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Advancing Supply Chain Transparency for Chemicals in Consumer Products

Snapshot of the Health Product Declaration Open Standard for Building Materials in the United States

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Table of Contents

	List of Abbreviations and Acronyms	**4**
1	**Introduction**	**5**
2	Sector overview and potential impacts on human health or the environment	7
3	Main barriers to and drivers of supply chain transparency	9
4	HPD Open Standard as best practice	12
5	Impacts of the HPD Open Standard	15
6	Outlook	16
	References	**19**

List of Tables and Figures

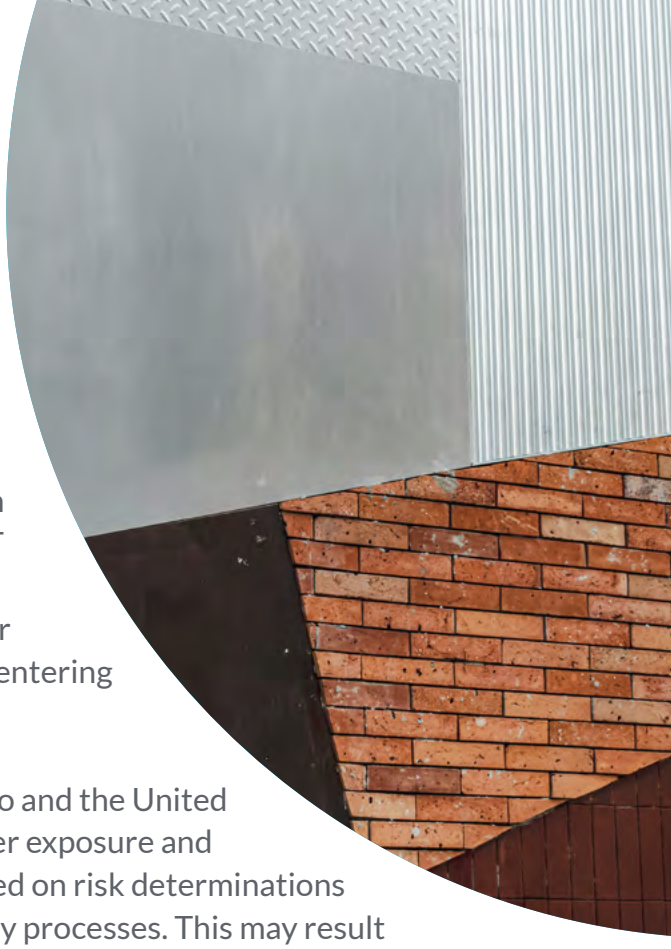
Table 1. Examples of chemicals that may be of concern that are commonly found in building products 8

Table 2. Priority information shared in the HPD standard for each substance used in a final product 13

Figure 1. The HPD Open Standard was released in 2012 10

List of Abbreviations and Acronyms

CaCBC	Canada Green Building Council
CEC	Commission for Environmental Cooperation
EPA	Environmental Protection Agency (United States)
EPR	Extended Producer Responsibility
HBN	Healthy Building Network
HCWH	Healthcare Without Harm
HPD	Health Product Declaration
HPDC	Health Product Declaration Collaborative (initiative to manage information on materials and substances used in vehicles)
LEED	Leadership in Energy and Environmental Design
NGO	Nongovernmental Organization
OSHA	Occupational Safety and Health Administration
PFAS	Aer- and Polyfluoroalkyl Substances
SDS	Safety Data Sheet
SCT	Supply Chain Transparency
UNEP	United Nations Environment Programme



1. Introduction

The Commission for Environmental Cooperation (CEC) initiated the project entitled "Advancing Supply Chain Transparency (SCT) for Chemicals in Products" with the purpose of fostering collaboration among the North American countries to improve SCT and of enhancing governments' ability to identify and prevent products containing chemicals of concern,[1] or chemical substitutes of concern, from entering or re-entering the economy.

In documenting chemicals of concern, Canada, Mexico and the United States implement risk-based approaches that consider exposure and relevant uses of chemicals in consumer products based on risk determinations made through domestic, science-based and regulatory processes. This may result in risk determinations that differ among the three governments. For example, for any given chemical, the three governments may make different determinations as to whether and to what extent the chemical should be subject to regulatory action, based on its level of exposure and the specific uses in each country. The CEC recognizes such differences and underscores that not all the materials or examples within this report may be applicable to all three countries. The information derived from this project is intended to:

1) Support the development of resilient supply chains that respond to industry and other stakeholder requests for information on the chemical compositions of products,
2) respond to consumer demand for safer products and information on their chemical compositions,
3) inform trade and procurement decisions for raw materials, recycled materials, product components, and final goods, at various points within value chains and,
4) improve industry's ability to comply with chemical reporting requirements and other regulations.

