD) according to EN 15804:2012+A2:2019 at the time of application and shall make it accessible. It must include declarations for Modules A1-A4 and C1-C4 as well as Module D.
- If the applicant can only submit an EPD for a class of average products, all the parameters and justifications used in the EPD background report for the formation of this class of products must be submitted. In this case, only the 'worst case' variant will be accepted as verification.
- In exceptional cases where the manufacturer does not have an EPD, the applicant shall submit the required data in accordance with DIN EN 15804:2012+A2:2019 in an understandable format in the verification document and declare where this data has been published and is accessible.

Source: Blue Angel (DE-UZ 13) 2021 Abrasives.

2.8 Summary of Level 2 actions

Recommended Actions for Procurers

There are numerous actions procurers can take when integrating ecolabels into public procurement:

- Organise and maintain a market dialogue with companies to determine whether an ecolabel can be used as a minimum requirement or a qualitative comparison criterion.
- Ensure there is more than one alternative product or service available on the market with the required ecolabel by checking on the websites of both companies and specific ecolabels to enable competition and avoid narrowing the market.
- Inform the market of any procurement that might include ecolabels at an early stage.
- Include a link to the required ecolabel or the criteria documentation when preparing procurement documents. These can also be appended to the procurement documents.
- Include the ecolabel requirement in the contract to ensure compliance during contract management.

The following questions should be considered, as a minimum, when determining what Type 1 ecolabels are appropriate for construction products:

1. Does it specify and address prohibited chemicals? or, Does it provide general categories of prohibited chemicals (e.g., no substances classified as carcinogenic 1A/1B)?
2. Does it provide criteria related to chemicals of concern that describe specific materials or components?
3. Does it impose information requirements related to chemicals that are used?
4. Does it provide criteria for chemicals that are allowed for use under the label?
5. Do requirements regarding health and safety and the working conditions of workers include reference to chemicals of concern, (e.g., exposure and emissions), where relevant?

Collaborate with suppliers to encourage shifts within the building products sector towards more sustainable products with lower dependency on CoCs within their production. Understand suppliers' barriers to reducing or phasing out particular CoCs, related to aspects such as cost or supply chain issues. Provide support to suppliers in understanding market benchmarks for CoC and viability of substitutes and alternatives. Facilitate further partnerships where possible (e.g. with innovation hubs or research institutes) to assist suppliers in improving performance related to CoC.

Recommended Actions for Procurers *(cont.d)*

Set performance or award criteria to specify improvement over time in supply contracts, for example:

- Moving from meeting minimum standards towards achieving certification, or progressing through the different levels within relevant certification schemes, over a specified timescale.
- Demonstrate internal performance improvement by moving from core criteria on CoCs to good and best practice levels (see Sections C2 and C3).

Require disclosure across the supply chain regarding key chemical and technical information.

Promote collaboration and sharing of this information between procurers in different public administrations, and the general sharing of experiences in chemical management in procurement.

Reduce impacts by encouraging suppliers to identify safer and more sustainable substitutes and alternatives. Refer to relevant lists of preferred chemicals in tenders and contracts.

Ensure that any eco-design requirements specified in tenders include adequate reference to management and/or reduction in chemicals of concern and, if not, include reference to a broader chemicals management plan in criteria for building products.

Extend restrictions on content of CoCs to the packaging used for building products.

Propose award criteria for suppliers addressing life cycle impacts including end-of-life options for reuse and recyclability by closing material loops.

3. Level 3

Beyond good practice

Public sector leadership is often cited as an important aspect of procurement whether dealing with the climate emergency (carbon reduction), reducing environmental impacts of consumption and production, encouraging a more circular economy or in improving welfare and living standards of citizens. The UN Sustainable Development Goals encapsulate all the above and more. In terms of procurement, two relevant leadership principles are:

- **Adopting shared services, strategic sourcing, and collective purchasing** – for example, collaboration with other buyers (pool purchasing, buyer groups etc) as well as suppliers and supply chains.
- **Managing competition and the supply base** – focused on deploying the right set of procurement practices that result in finding the best suppliers at the 'best value'. This includes, but is not limited to, strategic (i.e., regular) market engagement with the building products value chain.

Level 3 sets out an approach for going beyond good practice, based on continual improvement and encouraging the construction industry to progress responsible production in line with the rapid evolution of building products and their chemical ingredients.

Moving beyond good practice involves:

- Encouraging a shift in design of building products to reduce the dependency on chemicals of concern.
- Moving from avoidance of chemicals to preference for safer chemicals within building products.
- Moving towards a life cycle approach to managing and collecting information on chemicals of concern as part of a broader, more circular approach to construction.

Moving beyond good practice is dependent on sharing information and collaboration. Procurement practitioners may not always understand the importance of sharing data, experiences and resources with other public administrations or with downstream value chain actors such as construction site managers and operatives, facilities managers, and service providers. This may be due to time pressures and limited resources within procurement functions, or internal silos, for example between procurement and contract management departments.

Chemicals management in building products requires a life cycle approach from the very start of the procurement cycle (see Sections A4 and B1), and procurers should aim to collect information on chemical use as far as possible at the following life cycle stages:

- **Raw material extraction** – Practices at this stage of the value chain for building materials should be monitored, as extraction activities have a risk of chemical release (e.g. acid mine drainage in metals extraction). Responsible sourcing and chemical management plans are not always in place for companies carrying out this work, and information is not always available from this upstream point in the value chain (see Figure 8).
- **Manufacturing/production** - Studies have demonstrated high exposure to carcinogens and reproductive toxicants during production, including solvents, certain metals, VOCs, and epoxy resin emissions among workers.
- **Use phase** – For example through post-construction emission levels of VOCs, dioxins (e.g., polybrominated dibenzodioxins) and furans (e.g., polybrominated dibenzofurans) contained within flame retardants in indoor environments.
- **End of life** - Construction waste management and recycling can roughly be divided into formal and informal handling. Informal activities are usually carried out by unregistered small-scale businesses, groups of people or individuals. The extent of organization varies greatly. In some countries such business activities are prohibited, while in others they are allowed by the public authorities. In some cases, they operate in a legal grey zone where they are illegal in principle but accepted in practice. Informal recycling will very likely not record any data.

Transparency of information on CoC in global supply chains has been an emerging policy issue for SAICM since 2009, and there have been calls to create a global standard for Chemical in Products (CIP) information. While the UNEP Chemicals in Products Programme provides guidance for stakeholders exchanging chemicals in products information[79], a global standard has yet to be achieved. One initiative under development in this area is the Global Chemical Transparency Standard[80].

79 UNEP (2015). The Chemicals in Products Programme: Guidance for stakeholders on exchanging chemicals in products information

80 Global Chemical Transparency Standard

Tender
Specification

3.1 Criteria

Going beyond good practice requires an integrated and holistic approach to sustainability and circularity that includes the life cycle of building products and the materials - including chemicals - within them. This requires a systems-thinking approach to using criteria within tenders. Intended use and impacts at end of first use (e.g., reuse or recycling options) should always influence the purchasing decisions and therefore the choices of criteria within tenders.

Best practice criteria should also address impacts from production and are included in standards such as ISO 14001 and ISO 50001. In short, going beyond good practice means going beyond the product itself and considering the extraction, production environment and broader life cycle impacts.

For example, in ensuring safe working practices within the manufacturing supply chain, hazard assessments of chemicals on site may also be specified. For example, the BES 6001 Framework Standard for Responsible Sourcing addresses this as follows:

- **Clause 4.4.6.1** – "The organization shall use life cycle thinking and/or life cycle assessment (LCA) methods to identify significant environmental aspects and impacts throughout the product lifecycle; and shall have in place a documented approach for continual improvement of life cycle environmental performance."
- **Clause 4.4.7.1** – "Where chemicals are procured for manufacturing the assessed product, the organization shall undertake a hazard assessment."

Pre-Tender
Develop Strategy

3.2 Managing information on Chemicals in Products (CIP)

Ensuring full material declarations[81] (FMD) is key to any best practice in chemicals management. This means knowing exactly what chemical hazards exist within the building products procured directly or indirectly across the value chain.

Transparency is challenging to implement. While many chemicals of concern are addressed by regulation, the absence of regulations or differing (even conflicting) regulations between countries creates challenges for maintaining a chemicals in products (CIP) information system. Numerous chemicals may be restricted in some jurisdictions and either not regulated or regulated differently in others.

As discussed in section B4, an efficient and transparent flow of chemical information is critical to ensuring proper stewardship of substances along the value chain, enabling and empowering users of chemistry to make informed decisions on their management. However, this is challenging to achieve given the fragmented and complex nature of the construction supply chain, and information initially provided cannot always be kept up to date in line with updates to RSLs and chemical evaluations. For example, there may have been changes to safety evaluations of chemicals over the full and often long lifetime of a building, which can result in exposure risks at the end of life that have not been captured and cannot be communicated to operatives working at this stage. This need for a more dynamic approach to chemicals management is particularly difficult across larger buildings portfolios.

Addressing chemical and product life cycles in a sustainable way requires proper management of information flows and feedback loops among stakeholders involved in the product lifecycle. This may include requiring mandatory clauses in contracts for passing on chemical information between stages of the supply chain, requiring multiple levels of sign-off of data from an agreed responsible person, and ensuring consistent formats are used to preserve the integrity and accuracy of data. It also requires a transparent reporting framework across the contract management chain, as part of contract management and performance (Step 5 of the 5-step approach in section B3).

At present, there are several potential barriers at key interfaces within the information flow. This is not only observed across the buildings and construction value chain (Figure 8, highlighted by the bold orange lines), but also in its linkages with the chemicals value chain (see Figure 2). These breaks in the information flow can be a barrier to repairing, reusing, remanufacturing, or recycling materials and products, resulting in potential downstream impacts.

