Advancing Safer Chemicals in Products

The Key Role of Purchasing

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Acknowledgements

Institutional purchasing can play a powerful role in driving the marketplace for safer chemicals. While there are some examples of the impact of institutional purchasing in driving safer chemistry for specific product types, the broad potential of purchasing as an innovation driver in this area is largely untapped. The purpose of this document is to engage purchasing professionals, through a review of six case examples, in a dialogue on their role in accelerating the adoption of safer chemistry. This document is the product of more than a year of research and discussion with leaders in sustainable institutional purchasing.

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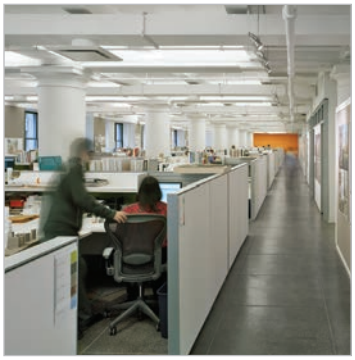

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Summary

Since the late 1980s, public- and private-sector organizations have been increasingly implementing and expanding environmentally preferable purchasing programs. As a result of these programs, supply chains are shifting towards safer, more sustainable products, transparency is increasing, and a growing number of products are available that are less harmful to people and the environment.

There are tens of thousands of chemicals in commerce in the United States. Many chemicals may have a range of negative impacts on health, the environment, and the economy during their lifecycle, from manufacture, through use and disposal. It should be a key part of any sustainable purchasing program to understand which of these chemicals could pose hazards in products and services procured, how they might harm users of those products or the environment, and what safer alternatives are on the market.

Issues such as energy efficiency and recycled content can be relatively straightforward for those who create and implement environmentally preferable purchasing guidelines and policies. The issue of toxic chemicals is more complicated.

This document profiles six organizations—from governmental to private-sector to not-for-profit—that are taking different approaches to screen and restrict products containing certain toxic chemicals or groups of chemicals and, as a result, are driving demand for safer chemistry; these organizations have developed processes beyond the use of third-party product certifications to identify and purchase safer products. It also describes their lessons learned, including:

- Understand Potentially Harmful Substances in the Products Purchased, and Set Priorities
- Create Strong Policy Based on Organizational Priorities, From Which Specifications Flow
- Set Goals and Track Progress
- Include a Broad Range of Chemicals and Products
- Understand the Marketplace and Engage Suppliers
- Engage Employees/Users
- Commit Resources
- Take a Broad View of Costs and Risks
- Recognize That Understanding and Reducing Harmful Chemicals in Products Is an Ongoing Process
- Build a Broad Network

The document also includes a resource section that describes organizations, tools, and resources that can help purchasers understand toxic substances in the products they buy and how to find safer alternatives.

The Case for Purchasing Safer Products

Public- and private-sector organizations are shifting the marketplace towards the creation of more sustainable products and services by increasingly implementing and expanding environmentally preferable purchasing programs. For example:

- In 2002, the State of Minnesota[1] issued a bid requiring vendors of vehicles on their state contract to disclose the presence of mercury components and eliminate them within three years. In response, automobile manufacturers replaced their passenger vehicles' mercury switches with electronic alternatives;
- In 2006, the State of California awarded a contract for low-mercury lighting equipment[2]; this caused a major manufacturer of fluorescent lamps to come up with a new formula. Because of these efforts, safer lights are now more readily available to a wider audience, at competitive prices.
- In 2014, San Francisco commissioned an alternatives assessment of safer disinfectants[3] that is now being used by jurisdictions and institutions across the US to transition to safer alternatives from bleach and other disinfectants that may be associated with asthma or cancer;
- Recently, 16 major companies[4] in several different sectors pledged to purchase products without chemical flame retardants, and manufacturers are responding.

While the first green purchasing programs, adopted in the late 1980s and early 1990s, focused largely on procuring products made with recycled content and/or those determined to be relatively energy-efficient, the adoption of policies and practices addressing chemical toxicity did not become commonplace until the mid- to late 1990s. Typically, toxicity issues have been addressed as part of a comprehensive environmentally preferable purchasing (EPP) policy, along with other environmental concerns. Such policies and practices focus on removing substances that may cause acute or chronic health hazards or build up in the environment.