[1] The UN Strategic Approach to International Chemicals Management (SAICM) definition of "chemicals of concern" includes "chemicals for which evidence for risk to human health or the environment is currently emerging from scientific research, but which are not yet regulated." The term has therefore been used deliberately to include not only chemicals for which domestic risk assessment and regulation have already been completed, but also additional chemicals where concern is emerging but there may not yet be sufficient scientific evidence for or consensus on the need for regulatory action (SAICM n.d.).

The main activities of this project included assessing global and regional SCT practices and tools and developing case studies highlighting SCT best practices and associated drivers of and barriers to their implementation. The present document is based on a combination of literature review and the engagement of experts and interested parties. This engagement included interviews, and an online consultation survey set up to help confirm common SCT practices and to identify best practices and the sectors leading their implementation. The survey was open from September 2023 to October 2023. Invitations were sent to 170 relevant organizations, from which a total of 65 responses were received.

The building products sector offers a few examples of chemical transparency throughout the supply chain. One of these, highlighted as a best practice for SCT by survey participants and expert advice, is the Health Product Declaration® (HPD) Open Standard developed by the Health Product Declaration® Collaborative (HPDC). The Open Standard guides manufacturers in reporting the chemical content of their products, along with the associated hazards. It was developed in the United States, with the aim of its being used by building products manufacturers in the United States and elsewhere. The Open Standard also has the potential to be adapted for use in other industry sectors.

This "snapshot" summarizes the development and use of the HPD Open Standard as a best practice for SCT in the United States. While not a comprehensive case study of the building materials sector across North America, it includes some information about the sector in Canada and Mexico, with a focus on the industry's use of the HPD Open Standard.

2. Sector overview and potential impacts on human health or the environment

The building products sector produces a complex and diverse set of goods, such as paints and coatings, flooring and roofing materials, and many other goods used to meet a range of applications (UNEP, 2021). It is classified under North American Industry Classification System (NAICS) code 4441: Building Material and Supplies Dealers. According to Business Research Insights, the global market for construction and building materials was valued at more than US$2 billion in 2024. Demand related to increasing urbanization and its corresponding housing and infrastructure development needs is expected to result in consistent growth in this sector over the next decade.[2]

Building products such as paints, varnishes, foam insulation, flooring materials, roofing materials, and others can contain substances that have been identified by one or more of the three North American countries as being chemicals of concern.[3] For example, halogenated flame retardants, such as tris (2-chloroethyl) phosphate, are used as plasticizers in insulation foam, adhesives and resins, back-coatings for carpets, and roofing; volatile organic compounds (VOCs) are used in paints, varnishes, coatings, adhesives, and engineered wood products; per- and polyfluoroalkyl substances (PFAS) are used in wood board, drywall, paint, plaster, textile floor covering, and other products; and diisocyanates are used as a cross-linking agent in polyurethane products such as ridged and flexible foams, paints and sealants (UNEP, 2021). Table 1 provides examples of chemicals that are commonly found in building products and that may be of concern due to their potential health and/or environmental impacts.

[2] Business Research Insights. Source: https://www.businessresearchinsights.com/market-reports/construction-and-building-materials-market-118406.

[3] Each of the three governments takes into consideration available information on chemicals used in building products, along with information on levels of exposure and specific uses in its country, when making risk determinations on safe levels of chemicals in those products.

Table 1. Examples of chemicals that are commonly found in building products and that may be of concern due to their potential health and/or environmental impacts

 Adhesives and sealants	 Paints and coatings	 Insulation products	 PVC materials or products
Diisocyanates, nonylphenol and octylphenol ethoxylates, phenolic benzotriazoles, ortho-phthalates, certain industrial solvents, volatile organic compounds such as formaldehyde, tris (2-chloroethyl) phosphate	Acrylamide, cadmium and its compounds, hexavalent chromium compounds, lead, 2-Butoxyhexanol, certain organotin compounds, certain industrial solvents and volatile organic compounds	Asbestos, diisocyantes, perfluorohexanesulfonic acid (PFHxS), its salts, and PFHxS-related compounds, tris (2-chloroethyl) phosphate	Lead, cadmium and its compounds, asbestos, dechlorane plus, certain organotin compounds

Note: This table is not comprehensive and was adapted from the UNEP Chemicals of Concern, in the Building and Construction Sector report (2021).