81 Full material declarations providing a comprehensive list of substances within a specific product or material to be provided. Further guidance is available from Assent: Full Material Disclosures

Procurement that specifies increased product stewardship, closing material loops would enable a more transparent chain of custody and flow of information from production and use, through to the different disposal options (Figure 8).

Some suppliers are not used to having to provide information downstream within the value chain and ultimately to the procuring body or customer. They also may not understand what the downstream user is asking for, or may not have certainty of what is coming next in terms of chemicals legislation, or new research about chemical hazards. Errors can creep into the data transmission process, the format, and the requirements for the suppliers.

Figure 8 Barriers to information flow on CoC for procurement of building materials

	Extraction	Manufacturing	Purchasing	Repair / Refurbishment	Reuse	Extended life	Pre-treatment	Recycling	Residual waste disposal
Life cycle phase	Production		Consumption				End-of-life		
Private sector	✓	✓				✓	✓	✓	✓
Public sector consumer			✓	✓	✓				
			Procurer	Asset manager, user	Waste manager				
Procurement requirement			Initial purchase	Repair & maintenance service	Collection / reuse service	Collection service	Waste management services		
Information transfer	Partially	✓	✓	×	×	×	Partially	Partially	Partially

Barriers to information flow on CoCs

Good data management is supported by market engagement and developing robust and transparent supply chain partnerships. All information required for the safe handling and use of products must be made available to the supply chain. Procurers should proactively communicate the objectives of their programme to the various value chain actors, along with specific policies on CoC management and direction.

Procurers should also encourage improved practice between value chain actors. Chemical information shared between supply chain partners can range from confirmation that the relevant product does not contain a specific priority substance(s), to the disclosure of all ingredients, where possible.

It is recommended that information requirements in tenders request the highest possible level of transparency. This may need to allow for and specify which information can be declared as confidential and which may be necessary to ensure suppliers put forward offers for tenders, in cases where they wish to not declare the formulation of proprietary substances.

Specifying verification through standards such as ISO 19650, EN ISO 23386 and EN ISO 23387, or similar, is one option[82]. These standards provide a framework for describing construction objects for digital use (e.g. in Building Information Modelling), providing a consistent format for data exchange between supply chain participants, which allows for more efficient and effective communication of data. The more complete the information provided in a communication tool, the easier it is to update or maintain such information in case of changes of legal requirements or product compositions.

In Sweden, BASTA, Byggvarubedömningen, and SundaHus provide online systems to capture information on the chemical content of construction materials and products[83,84,85]. The requirements are based on REACH[86] and CLP[87] requirements, but go beyond legislation. The systems are for anyone who wants to make conscious product selections with the aim of phasing out substances of concern.

The three assessment systems have a common origin in historical, costly remediation of asbestos, PVC and floating putty, which led to industry demands for more information and better materials. Assessment systems today have an obvious role, not only for product selection but also in procurement procedures. The assessment systems provide logbook tools for a systematic reporting of materials included in a building, a prerequisite for the correct handling of materials during demolition, rebuilding, and possible future clean-ups.

Although at an early stage in their development, another approach is to request materials passports as part of the construction project. These are comprehensive digital datasets of information about products and their ingredients (see Box 17).

82 Materials Declaration Data Exchange Standards
83 BASTA
84 Byggvarubedomningen
85 Sundahus
86 EUR-Lex. Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)
87 EUR-Lex. Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures

Box 17
Materials passports

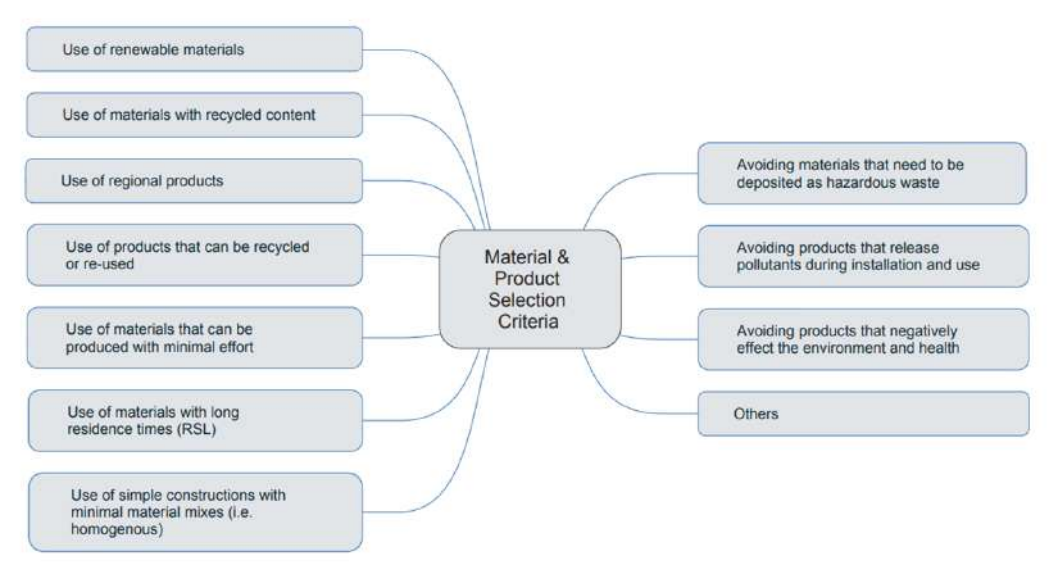
Materials passports are a methodology for structuring and capturing information in digital datasets that catalogue and disseminate characteristics of building materials, components, and products. As such, they can help bridge the information gap around CoCs in building materials. Materials passports can also help in verification and form part of some Type 1 ecolabels (e.g., Cradle to Cradle) and building certification schemes.

Materials passports also contribute to circular building practice as they bring together information from disparate sources as well as providing a framework for information requirements throughout the construction value chain. This information includes chemical properties, which are linked to factors such as material health, life cycle environmental assessments, material criticality, resistance and stability, and health and safety. Materials passports are an emerging solution to improving circularity and informing product selection criteria (see Figure 9 below).

Orms, Madaster, and Circuland have created methodologies for materials passports. The release of the EU's new Ecodesign directive for sustainable products aims to bring this initiative forward in Europe, while in Chile, the pioneering material passport platform *Pasaporte de materiales y activos sostenibles (P+MAS)* is being developed.

Figure 9 Chemical properties influencing materials and product selection criteria

Source: Materials Passports: Best Practice. BAMB2020, 2019.



Pre-Tender
Market Dialogue

3.3
Design shifts in building products

Procurement can help to encourage a shift in design and production of buildings and the products they incorporate. Design shifts for building materials can include:

- Design of a more sustainable product, or safer chemical to perform the same function in a building material – such as a plasticizer, adhesive or coating. For example, PureBond adhesive by Colombia Forest Products uses a different technology from conventional, urea-formaldehyde-based adhesives, using biomimicry principles to bond wood using a safer and biodegradable formulation (see good practice examples section).
- Designing out chemicals entirely through using alternative materials. For example, hempcrete is a naturally fire- and pest-resistant material, meaning there is no need for potentially toxic chemicals to be added[88].
- Design shifts around physical properties of building materials that enable improved dismantling or reduce chemical use. This approach can range from specifying mechanical, rather than chemical, connections where possible[89], to designing modular office partitions and furniture that can be adapted and reused in different applications[90].

Design shifts require a strong partnership with manufacturers, suppliers and building contractors. Regarding chemical management strategies in design shifts, the BizNGO Guide to Safer Chemicals[91] identifies some common strategies used by a range of leading manufacturers and companies to manage chemicals and materials in their products:

- Identify all chemicals in products.
- Eliminate high-hazard chemicals.
- Strive to use only safe chemicals.
- Commit to product redesign (e.g., eco-design).
- Take responsibility for products cradle-to-cradle.
- Adopt internal chemical policies.
- Work collaboratively with environmental stakeholders, NGOs etc.
- Publicly support government reform of chemical policies.

88 UK Hempcrete (2015). Frequently Asked Questions – Hempcrete
89 Healthy Buildings Network (2021). Modular Construction - Let's Get it Right from the Start
90 UK Green Building Council (2019). Circular economy guidance for construction clients: How to practically apply circular economy principles at the project brief stage
91 BizNGO (2013). The Guide to Safer Chemicals: Implementing the BizNGO Principles for Safer Chemicals, Version 1

Key principles for procurers to encourage design shifts from suppliers include the following three inter-related elements:

1. Setting out aims and targets for the reductions in chemicals of concern.
2. Communicating their chemicals management policy to contractors and suppliers as well as steps needed in design shifts to achieve targets and the continual improvement required, in line with policies.
3. Linking the flow of information on chemicals from the initial procurement through the use phase into disposal either for reuse or recycling, through effective data management systems, or a tool such as a materials passport (see Box 17).

Taken together, these elements will form a viable, proactive approach to shifting design towards products containing safer chemicals. A few factors, however, need to be considered to ensure effective communication of a design shift.

The procuring body will likely need to factor in which procurement model it is contracting with and identify potential information gaps. This will generally require that CoC management is explicitly addressed within tenders and contract management at the highest level (e.g., whole building or service agreement levels).

Procurers should ensure they harness their role and position within the value chain, as this enables them to act as a gateway and conduit for the flow of chemicals information, from suppliers to downstream operatives involved in building maintenance, refurbishment, demolition and recycling.

Tender
Specification

3.4 Supplier selection

Beyond evidence of the strategies listed in Section C1 – Level 1, a further level of evidence when selecting suppliers is evaluating their organizational standards. These may include, but not be limited to, third party certifications such as the ISO14001[92] for environmental management, social responsibility guidelines such as ISO26000[93] or the OECD Guidelines for Multinational Enterprises[94] (or equivalent). Or do suppliers meet eligibility criteria and means of proof set out in the relevant regulatory framework for procurement?