There are tens of thousands of chemicals in commerce in the United States. It should be a key part of any sustainable purchasing program to understand which chemicals in products and services procured could pose hazards, how they might harm users of those products or the environment, and what safer alternatives are on the market. Many chemicals may cause a range of negative impacts during their lifecycle, from manufacture, through use and disposal. The histories of lead, asbestos, and mercury provide clear indications that product choices can have significant implications for health, the environment, and the economy. For example,

a 2002 study[5] found the economic cost of childhood lead poisoning, including neurologic damage, to be approximately $43 billion per year, years after lead was phased out and ultimately banned from gasoline. There has been evidence for many years that some chemicals commonly found in cleaning products, lawn care products, paint and other maintenance products, such as solvents, strong bases and acids, and some pesticides, may cause cancer, asthma, reproductive harm, chemical burns, and other acute hazards.

There is growing evidence that a significant number of chemicals in a wide range of formulated products and even articles, such as furniture and flooring, might lead to similar problems. For example, a recent study[6] from researchers at the Mount Sinai School of Medicine found exposure to Bisphenol A (BPA), as a result of its use in food and beverage containers, might be responsible for an estimated $3 billion a year in costs associated with childhood obesity and adult heart disease. There is also increasing evidence suggesting that BPA may be linked to other health problems, such as prostate[7] and breast[8] cancers, asthma,[9] endocrine[10] and reproductive[11] disorders, and behavioral issues.[12] Phthalates, softening agents commonly found in PVC plastic (vinyl), have also been associated with developmental and reproductive harm.[13] Polybrominated diphenyl ethers (PBDE), flame retardants used in furniture and electronics, have been linked to problems[14] with the reproductive system and brain development, as well as cancer. The Collaborative for Health and Environment lists more than 200 illnesses[15] that may be linked to chemical exposures.

Issues such as energy efficiency and recycled content can be relatively straightforward for those who create and implement environmentally preferable purchasing guidelines and policies. The issue of toxic chemicals is more complicated: information on chemical ingredients in products, even formulated ones, is difficult to obtain through complex supply chains; reduction of a hazardous chemical might lead to use of a substitute with different and potentially problematic toxicity characteristics; scant information is available on the impacts of many chemicals, alone or in combination, on human health and the environment, and the information available is frequently updated as new scientific information emerges; there are no easy metrics for evaluating reduction of toxicity in products or the health benefits of safer products; and generally, purchasers neither are trained nor have the time to dig into these complex issues. Adding to this complication is the fact that there can be trade-offs between toxicity and other sustainability attributes—for example, while the move to compact fluorescent bulbs saved energy, it also put more mercury in homes and businesses without adequately addressing the issue of safe collection and recycling.

Purchasers need to be savvier than ever about the many components of sustainability, but they have both large amounts of information to sort through and a mandate to keep prices low and ensure that products perform well—the goals that are primary in driving most institutional purchasing decisions.

The Key Role of Purchasing in Driving the Availability of Products With Safer Chemistries

The United States lags behind some other parts of the world in regulating chemicals found in everyday products. This lack of policy leadership makes it challenging for organizations to easily determine what chemicals are in the products they procure, whether these chemicals are harmful, and what safer alternatives might exist.

This lack of leadership, however, creates an opportunity for those who make purchasing policies and decisions to move the marketplace towards safer alternatives. To effectively take advantage of this opportunity, these individuals must become more educated on chemical issues, identify credible resources to guide and assist them, create clear direction for suppliers about what is desirable and what is not acceptable, and develop and keep up-to-date programs to screen for hazardous chemicals and make sure that they are substituted with safer alternatives. At a minimum, those who make purchasing decisions need to know enough to be able to ask thoughtful questions of suppliers, such as what chemicals are in the products they're purchasing, what the chemicals' potential hazards are, and what potential alternatives exist. Ideally, they will also engage with product and chemical users in their organizations about functional needs and opportunities for substituting safer chemicals and products. Such knowledge can help create organizational cultures, understanding, and networks that support safer chemistry.