3. Main barriers to and drivers of supply chain transparency

Barriers

The wide range of goods used and manufactured by the building products sector creates a challenge relative to providing transparency throughout the supply chain. As stated in UNEP's 2021 report on chemicals of concern in building and construction products, "*one chemical may be used in multiple different applications throughout the sector, leading to a large number of different chemical-product combinations with sometimes very different fields of use.*"

Many North American manufacturers do not disclose the composition of a product beyond what is required by regulatory standards, which vary by chemical, product type, country and state. In the United States there are limited regulatory requirements for SCT in the building products sector. The primary U.S. federal regulatory standard for SCT is the Occupational Safety and Health Administration's (OSHA's) Hazardous Communication Standard, which requires the preparation of safety data sheets (SDSs) for the purpose of ensuring occupational safety. This regulation is not specific to building products but does apply to them. There are, however, several U.S. state regulations that require disclosure of chemicals in building products, such as Maine's recent law requiring notification of the use of PFAS in all products (State of Maine, 2021). Manufacturers must also disclose additional chemical information when selling products in countries or regions that have their own chemical disclosure policies, such as the European Union.

A key barrier to the adoption of SCT in this sector is the lack of incentives for manufacturers to participate. Related to this is the need to provide evidence that such transparency efforts can translate into increased purchases by customers (Vittori, 2024). Certain language and information barriers also exist in this sector. For example, there are gaps in SCT for countries where English is not the primary language; and manufacturers might struggle to fill in the gaps in information when they are unable to get full information from their supply chains.

Catherine Kinsman-Neurauter, Acting Director of Market Engagement at the Canada Green Building Council (CaGBC), mentioned that another challenge can be the uneven understanding of building-product specifications among project workers (*e.g.*, subcontractors). She also noted that notwithstanding their expressed desire for the industry to adopt a global, recognized SCT tool such as the HPD Open Standard (described below), design firms continue to use their own materials libraries (Kinsman-Neurauter, 2024).

Drivers for creating the HPD Open Standard

Over a decade ago, a group of U.S.-based architects and designers seeking information about the chemicals in the products they were sourcing were a driving force for the development of the HPD Open Standard. These designers and architects wanted to make informed decisions based on the safety of the chemical ingredients of products, but there was a lack of information available (HPDC, n.d.a; Vittori, 2024; Walsh, 2024). While certain SCT standards existed in Europe, they varied greatly and thus created challenges for product manufacturers.

Figure 1. The HPD Open Standard was released in 2012. Version 3.0 will be available in fall 2025.

At the same time, a group of scientists involved in reduction in use of material and toxics was working to improve SCT as a means to reduce the use of hazardous substances in building products (Vittori, 2024; Walsh, 2024). Scientists at the Healthy Building Network (HBN), which was founded in the early 2000s, developed a tool called Pharos to create a scalable and standardized way to collect and share material ingredient information. Pharos is a database that provides hazard, use, and exposure information on hundreds of thousands of chemicals used in building products (Pharos, n.d.). This work drove the development of the Health Product Declaration Collaborative (HPDC) and the HPD Open Standard (or simply "HPD"). The HPDC was created in 2012 to develop a standardized method for sharing chemical ingredient information in building products, along with the health care sector, since several nongovernmental organizations (NGOs) identified a need for the use of safer chemicals in hospitals and other health care settings (Figure 1). One such organization is Healthcare without Harm (HCWH), which focuses on sustainability in the health care sector. Its goals include eliminating harmful chemicals and using safer alternatives in healthcare buildings (Healthcare Without Harm n.d.). HCWH had a role in developing the Leadership in Energy and Environmental Design (LEED) guidelines for health care (Vittori, 2024).

Certifications for sustainable, environmentally sound, and healthy buildings, such as LEED v4 and the International Well Building Institute's WELL certification, are driving the use of the HPD Open Standard in the United States and Canada today. Both certification programs include standards and credits for reporting and optimizing the chemicals used in building materials; and they consider the HPD Open Standard to be an acceptable chemical inventory and assessment program (IWBI, 2023; USGBC, 2024). For example, for LEED v4 certification, the HPD may be used "*to demonstrate the chemical inventory of the product to at least 0.1% (1,000 ppm)*" (USGBC, 2024). The HPDC states that the HPD is one of the most common tools for gathering documentation for compliance with LEED v4 and v4.1 requirements relative to building-product disclosure and optimization (HPDC, n.d.b), although not all HPDs meet the more stringent (*i.e.*, 0.1%) LEED chemical content reporting threshold related to its material optimization standard. Demand from certain large architect and design firms continues to drive transparency for chemicals in building products (Loader, 2024). Perkins&Will is an example of a large design practice that prioritizes healthier building products and the facilitation of SCT in the sector (Perkins&Will, n.d.).