92 ISO. ISO 14001:2015 - Environmental management systems
93 ISO. ISO 26000:2010, Guidance on social responsibility
94 OECD (2011). OECD Guidelines for Multinational Enterprises

Pre-Tender
Develop Strategy

Contract
Monitoring Performance

3.5 Cleaner production

Cleaner production is a preventative approach, developed as a programme by UNEP and UNIDO to manage the environmental impacts of business processes and products. Clean Production Agreements may be put in place between suppliers and procurers, as seen in this example from the Chilean Agency of Sustainability and Climate Change.

A significant advantage of cleaner production is that it is applicable to all businesses, regardless of size or type and therefore does not exclude small, medium enterprises within the construction and building products value chains, including in countries where there are fewer regulations related to CoC.

Key principles of clean production include:

- Encouraging changes in technology, processes, resources or practices to reduce waste, environmental and health risks.
- Minimising environmental damage through unnecessary use of CoCs.
- Using energy and resources more efficiently.
- Documenting consumption, considering material and energy flows, which can be done with a Sankey diagram.
- Encouraging an increase in the efficiency of production processes, with minimised waste.
- Increasing business profitability and competitiveness.

Best practice sustainable procurement should encourage supply chains to follow these key principles. Where allowable, specifying cleaner production can be a component of supplier selection. For example, this can involve requiring evidence of an integrated approach to:

- Technology – emphasising a reduction in materials and energy consumption.
- Product design – reducing chemicals input and dependency on CoC by, for example, replacing hazardous or non-renewable inputs with less hazardous or renewable materials (see the Typhaboard case study in in the good practice examples section) or with materials with a longer service lifetime.
- Operating practices – reducing workforce exposure to CoCs during production or disassembly/ disposal.
- Maintenance – improving repair and reuse options, and extension of product life, for example

through remanufacturing.

- Waste treatment – ensuring products are recyclable.
- Packaging of products – for example, through reducing expanded polystyrene and/or single-use plastics.

Pre-Tender
Market Dialogue

Contract
Servicing

3.6
Extended producer responsibility

Many waste-related policies are based on the principle of extended producer responsibility (EPR). The idea behind this principle is that manufacturers have a responsibility for their products, and the related environmental impacts, beyond the production stage. This is dependent on a transparent and robust information transfer system. There are three primary objectives of the EPR principle:

- Manufacturers are incentivized to improve the environmental design of products and the environmental performance of supplying those products.
- Products should achieve a high utilization rate.
- Materials should be preserved through effective and environmentally-sound collection, treatment, reuse, and recycling.

However, EPR is more complex when dealing with building products that have long lifetimes and can be incorporated in many different components and elements within the finished building or structure. Purchasing bodies and procurement functions therefore play a significant facilitating role, for example, through information transfer at the point of purchase and the point of disposal. It may also be challenging to develop tender evaluation processes for this model. In practical terms, tenders may not be able to fully differentiate between suppliers, assess the level of competition, or determine added value related to EPR.

Implementing EPR through procurement, can cover specifying actions such as:

- Designing products for reuse or recyclability.
- Implementing takeback programmes for building materials and products, and their corresponding waste (e.g., gypsum wallboard in New York City).
- Arranging waste collections, recycling, or other suitable disposal for products with specific CoC treatment needs (e.g., mercury).
- Ongoing product stewardship, where manufacturers assume product responsibility over the

full product lifecycle and are responsible for return, remanufacture or recycling after use, instead of the conventional 'build, sell, forget' process. An example of this is the RessProKA project in Germany which trialled technical and financial solutions to keep building products in commercial premises in circulation for as long as possible. This type of approach is not yet mainstream but could be a future application of product-as-a-service models that would be appropriate for public procurement, supporting improved circularity and chemicals management.

Further information on procuring and incorporating EPR into chemicals management planning can be found in the recent (2020) Eunomia study on EPR for the European Commission[95].

95 DG Environment of the European Commission (2020). Study to Support Preparation of the Commission's Guidance for Extended Producer Responsibility Schemes.

Pre-Tender
Procurement Policy

3.7 Procurement approaches

The selected procurement approach can have a marked positive (or negative) effect on the outcome of a chemicals management policy, in terms of operational activities, the transparency of procured building products, the stage when they are specified, and how the decision is made.

Therefore, consideration of the potential drawbacks and opportunities of approaches, and whether it can contribute to going beyond good practice, should be strongly considered. The following procurement approaches are often used:

Traditional method – a basic, but common method of procurement in the construction industry. The responsibility of a contractor is limited only to build, and all design works and contract management is procured through a consultant or engineer. The client requirements on CoCs need to bridge this potential gap.

Management contracting – often the main choice for complex projects. In addition to the client, the consultants, contractors, and specialised contractors become participants. So potentially the requirements for CoCs reduction and information management are more transparent.

Design and build – this method (and its variants) means the design and build elements are left completely to the contractor instead of responsibilities being split out. This arrangement may result in a higher chance that product specifications are changed between sub-contractors, which may have a bearing on chemicals management. Hence the potential and need for stronger relationships and clear requirements on chemicals management is greater.

Joint venture/partnering – a joint venture allows two or more separate entities to be responsible for a project. This enables the parties to share both rewards and risks. The goal is to ensure clarity around ownership and decisions relating to CoCs across the whole life cycle of the products and the structure.

Approaches should be selected that enable strong project oversight, connectivity, and transparency between actors at the different stages of the value chain. Clear indicators on chemicals management, from extraction to disposal, which are integrated early, well communicated, and regularly monitored should be a key element of whichever of the above approaches is used in practice.

Table 9

Common contract types encountered in public procurement for building material procurement, construction, and associated works

Design and build	Build / installation
Design, build, maintain	Maintenance
Design, build, operate, maintain	Demolition / deconstruction
Raw material sourcing	Fit-out – Shell and core only
Material sourcing	Fit-out - Category A
Finished product sourcing	Fit-out - Category B
Material transportation	

Pre-Tender
Develop Strategy

3.8 Circular procurement

Implementing circular economy principles in procurement is another approach to design out dependency on CoC in products. Circular economy principles are becoming the norm in some national and multinational policies within the public and the private sector of some countries. For example, the EU Circular Economy Action Plan[96] and many large national and international construction companies have sustainable product and supply chain programmes.

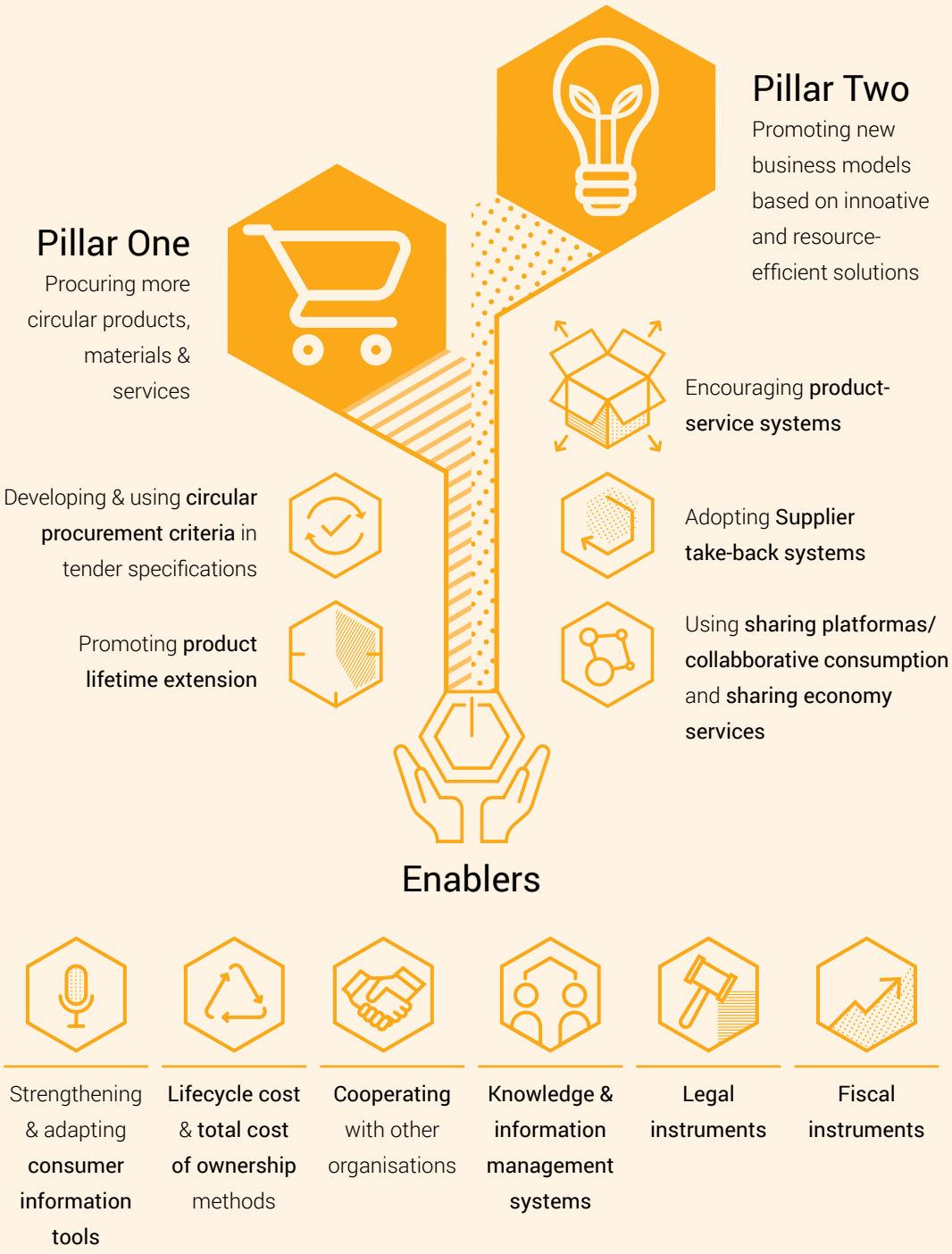
Using procurement as an instrument for delivering a more circular economy contributes to chemicals management by closing product and materials loops and retaining materials value within the closed loops for as long as possible. Circular procurement (CP) is a rapidly evolving approach that has roots in the Netherlands Green Deal for Circular Procurement, which initiated a range of CP pilots from 2014 to 2018 to accelerate the shift in the Dutch ambition for a circular Netherlands by 2030. Over 40 pilot factsheets have been produced across a range of categories including 11 pilot factsheets related to construction and infrastructure directly, and a further 10 pilot factsheets to facilities management[97].

Figure 10 summarises how integrating circularity into procurement can contribute to a more effective chemicals management plan for construction, and particularly building products, through the adoption of key enablers like life cycle costing, collaboration, and incorporation of knowledge management and information systems. These circular approaches, tools and solutions can also provide inspiration and ideas on how to better manage CoC in products through procurement.

Circular procurement also champions a life cycle approach to products and materials management (see Section B1). CP can be an effective instrument in tackling end-of-life approaches to CoCs in waste where national regulation or local recycling infrastructure may not be as advanced. Circular procurement actively encourages closing material loops and the life cycle approach it is based on will incorporate disposal duty-of-care consideration at the time of tendering.

96 European Commission (2020). Circular Economy Action Plan
97 See Pianoo Circular Procurement Examples in Construction and Infrastructure

Figure 10 Circular procurement scope



Source: UNEP, 2019[98]

98 UNEP (2019). Building Circularity Into Our Economies Through Sustainable Procurement

Pre-Tender
Develop Strategy

Pre-Tender
Market Dialogue

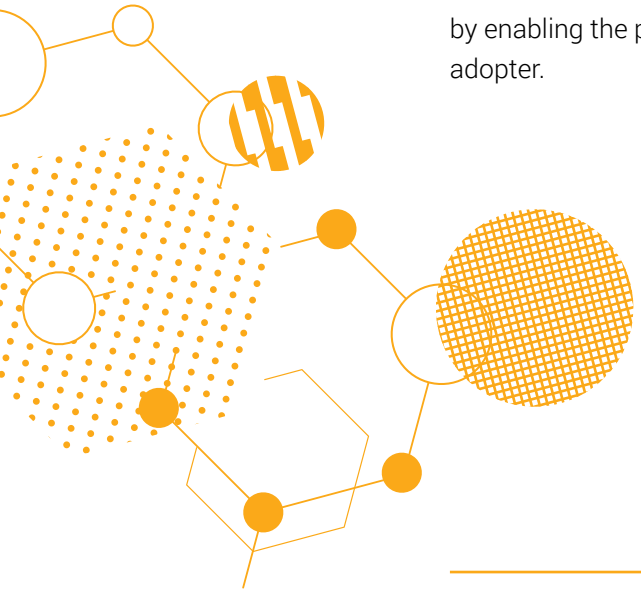
3.9 Innovation in procurement

Public Procurement of Innovation (PPI) enables public sector entities to use procurement as a way of encouraging the market to come up with innovative solutions. Public entities can engage in PPI in one of two ways – by providing market players with the scope to develop and/or offer an innovative solution, or by conducting a targeted search for an innovative solution to its problem. There are two aspects of innovation procurement that relate to managing chemicals of concern in building products:

1. Innovating procurement processes to improve outcomes.
2. Applying innovation procurement approaches to encourage more sustainable products, for example through eco-innovation (see Box 5) of building products.

In many cases, including countries actively implementing SPP principles, encouraging innovation within construction first requires innovation of existing procurement approaches. Innovation procurement also requires significant supplier engagement which can also be subject to perceptions of risk, e.g., in terms of restricting competition. More detailed information on establishing innovative procurement practice, along with global case studies, can be found in the OECD guidance on innovation procurement[99].

PPI can and should encourage eco-innovation and eco-design in production and products as well as improving communication with value chain and stakeholders. In terms of competition, eco-innovation enables small businesses as well as large-scale multinationals to offer innovative products and solutions. SMEs are often more agile and can respond more rapidly to innovation calls than larger businesses. However, as with all innovation and R&D, there are risks in terms of market development and access which can act as barriers, especially to smaller businesses. PPI approaches can encourage substitution of hazardous chemicals through R&D into new product materials and design by enabling the public sector to act as a launching customer, first purchaser, or early adopter.



99 OECD (2017). Public Procurement for Innovation. OECD Public Governance Reviews.

Pre-Tender
Planning

3.10
Creating demand-pull

Many building product supply chains operate at an international as well as national scale. They require a sufficiently large and uniform demand to effectively change the direction of their business. Where public sector demand is small-scale and fragmented (e.g., in maintenance and refurbishment), collaboration across public sector entities is required to enable the change needed.

Public procurers need to collaborate on a peer-to-peer, sectoral, national, and international scale to accelerate the transition towards safer chemicals in construction products. Collaborative purchasing arrangements, such as frameworks, are frequently used for common purchase categories including spend areas like newbuild construction, infrastructure, planned and reactive maintenance, refurbishment, facilities management, heating, ventilation and air conditioning. Frameworks will typically focus on cost and, while sustainability criteria are included, these typically represent basic SPP criteria rather than best practice.

Sectoral buyer groups are one way to reduce the cost of preferred materials by creating scale and providing a market signal of broader sustainability (and circular) ambitions to suppliers, as well as creating platforms for pre-competitive dialogue and peer-to-peer exchange of knowledge. An example from the EU is the Joint Declaration of Intent, agreed by the Members of the Big Buyers for Climate and Environment's Working Group on Circular Construction[100].

Pre-Tender
Develop Strategy

Contract
Monitoring Performance

Contract
Disposal

3.11
Preferring safer chemicals

Adopting a chemicals management plan that screens preferred chemicals is one action that can manage the risks around CoC. Screening methodologies within chemicals management systems can be based on third party methodologies and verification such as those found in Type 1 ecolabels (see Section C2). RSLs are reasonably common and familiar to procurers and supply chains alike. Some manufacturers use Manufacturing Restricted Substances Lists (MRSLs)[101] to manage the inputs of chemicals at the front of the manufacturing process rather than the back end. These are both examples of 'negative lists' – in that they focus on eliminating harmful chemicals after the fact (i.e. risk management tools).

Approaches have also been seen to develop 'positive lists' specifying safer chemicals, which can be replicated in procurement. TCO Certified, a certification scheme for IT

100 European Commission. Big Buyers Working Together
101 Eurofins (2019). Know your MRSL from your RSL

products, uses an approach of only specifying 'accepted' substances in products as part of meeting sustainability criteria (the 'Prefer' principle set out in section B1).

This provides a precautionary and proactive means for chemical management and substitution. This improves safety and information management over standard practices, which generally allow the use of an untested substance, but if this substance is found to be hazardous and banned, and a substitute is needed, this may also be untested and hazardous. TCO Certified describes its approach as assuming that "a chemical is considered a high risk until it is proven to be otherwise".

The TCO Certified Accepted Substance list is publicly available and regularly updated. It operates on the basis of GreenScreen for Safer Chemicals ratings, with a benchmark score of 2, 3, or 4, the requirement for inclusion. The list contains plasticizers, flame retardants, process chemicals and solvents and a similar approach could be taken by the building materials sector, to ensure that only safer chemicals are used.

From a procurement perspective, keeping pace with developments in chemicals and their use in building products can be resource-intensive and also create delays in incorporating changes into procurement criteria. Preferring safer chemicals represents the highest tier on the GreenScreen benchmarking methodology[102]. This requires explicitly stating a preference for safer chemicals. Chemical screening methodologies, for example GreenScreen and the US EPA Safer Chemical Choice programme, enable scoring against criteria to assess chemicals and formulations. These can be grouped, for example, as either 'preferred', 'needs improvement', or 'phase out' according to the procurer's criteria and preferences.

Preferred lists or chemical screening are becoming more common in other sectors, for example textiles (such as workwear), and electrical products[103]. This goal is to facilitate a shift from a product-by-product (bottom-up) focus to a top-down focus that enables the purchasing entity to combine requirements for chemicals of concern within an organization-wide policy (e.g., Sustainability, CSR and/ or Sustainable Procurement policy), rather than focusing on a specific product or sector specific spend area, like construction and infrastructure. A key benefit of this top-down approach is that it would include the wider spend areas where building products form an important, but not necessarily highly visible, part – for example, in maintenance, refurbishment and facilities management.

102 GreenScreen Method
103 ZDHC Foundation Roadmap to Zero

3.12
Summary of Level 3 actions

Recommended Actions for Procurers

Be proactive with market engagement and information sharing by:

1. Allocating time and resource to finding the relevant information, and to actively keeping updated with the evolving policy, product development and practices relating to CoCs within the construction sector and its related building product supply chains.
2. Creating a mandate and allocating time and capacity to drive market engagement and communications activities across the relevant building product supply chains.
3. Considering the audience, relevance of data, and intended use when collecting and disseminating chemicals in products information.

Share experiences and learning through peer-to-peer groups to disseminate both good and best practices – what is good practice in one supply chain or country may be best practice in another. This can be achieved through participation in regional, national, or international platforms.

Sharing experiences can also help develop a more consistent demand-pull from the public sector, e.g., through buyer groups for green products and practices within the construction sector and its related supply chains.

Identify the procurement approach and the business model being contracted and set requirements accordingly at the earliest stage, to ensure that the chemicals information may be transferred through all stages of the project, and the building product life cycle. This requires the procuring entity to recognize and actively participate in its role to facilitate information flow from the producers to the end-of-life and waste management companies at decommissioning.

Adopt an integrated approach to material needs, production methods, products, operation, and disposal (i.e., a life cycle procurement approach to mitigating impacts from construction practices).

Where possible, consider specifying evidence of cleaner production methods as a requirement for supplier selection.