4. HPD Open Standard as best practice

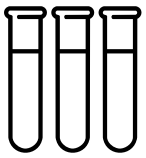
As mentioned above, the HPDC created the HPD Open Standard as a voluntary method for manufacturers and their suppliers to report and share chemical information and associated health hazards throughout the supply chain (HPD, 2023c). The standard provides guidance on how to create a Health Product Declaration and offers detailed information on other best practices for chemical transparency, such as sharing information on residuals and impurities in products.

Optional information that a manufacturer can provide in the HPD includes an evaluation of chemical residuals and impurities, information on the manufacturing location, the origin of the raw materials used, and additional explanatory notes about chemical ingredients. Manufacturers can also choose among various reporting thresholds (100 ppm, 1,000 ppm, threshold reported on the product SDS, or "other"), which affords some protection of proprietary business information.

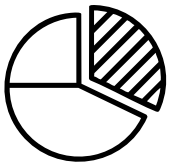
The HPD reporting format comprises two categories of chemical hazard information (HPDC, 2023c). The first category consists of chemical hazard types and warnings. Called the HPD Open Standard Priority Hazard Lists, this "list of lists" is based on the GreenScreen® for Safer Chemicals Specified Lists (which in turn are based on a chemical hazard assessment method developed by Clean Production Action to identify chemicals of concern and safer alternatives), as well as other authoritative lists developed in the EU, the United States, and elsewhere. Table 2 outlines the essential disclosure requirements of the HPD standard.

The second category of hazard information contained in the HPD is based on the GreenScreen® List Translator scores and GreenScreen® Benchmark Assessment results. The List Translator is a list-based hazard-screening approach that evaluates chemicals using information on hazard lists and "translates" hazard information into a score that indicates whether a chemical is a "chemical of high concern" (Clean Production Action, 2021). The Benchmark Assessment scores are based on full GreenScreen® assessments, which are more comprehensive than those used in the List Translator. The Benchmark Assessment includes a toxicological review based on scientific literature, hazard lists, and reviews of similar chemicals as a way of filling in data gaps (HPDC, 2023c). It produces a summary score (known as a Benchmark Score) that classifies a chemical as one of higher or lower concern.

Table 2. Priority information shared in the HPD standard for each substance used in a final product.



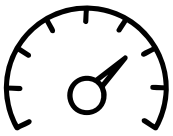
Substance identification



Percentage of the substance contained in the final product

Substance's role in the product

Substance's known health hazards



Substance threshold or disclosure level in parts per million (ppm)

Volatile organic compound (VOC) data and related certifications

Source: HPDC, 2023c

Manufacturers can create their Health Product Declarations using a tool called the HPD Builder. This tool helps manufacturers enter their chemical ingredient data, perform hazard screening, and format their reports to ensure compliance with the HPD Open Standard (HPDC, 2022). The HPD Builder utilizes the Healthy Building Network's Pharos Chemical Material Library, described above, to evaluate material contents for chemical hazards.

Completed HPDs are available for search and download in the HPDC's public repository. HPDs must be published in this repository, or be available in other standards and libraries, in order to qualify for certain certifications. Over 12,000 HPDs have been published in the HPDC's public repository as of December 2023, representing over 40,000 individual building products (HPDC, 2023b). Users of the repository include architects, designers, property owners, and others who use HPDs to meet chemical reporting standards for LEED v4/4.1 in the United States and Canada (HPDC, n.d.b; Loader, 2024). Canadian and U.S. manufacturers of building products are also familiar with the HPD Standard, and while there is some engagement from Mexican manufacturers selling their products in these two countries, there would be a need to translate HPD resources into Spanish (Vittori, 2024; McGrath, 2024).

5. Impacts of the HPD Open Standard

The HPD Open Standard has helped improve harmonization and consistency in reporting the chemical contents of building products and associated health information (HPDC, n.d.a). Prior to 2012, manufacturers relied on SDSs and Environmental Product Declarations (a lifecycle assessment method focused on environmental impacts), to share information about their products (HPDC, n.d.a; Walsh, 2024), which provided limited information for understanding chemical hazards. Architects, designers, building owners and others wanting to make more-informed decisions about building products created their own inventories and methods to fill the gaps in information, but these efforts to create more product transparency led to redundancy and inefficiency within the industry.

As mentioned, the public HPD repository helps to overcome barriers to access product information, with thousands of HPDs available to all levels of the supply chain, as well as to product assessors and customers. They are also useful for meeting certain green building certification criteria. However, as mentioned earlier, manufacturers have the option to withhold proprietary business information; and not all HPDs meet the more stringent LEED chemical content reporting thresholds. The Declare label, on the other hand, is another tool used in the building materials sector that requires the disclosure of "*all intentionally added ingredients and residuals at or above 100 ppm (0.01%) present in the final product by weight*" (International Living Future Institute n.d.). Manufacturers tend to choose a disclosure tool based on customer demand for either HPDs or Declare labels (McGrath, 2024). According to an interview with the Canada Green Building Council (CaGBC), HPDs are the primary method used to meet the LEED standard of reporting chemicals to the 0.1% threshold, while other disclosure tools, including Declare, are used to meet the more rigorous LEED standards (Kinsman-Neurauter, 2024; Loader, 2024).

It is difficult to measure economic, environmental, and health impacts of the HPD and related best practices, as they have been slow to be adopted and are still only used by a portion of the building products industry. As noted by Teresa McGrath (2024), Chief Research Officer at the Healthy Building Network, participation in a transparency initiative alone is not an indicator of health, economic or environmental impact. Product design, manufacturing, distribution, use, re-use, and end-of-life management, along with cultural practices, will need to change to create measurable impacts on health and wellbeing.

6. Outlook

While some barriers remain to the widespread adoption of recognized SCT tools such as the HPD Open Standard in the building products sector, there is an expectation that manufacturers using these best practices will have an economic advantage due to increasing downstream demand for transparency about the chemicals contained in products. Increasingly, online tools such as Ecomedes and Sustainable Minds are helping manufacturers and their clients measure environmental performance and the impacts of SCT practices (Vittori, 2024).

A recent trend in building material sustainability, noted by several project interviewees, is a shift from the emphasis on chemicals to a carbon focus. For example, the U.S. Green Building Council states that the newest version of LEED (v5) represents a milestone in the built environment's alignment with a low-carbon future (Baker, 2023).