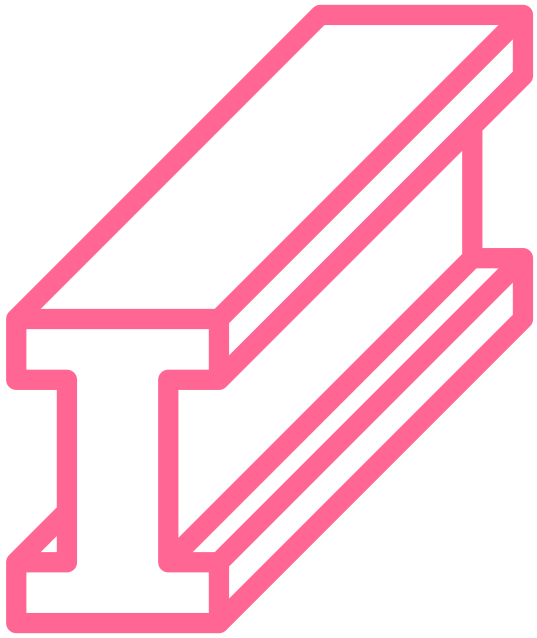
Recommended Actions for Procurers *(cont.d)*

Extended Producer Responsibility (EPR) should be specifically referenced, where relevant, when procuring all types of construction and facilities management activities containing building products.

Where EPR is not in place, benchmarking the cost of an equivalent service for a given waste management activity, for example, additional infrastructure to mitigate CoCs during Waste Electrical and Environmental Equipment recycling, will ensure that the local costs are proportionate and not significantly exceeding expectations had EPR been in place.

Buyer groups for particular products and categories can standardize and aggregate demand in supply chains, support collaborative procurement and innovation, and foster consistency in market dialogue.

- Consider joining a relevant buyer group, e.g., the Circular Construction Big Buyers Group in Europe.
- Check that the scope extends not only to sustainable purchasing but improving sustainability in a dialogue with suppliers that includes addressing chemicals of concern.
- Encourage the group to initiate a clear transformation pathway for chemicals management in products. This should include reference to improving outcomes for construction and demolition waste recycling alongside reducing inputs of chemicals of concern into new products.
- Consider establishing a local or national buyer group for construction products with similar commissioning organizations if one is not available.



Recommendations: Sustainable procurement of building materials

Sustainable Procurement of Building Materials
A Progressive Approach to Chemicals of Concern

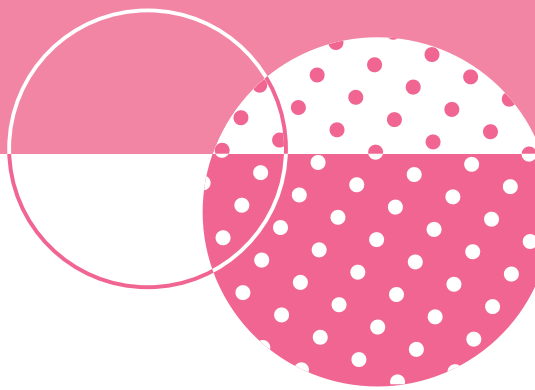
Public authorities and their associated procurement departments can improve processes for SPP through the following strategies:

Recommendations

- **Aim to harmonize procurement specifications as widely as possible**. Depending on the region, working with other local authorities in the region to share knowledge and experiences can lead to a more consistent approach, which may help to raise the level of ambition, create scale in purchases (e.g. through buyer's clubs), and reduce the administrative burden for suppliers. Collaborations are also key to improving knowledge in procurement, which is reported as low, but increasing this knowledge and capacity is a key driver of transforming markets towards safer and more sustainable products.
- **Monitor the effectiveness of SPP programmes regularly and accurately**. This is essential to determine how well approaches are working. Collect qualitative data as well as quantitative to better understand barriers at various stages of the process. There is no one standardized methodology for monitoring, but some approaches and examples are included in Standards and Evaluation Guidelines for Green Public Procurement and the report Green Public Procurement in the Republic of Korea – a Decade of Progress and Lessons Learned.
- **Champion SPP throughout the procuring organization**. Top-level management commitment is essential, but empowering and educating individuals at all operational levels can increase the wider buy-in to the programme. Publicize successes to gain support for programmes internally, as well as rewarding suppliers who have contributed to the successful projects. Increasing incentives in contracts for going above and beyond CoC specifications or adding extra services such as take-back schemes under voluntary clauses, can incentivize increased ambition from suppliers. This can help increase participation in tenders, market competition and have a market-pull effect.
- **Procurers should maintain strong, ongoing relationships with suppliers**. Early engagement and communication of the overall ambition and principles of the procurement strategy is vital, and engagement should not only address isolated aspects of projects or material specification. Understand in detail their barriers to chemical phase out, data management or other aspects such as the availability of affordable testing. A regular dialogue at both the individual company level, and with an industry as a whole (e.g. through trade associations) is necessary to address the detailed issues which may inhibit compliance or improvement in performance, while maintaining fair competition.

Recommendations

- **Once a procurement programme has become sufficiently established in a public authority, strive for ambitious criteria setting, and proactively engage the supply chain with this ambition**. Conducting regular market analysis of sustainability and CoC benchmarks for building materials can provide a useful discussion point and evidence base to engage suppliers and encourage them to improve. Reward market leaders who are going further and investing in activities such as achieving ecolabels, generating EPDs and providing better data. Encourage companies who are behind market leaders in their practices to improve and maintain relationships to understand barriers and track progress. Set criteria that is challenging for the market, but also balance this with ensuring verification processes are robust and properly resourced internally.
- **Active and regular capacity building is recommended to embed sustainability considerations in markets and help foster a culture of compliance and transparency**. Regular events (e.g. 'meet the buyer'), industry roundtables, and demonstrations of exemplar projects, materials and data solutions can all contribute to increased knowledge and awareness of CoC issues in the sector. Involving the local community also has benefits, as the users of public and residential buildings. Publicizing the direct effect of reducing CoC in procurement can help increase demand for safer products. A storytelling approach as well as effective use of data can help convey public success stories effectively.
- **Ensure that procurement procedures look forward as part of chemical management strategies and policies**. This guidance has provided information on substitution practices and avoiding regrettable substitution. However, it is important to consider scenarios where a chemical used may be initially evaluated as safe, only for a different issue to be discovered several years later. Procedures for chemical management should incorporate a dynamic approach to data management that can react to changing information. This can be supported by data systems (such as effective use of materials passports) that can track the buildings and products where chemicals have been used. Health and environmental safety profiles and evaluations are seen to be an evolving process for some chemicals, and procurement policies, management and data systems should consider this in their approaches.



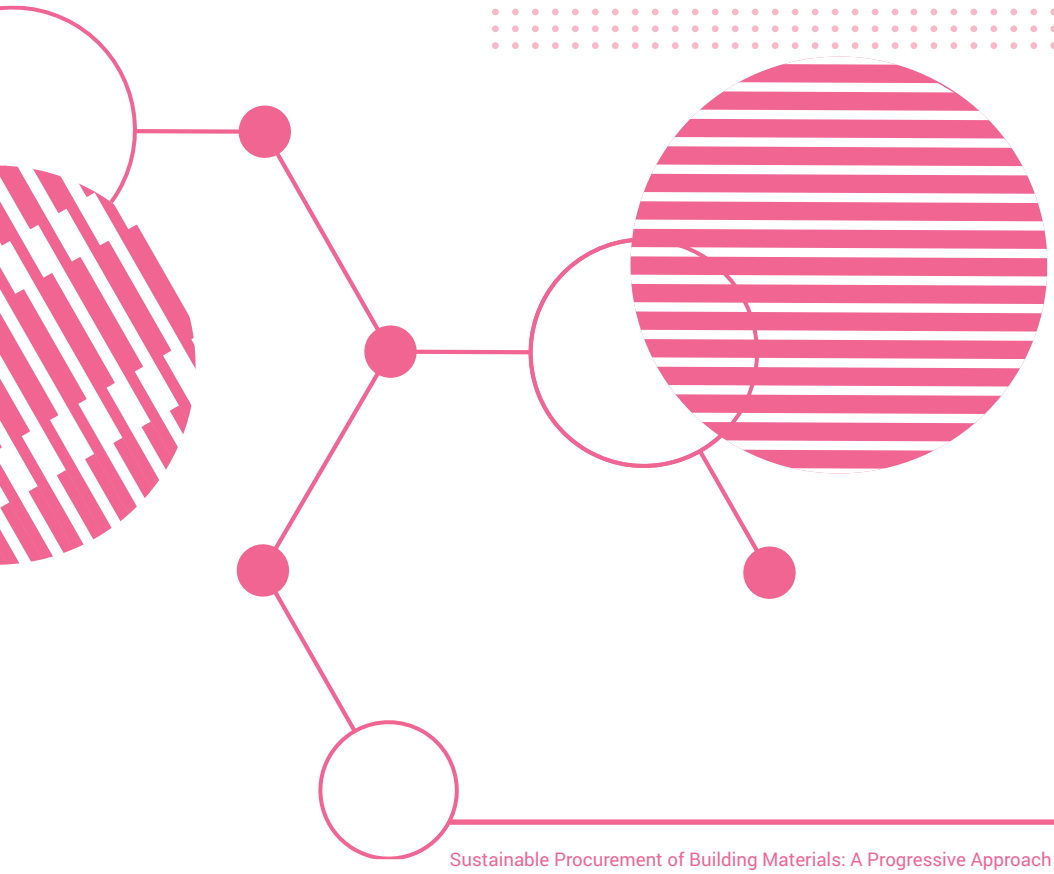
Policymakers can contribute to the effectiveness of procurement as an instrument to address:

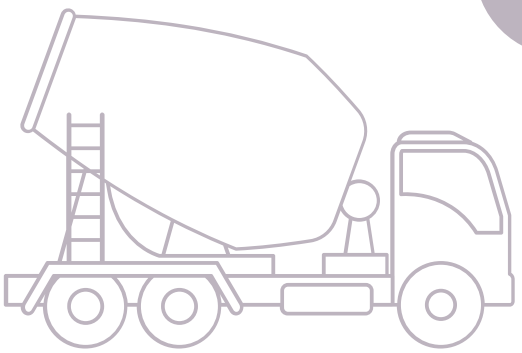
Recommendations

- **Ensure policy analysis is carried out and reported using the most important metrics, considering which are the most relevant economic and health metrics, with timescales established for delivering benefit**. Publicize where policies have delivered excellent value for money, and use metrics to make a compelling case for funding, and demonstrate where SPP might offer better value for money than other interventions.
- **Further encouraging inclusion of CoC criteria within the various instruments that can influence procurement**. There is further provision for addressing CoC within ecolabels, building ratings schemes, standards and codes, which can then be referenced in procurement specifications. This requires sound analysis of policy, understanding of the market, and effective convening of the bodies and stakeholders required to implement this change, ensuring criteria set is both ambitious and achievable.
- **Consider the role of monitoring and enforcement bodies, as this is crucial to compliance, creating a level playing field for procurement and market confidence**. Lessons learned from the LEEP project's development of the case for a phase-out of lead paint in Malawi suggest that the presence of legally-binding regulation is often insufficient. Further capacity and funding in this area may be needed to ensure SPP programs remain effective. Other areas such as building testing capacity can contribute to improved compliance, and follow-up studies and ongoing engagement with the market can present a strong evidence base and help initiate market transformation.
- **Develop voluntary standards, where there are no mandatory standards and limited institutional capacity in place, to enable procurers to start setting criteria for safer and more sustainable products**. Policymakers are a key conduit for this to happen, and must ensure sufficient knowledge, impartiality, and balance on working groups formed.

Recommendations

- **Determine if legal instruments can drive further development of SPP programs by local authorities**. Analyze examples from other regions that could be applied, e.g., staged phase-out regulations on a chemical, or mandatory data reporting and labelling. For example, the Philippines won a Future Policy Award for banning lead in all paints, which involved implementing a certification program, and concerted efforts from industry to improve and comply. This further ambition and strong industry engagement was key to the success of the policy and an example for other countries seeking to increase ambition in this area.
- Support innovation by increasing connections between industry and research to tackle specific problems related to chemical safety. Innovations in safer building products may require funding support, incentives, and greater scale to be able to be brought to market quicker.





Good practice examples

Sustainable Procurement of Building Materials:
A Progressive Approach to Chemicals of Concern

Case study 1
Procurement of safer, more circular office furniture in Denmark

Denmark's central procurement agency was able to leverage public procurement to provide improved furniture for a range of municipalities across the country and generate cost savings through the scale generated by a large framework arrangement. This was made possible by using a joint strategy for smart public procurement across more than 60 municipalities, as well as setting ambitious sustainability criteria addressing chemicals of concern, responsible sourcing and design for disassembly.

The Framework agreement for the procurement of sustainable furniture specified the following criteria:

- Absence of undesirable chemical substances as listed in the 'List of undesirable substances 2009' from the Danish Environmental Protection Agency. This incorporated criteria from the Nordic Swan ecolabel covers biocides, fill materials, coatings, dyes and flame retardants.
- Requirements on emissions in meeting the Danish Indoor Climate Label.
- Chemical requirements set in the manufacturing processes of furniture.
- Requirements for separation and recovery of metal components. In this context criteria specified that metals must not be coated with cadmium, nickel, zinc, or their compounds.
- Demonstration of responsibly sourced wood, or a minimum level of 70% recycled wood.

One supplier was selected for the contract from five bidders, with the contract lasting four years at a value of approximately 27 million Euros. As a result of the scale achieved, cost savings for municipalities using the framework were up to 26% compared to the current market price.

This addressed the main environmental hotspots for office furniture across the life cycle – the uncontrolled sourcing of timber, and use of chemicals of concern. Additionally, through the requirements on specifying safer chemicals in metal coatings, this encouraged further reuse and recycling of these components. As a voluntary clause, in some cases the supplier was able to offer take-back of furniture to enable it to be reused, re-sold or donated.

Source: European Commission - GPP in Practice

Case study 2
Alignment of legal instruments with public procurement to shift the market away from lead in paint in Asia

Under the SWITCH-Asia Lead Paint Elimination Project, several Asian countries have committed to mandatory standards to reduce lead levels in paint and align public procurement contracts with this level to incentivize the market to improve.

Case study 2 *(cont.d)* Alignment of legal instruments with public procurement to shift the market away from lead in paint in Asia

- In Nepal in 2015, a limit was set for paint at 90 ppm, in line with the most ambitious international standards. The Department of Education required all schools to use paints compliant with this standard.
- In the Philippines, the 90 ppm limit was introduced within Philippine National Standards in 2015, alongside development of the voluntary Lead Safe Paint® certification. The Department of Education issued orders for mandatory use of the Lead Safe Paints in schools, and various cities also adopted ordinances for procurement of Lead Safe Paints for publicly funded construction, maintenance and renovation activities. The market transformation was rapid – in 2013 39% of paints had lead levels below 90 ppm, increasing to 76% in 2017. Factors that contributed to success included strong efforts on compliance monitoring of the market; continuous information, education and communication activities on the issue; and promotion of paint manufacturers' voluntary participation in the Lead Safe Paint certification programme.

Mandatory standards are a powerful instrument to enable market transformation, as voluntary standards are not always followed by the market. In Indonesia, a voluntary standard of 600 ppm for lead paint was introduced in 2014. This was accompanied by an agreement on developing lead-free paint criteria in public procurement and, in 2022, the limit was reduced to 90 ppm. However, the standard remains voluntary.

UNEP has produced a factsheet on *Suggested Steps for Establishing a Lead Paint Law* to assist countries who have yet to implement this.

Sources:
Asian Lead Paint Elimination Project Partner Newsletter
Lead in Paint Regulation: Case Study – The Philippines

Case study 3 Cost competitive adhesive with reduced chemical impact: PureBond

In recent years, most glues used in wood composite boards have been urea-formaldehyde (UF) and phenol-formaldehyde (PF) resins. Yet these products may cause human health issues due to the off-gassing of formaldehyde, which is recognized by the World Health Organization as a potential human carcinogen, which can also cause irritation of the eyes, nose, lungs and throat.

However, development of no-added formaldehyde (NAF) glues and resins is a growing area, which not only provide a safer indoor environment, but are biodegradable and can also reduce the use of fossil-based feedstocks.

PureBond is a NAF adhesive based on abundant soybean feedstocks, taking inspiration from processes in nature initially researched by Dr. Kaichang Li of Oregon State university. The product came to market through research collaborations with Columbia Forest Products and Hercules, and can now demonstrate cost-competitiveness with UF adhesives. Panels made by Columbia Forest Products with PureBond can contribute towards LEED credits and are reported to be widely procured for buildings seeking to achieve compliance with air quality regulations and achieve higher building rating scores. PureBond also demonstrated meeting the California Air Resources Board (CARB) Phase 2 limits in its veneer core panels.

Case study 4 Tarkett Sustainable Flooring – reduced chemical impact, product stewardship, data transparency and collaboration

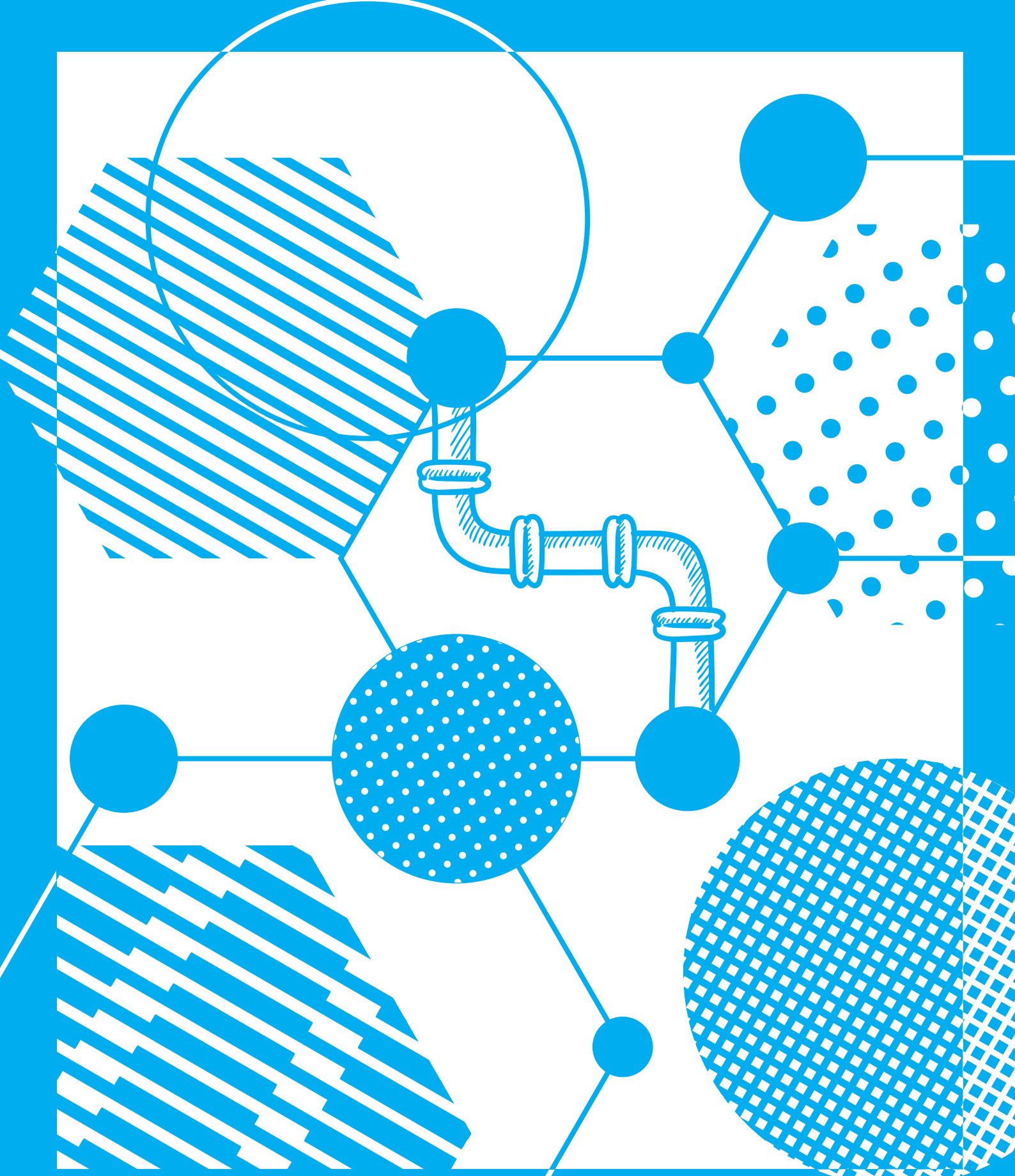
The flooring manufacturer Tarkett has introduced several measures that improves the safety of its product, material efficiency, and data provision. This has been reported to have increased its competitive advantage in tenders. Key initiatives include:

- Development of phthalate-free and low-VOC technology in some of its vinyl flooring ranges.
- Using Material Health Statements on its website for a number of products, which provides transparency for plasticizers used as substitutes for high-concern phthalates, defining the exact chemical used alongside a safety rating and justification. Proprietary chemicals are used that have a grey rating and some substances have red ratings – while this suggests improvements in chemical safety can also still be made, this approach is an overall improvement in encouraging the industry to shift towards a culture of transparency.
- Tarkett operates the ReStart Takeback and Recycling Programme, which enables product collection at the end of its life, reducing waste and enabling use of recycled materials in new products. This is supported by collaboration with construction firms to train workers to engage site workers in product collection and write circularity goals into agreements.
- Collaboration with the Supply Chain Sustainability School helped Tarkett to communicate its sustainability credentials and provide an improved reputation, described as acting as an informal 'pre-check' for customers.

Case study 5 Building materials demonstrating cleaner production: Typhaboard

While the material is still not fully at market, the architectural material Typhaboard has great potential as a cleaner production (see section C3) technique. Typhaboard is made from the cattail plant, an abundant resource in marshes throughout the world. As such, its sourcing fits well with landscape management policies that a municipality may conduct – in Senegal, cattail is considered harmful and invasive and harvesting for use as a building material has benefits.

The material itself does not contain toxic chemicals. Further application is in development, supported by the German Federal Environmental Foundation and the Fraunhofer Institute for Building Physics IBP. Development testing is exploring how low toxicity binders (such as magnesite) may be used with the material, as well as exploring fire resistance properties, such that chemical flame retardants may not be needed. The material demonstrates good thermal properties alongside its circular potential and benign chemical profile.



Product Profiles

Sustainable Procurement of Building Materials:
A Progressive Approach to Chemicals of Concern

PRODUCT PROFILES

1. Paints and coatings

Example product types

Solvent-based	Water-based / Emulsion	Synthetic rubber	Enamel
Lead-based	Synthetic polymeric cellulose	Plastic	
Oil-based	Bituminous	Silicate	
Cement-based	Anti-corrosive	Casein	

Common procurement codes

GPC Brick	Description
10003874	Household paints
10008048	Undercoats / Primers
10002466	Wood finish / Treatments / Coatings
10002688	Roof coatings
10008116	Finishing and texture coatings

Examples of associated CoC

Lead	Diisocyanates	Ortho-phthalates
VOCs	Nonylphenol ethoxylates	Tar compounds
Acrylamide	Octylphenol ethoxylates	TCEP tris(2-carboxyethyl) phosphine
PFAS	Organotin compounds	
Cadmium and chromium	Phenolic benzotriazoles	

Example product-specific procurement specifications and CoC level criteria

- GreenNY Specification: Paint, and Coating Removal Products
- Irish GPP Criteria: Office Building Design, Construction and Management. Emissions limits (ug/m^2) for TVOCs, SCOVs, Formaldehyde, and carcinogens including trichlorethylene, benzene, DEHP, and DBP
- EU green public procurement criteria for paints, varnishes and road marking
- ÖkoKauf Wien — green public procurement in Vienna: Interior colours, Coatings for wood and metal and paint strippers (interior), Facade colors, Coatings and Strippers for Wood and Metal in Exterior Applications
- 2022 Washington State green purchasing guide – Paints and primers, paints and coatings, paint removers and thinners

Example labels and standards

- EU Ecolabel for Indoor and outdoor paints and varnishes
- M1
- GEV-EMICODE EC1
- Finnish Allergy Label
- Nordic Ecolabel for indoor paints and varnishes
- Cradle to Cradle
- UL GREENGUARD Certification
- Green Seal certification paints, coatings and adhesives
- EPA Lead-Safe Certification
- SCS Indoor Advantage
- Umwelt-Etikette
- Colombian Technical Standard NTC-1335 for Emulsion-type water-based paints
- Colombian Technical Standard NTC-5828 for Emulsion-type water-based paints for high resistance exterior use
- ASTM G21/Colombian Technical Standard NTC-5429 for Determination of resistance of synthetic polymeric materials to fungi

2. Building plastics

Example product types

Reinforced plastic	PE	PC
Plastic resin	ABS	Rubber
PP	PVC	

Common procurement codes

	Sector	Subsector
NAICS	Manufacturing (31 - 33)	Plastics and Rubber Products Manufacturing (326)

GPC Class	Description
83011100	Doors
83010900	Window

Examples of associated CoC

Presence of phthalates (endocrine disruption concerns	Chrysotile Asbestos (e.g., in reinforced PVC and other plastic and resin composites)
Microplastic release and plastic degradation in environment	Perfluorohexanesulfonic acid (PFHxS), its salts and PFHxS-related compounds
Contamination from recycled sources (e.g., certain metals)	Acrylic acid
Vinyl chloride monomer (VCM)	

Example product-specific procurement specifications and CoC level criteria

- ÖkoKauf Wien — green public procurement in Vienna: Liquid plastics for roof and building waterproofing and Plastic and elastomer webs
- St Albans City District Council Sustainable Procurement Strategy – Plastics

Example labels and standards

- Nordic Swan plastic and biobased plastic
- Blue Angel label for plastics and EUCertPlast certification scheme
- Compostability Mark of European Bioplastics
- Compostable: Biodegradable Products Institute Label
- GreenPla / Biodegradable Pla – Japan BioPlastics Association
- RSB Certification Mark

3. Insulation

Example product types

Polyurethane (foams)	PIR	Fiberglass
Mineral wool (roll)	EPS and XPS (boards and slabs)	

Common procurement codes

GPC Class	Description
83010300	Insulation

Examples of associated CoC

Formaldehyde, lead, mercury, nanomaterials, PVC, phthalates, flame retardants, PFCs, antimicrobials, coal fly ash	Tributyltin compounds
Perfluorooctane sulfonic acid (PFOS) and related substances	Chromium (VI) compounds
Vinyl chloride monomer (VCM) in production	Certain solvents and volatile organic compounds (VOC)
Timber/wood flooring: CCA (chromated copper arsenate) PFAS	Certain tar compounds
Pentachlorophenol (PCP) and related compounds preservatives	Synthetic vitreous fibres (irritation – 'fiberglass itch')

Example product-specific procurement specifications and CoC level criteria

- Irish GPP Criteria — Office Building Design, Construction and Management
- ÖkoKauf Wien — green public procurement in Vienna: Insulating materials made from mineral raw materials
- 2022 Washington State green purchasing guide: Insulation

Example labels and standards

- M1
- GEV-EMICODE EC1
- CEN Keymark for Building Insulation
- EN 13171 for wood fibre insulation
- EN 13168 for wood wool insulation
- EN 13170 for expanded cork insulation
- ETA-5/0186 for cellulose insulation
- SCS Indoor Advantage
- Minergie-ECO

4. Flooring

Example product types

Carpets	Cork	Ceramic
Porcelain	Bamboo	Rubber
Wood	Stone	Laminate
PVC	Marble	Linoleum

Common procurement codes

GPC Class	Description
83011500	Decking / Railing
83010100	Wall / Ceiling / Flooring coverings - Includes bricks for all materials and product examples listed

Examples of associated CoC

PFAS in stain repellents	Halogenated flame retardants
Ortho-phthalates in vinyl flooring	Isocyanates in carpet backings
Coal fly ash in carpet backings	Antimicrobials

Example product-specific procurement specifications and CoC level criteria

- GreenNY Specification: Floor Coverings
- Irish GPP Criteria — Office Building Design, Construction and Management. Emissions limits (ug/m2) for TVOCs, SCOVs, Formaldehyde, and carcinogens including trichlorethylene, benzene, DEHP, and DBP
- San Francisco Department of the Environment Regulation #SFE 207 8-01-PPO/GBRCBO. Adopting Approved Alternative Products for Sustainable Carpet for City Department
- ÖkoKauf Wien — green public procurement in Vienna: Textile floor coverings, Resilient floor and wall coverings

Example labels and standards

- EU Ecolabel Coverings / Wood-, cork- and bamboo-based floor coverings
- GEV-EMICODE EC1
- Green Label Plus - CRI - Carpet and Rug Institute
- NSF/ANSI 140; NSF – 332
- Label STEP
- Cradle to Cradle
- SMaRT Consensus Sustainable Product Standards
- CRI Green Label
- Good Weave
- SCS Indoor Advantage; SCS FloorScore; SCS Sustainable Carpet Certification