Future opportunities to strengthen SCT practices

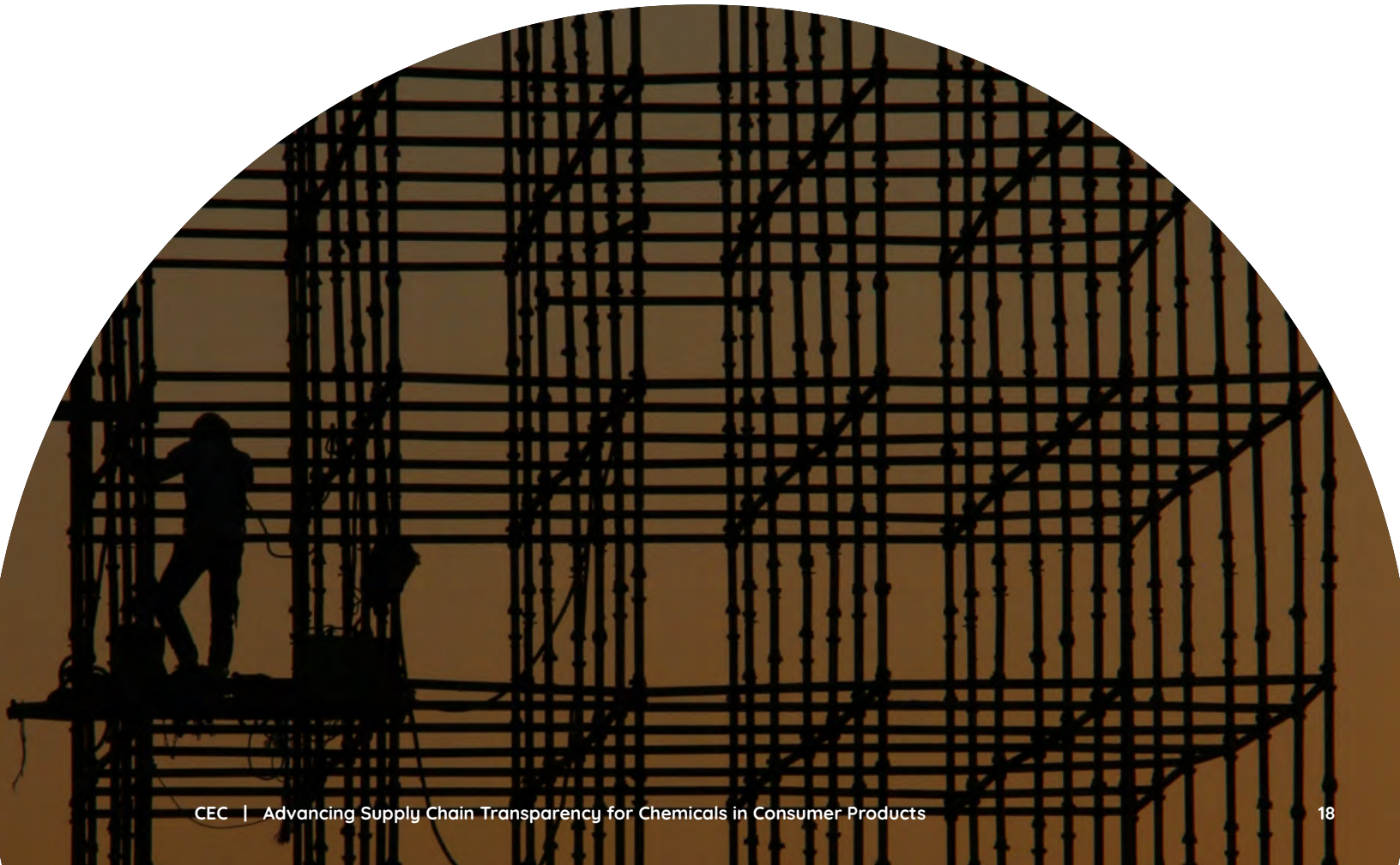
Future opportunities to strengthen participation in SCT practices include continuing to improve convenience for manufacturers by automating the reporting process. HPDC is working to adapt the Open Standard for use in the European Union. Specifiers and selectors are also beginning to ask for information on manufacturing and material sourcing locations to evaluate social equity and environmental concerns. HPDC has recently added an optional feature to the HPD called the Social Equity Location Indicator to "*capture where products are manufactured and where the substances and materials used as ingredients are made, extracted, farmed, refined, etc.*" (HPDC, 2023a). This, however, is an aspect that has not been embraced by all, including those who may be concerned with the potential for cross-referencing such data with other social equity measurements to identify potential social equity concerns.

The developers of the HPD Open Standard understood that creating an easy-to-use reporting system was essential for encouraging participation and transparency across the supply chain (Vittori, 2024). They focused on making the standard easy and affordable for manufacturers of building products and involved manufacturers in the development of the standard. Lessons learned from creating the Health Product Declaration for building products can help to advance transparency initiatives in other industry sectors.

Ideally, a transparency initiative would start with shorter-term objectives, such as understanding the current state and needs of an industry sector. The initiative would also feature an easy and accessible reporting format to demonstrate its feasibility and support early adopters. Longer-term objectives would include actions to scale up the initiative and support new users. It would also be critical to demonstrate the value of the initiative to manufacturers by illustrating its benefits and ease of use. Additionally, project interviewees point to the importance of ensuring corporate participation in the development of such initiatives to benefit from business experience, particularly regarding approaches for scaling up and creating collaborations with other companies within the same sector (Walsh, 2024).

In Canada, the Sustainable Building Materials Accelerator is a newer initiative formed by the CaGBC that aims to ensure that specifications for sustainable materials within a building project are known and understood by all divisions involved in completing the project (Kinsman-Neurauter, 2024). Though this initiative is being built with a focus on carbon specifications, there may be room to include material ingredient hazard specifications, as well.

Materials passports for the building products sector, which aim to support a more circular industry and sustainable built environment through the effective recovery and re-use of products and materials, are being developed in the European Union. Depending on the information that will be specified for collection, these passports may be helpful in tracking materials throughout their life cycles. This type of tracking is designed to be helpful for those making decisions about disposal, recycling, and the re-use of materials. Extended Producer Responsibility (EPR) initiatives, which require manufacturers to take back products at the end of their useful life with the aim of re-using the materials, can also serve as incentives for manufacturers to design out potentially harmful chemicals from their products.



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