5. Interiors and furniture

Example product types

Wooden and fabric furniture	Fittings	Wall coverings

Common procurement codes

	Sector	Subsector
NAICS	Manufacturing (31 - 33)	Furniture and Related Product Manufacturing (337)

GPC Segment	Description
75000000	Household / Office Furniture / Furnishings

Examples of associated CoC

Formaldehyde in adhesives	Halogenated flame retardants
PFAS in adhesives	Plasticizers, fungicides, and colourants in vinyl wallpapers

Example product-specific procurement specifications and CoC level criteria

- GreenNY Specification: Furniture, and Outdoor Furniture and Playground Structures
- Irish GPP Criteria:
  - Office Building Design, Construction and Management: Waste management system including furniture collection and reuse or recycling
  - Guidance for the public sector: Specifying reused furnishings and fittings in office buildings
- Massachusetts OSD spec OFF38: Environmentally Preferable Furniture for Indoor Air Environments
- 2022 Washington State green purchasing guide: Office furniture

Example labels and standards

- ANAB - Architettura Naturale
- SCS Indoor Advantage
- CertiPUR
- LEVEL mark
- Indoor Air Comfort – Eurofins
- NSF/ANSI 336: Sustainability Assessment for Commercial Furnishings Fabric
- ÖkoControl

6. Plasterboard / Drywall

Example product types

Natural gypsum	Synthetic gypsum	Lime plaster

Common procurement codes

GPC Brick	Description
10002540	Gypsum / Cement board

Examples of associated CoC

Presence of mercury in synthetic gypsum production	Landfill emissions and leaching (H2S, mercury)
Dust emissions during installation, effect on indoor air quality of additives	Mercury (persistence and bioaccumulation potential, toxicity)

Example product-specific procurement specifications and CoC level criteria

- Irish GPP Criteria - Office Building Design, Construction and Management: Site and demolition waste audit management plan, including plaster and gypsum panels
- 2022 Washington State green purchasing guide: Drywall, gypsum panels
- US specification that products shall meet the California Department of Public Health (CDPH) Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.

Example labels and standards

- M1
- Biopreferred Programme – Federal Purchasing (US), and USDA Certified Biobased
- GEV-EMICODE EC1
- Cradle to Cradle
- SCS Indoor Advantage Gold

7. Wood and timber products

Example product types

Hardwood and softwood beams and boards	Composite boards

Common procurement codes

	Sector	Subsector
NAICS	Manufacturing (31 - 33)	Wood Product Manufacturing (321)

GPC Class	Description
83010700	Structural Components / Assemblies
81010500	Lawn / Garden Fencing
83011500	Decking / Railing
83011100	Doors

Examples of associated CoC

CCA (chromated copper arsenate)	Chromium (VI) compounds
Pentachlorophenol (PCP) and related compounds preservatives	Certain solvents and volatile organic compounds
Formaldehyde emissions	Certain tar compounds
Tributyltin compounds	

Example product-specific procurement specifications and CoC level criteria

- Irish GPP Criteria - Office Building Design, Construction and Management: Emissions limits (ug/m²) for TVOCs, SCOVs, Formaldehyde, and carcinogens including trichlorethylene, benzene, DEHP, and DBP; Sustainable sourcing of timber, including FSC and PEFC certified timber; EPD and LCA requirements; Site and demolition waste audit management plan, including timber
- Efeca/European Commission (2018) Draft proposal: GPP/ Ecolabel criteria for timber and timber products
- Danish Ministry of the Environment (2014) Criteria for assessment of timber: Certification schemes and results for FSC and PEFC.
- ÖkoKauf Wien— green public procurement in Vienna: Wood and wood-based materials
- 2022 Washington State green purchasing guide – Landscaping timbers and posts

Example labels and standards

- Forestry Stewardship Council (FSC)
- Programme for the Endorsement of Forest Certification (PEFC)
- Australian Forest Certification Scheme
- Lembaga Indonesia Ekolabel

8. Adhesives and sealants

Example product types

Adhesives	Acrylic, epoxy, synthetic polymeric (e.g. polyurethane)
Sealants	Spray foam, polyurethane, silicone, acrylic, latex

Common procurement codes

GPC Brick	Description
10003204	Sealants

GPC Class	Description
83012100	Sealants / Fillers / Adhesives / Defect Agents

Examples of associated CoC

Volatile Organic Compounds e.g., formaldehyde, benzene, toluene, xylene, methylene chloride, isocyanates	Certain nonylphenol and octylphenol ethoxylates
Polychlorinated biphenyls (PCB)	Certain phenolic benzotriazoles
Short-chain chlorinated Paraffins (SCCPs)	Phthalates and certain ortho-phthalates (e.g., DEHP, DBP, DIBP and BBP)
Diisocyanates	Per-fluorinated alkyl substances (PFAS)
Perfluorooctanoic acid (PFOA) and related substances	Polybrominated diphenyl ethers (PBDE)

Example product-specific procurement specifications and CoC level criteria

- GreenNY Specification: Adhesives
- ÖkoKauf Wien— green public procurement in Vienna: Wood gluing, Elastic sealants
- 2022 Washington State green purchasing guide – Adhesives, Asphalt sealants
- Adhesives free of chemicals contained on the California Prop 65 list

Example labels and standards

- GS-36 Green Seal Standard for Commercial Adhesives
- ASTM G21/Colombian Technical Standard NTC-5429 for Determination of resistance of synthetic polymeric materials to fungi
- CRI Green Label
- SCS FloorScore

9. Ceramic tiles

Example product types

Glazed and unglazed ceramic floor tiles

Common procurement codes

GPC Brick	Description
10002443	Flooring - Ceramic/Porcelain Tiles

Examples of associated CoC

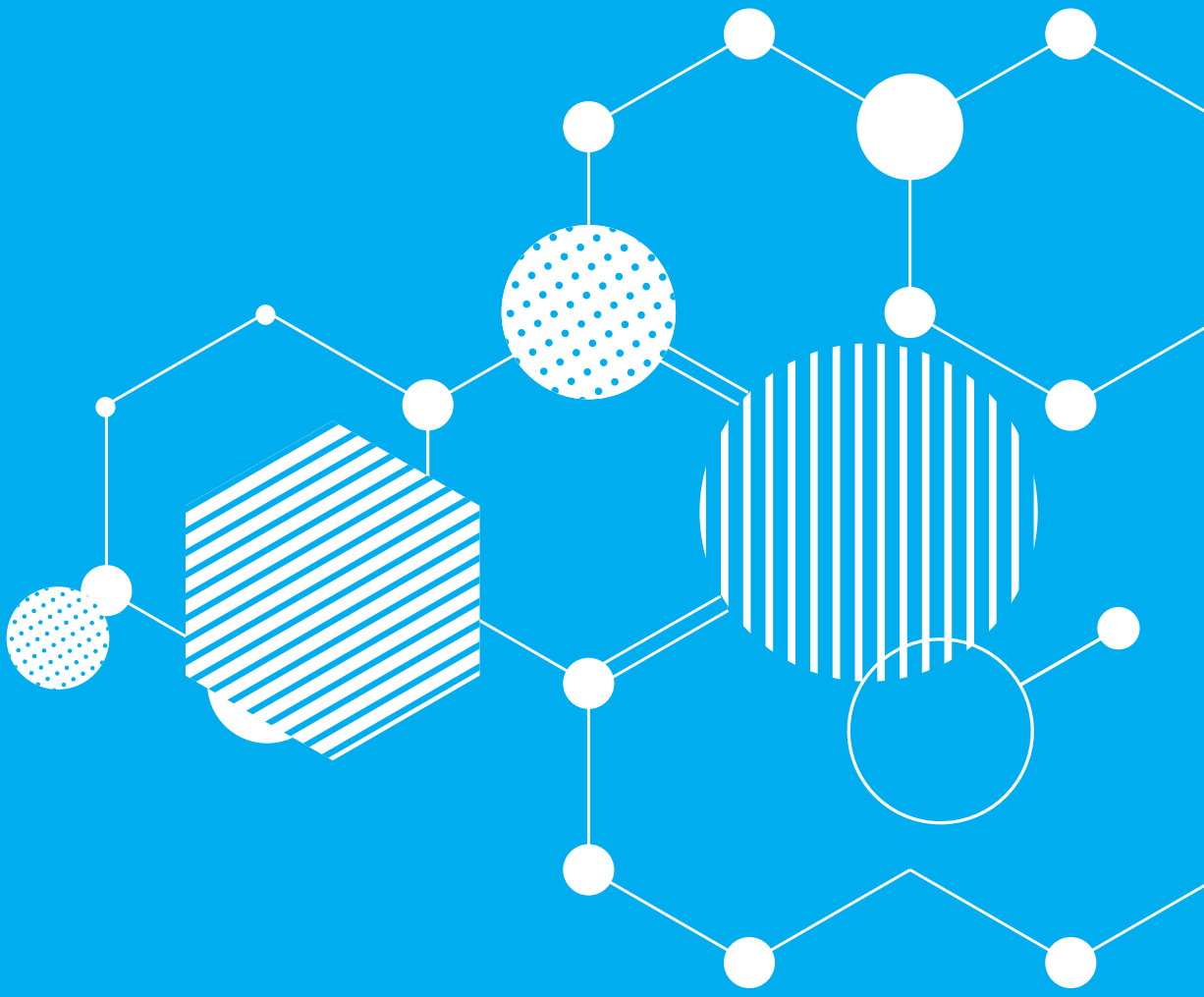
Certain metals (e.g., cadmium, antimony in glazes)	Dust emission in production

Example product-specific procurement specifications and CoC level criteria

- Irish GPP Criteria - Office Building Design, Construction and Management – Site and demolition waste audit management plan, including ceramic tiles

Example labels and standards

- ISO 17889-1:2021: Ceramic tiling systems — Sustainability for ceramic tiles and installation materials — Part 1: Specification for ceramic tiles
- EU Ecolabel for hard covering products
- Turkish Ecolabel for Ceramic Tiles



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