Many public entities and businesses have found an easy way to begin purchasing safer products: specifying those certified "lower toxicity" by organizations such as Green Seal,[16] the US Environmental Protection Agency (under its Safer Choice Program,[17] formerly Design for Environment or DfE), the Cradle to Cradle Innovation Institute,[18] UL under its EcoLogo Program,[19] or the US Department of Agriculture's Organic Program,[20] or that meet design or sustainability standards such as EPEAT standards for electronic products[21] or the BIFMA Level standard for office furniture.[22] Certifications of low toxicity are available for general-purpose and specialty cleaning products, hand soaps, paints, laundry and dish detergents, janitorial paper products bleached without chlorinated compounds, some types of office supplies and building materials, food, and other products.

At a minimum, those who make purchasing decisions need to know enough to be able to ask thoughtful questions of suppliers.

Other organizations are restricting their purchases of particular types of products containing a specific chemical (such as, in medical

devices, mercury) or a class of chemicals (such as, in furniture and building products, brominated flame retardants).

Still other organizations are going even further, developing policies that cover a broad range of chemicals or chemical classes (such as persistent and bioaccumulative toxins, PBTs), using or creating tools and systems to collect information on where these chemicals/classes might be found in the products they buy, and undertaking procurement practices that build the market for safer alternatives. Six organizational leaders in the procurement of lower-toxicity products are profiled here.

Though this has not traditionally been considered their primary role, purchasers do have the ability to shift the marketplace towards safer chemistry. As an increasing number of policies, standards, and consumer pressures augment the demand for safer products, purchasers will increasingly need to know how to integrate consideration of chemical ingredients, hazards, and alternatives into their purchasing decisions.

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The Advantages and Disadvantages of Product Certifications

Many organizations are requiring the purchase of products that have obtained a particular sustainability certification or certifications. A certification is given to a product by a third party to attest that it meets standards or criteria specified by that third party.

Sustainability-related certifications, often demarcated by an ecolabel,[23] can help purchasers and their suppliers determine which products are safer for human health and the environment. Requiring the purchase of products that conform to the requirements of these certifications saves purchasers the work of sorting through various claims and data for individual products and having to become sustainability experts; purchasers only need to learn what types of products the certification covers and what criteria it includes in order to determine which certifications to specify and require that products purchased conform to the selected standards. These certification programs make the purchase of lower-toxicity products much easier because they level the playing field among products and ensure that the supplier's claims are verified. Specifying that products meet certain certifications can also prevent bid challenges because the selection criteria are transparent and more defensible. Certifications currently exist that are publicly and privately sponsored.

Participating in certification programs is also helpful to manufacturers and suppliers. It makes it easier for both groups to identify products in their offering that meet widely accepted environmental standards and criteria. In addition, it can reduce the need for them to fill out separate disclosure forms and comply with varying environmental requirements from each organization that wants to purchase their products. Finally, it helps them build their products or offerings to one (or a small) set of environmental requirements rather than to the different requirements of every purchasing organization, and demonstrating product conformance to certifying entities helps suppliers maintain the security of their confidential business information.

There are cautions and limits to relying on certifications, and these should be understood by those wanting to buy safer products, since not all standards and certifications are created equal.

However, there are cautions and limits to relying on certifications, and these should be understood by those wanting to buy safer products, since not all standards and certifications are created equal. It is important for purchasers to understand the certifications that they are considering in orderto ensure that the products

meet the criteria that are important to their organization and to their purchasing goals.

For example, certifications might not exist for certain products or categories of products. Some certifications, moreover, only cover a single toxic chemical (such as formaldehyde) or attribute (low Volatile Organic Compound, VOC). These are more limited than multi-attribute certifications such as Green Seal,[24] Cradle to Cradle,[25] Ecologo,[26] EPEAT,[27] and Safer Choice[28] that screen out many chemicals or classes of chemicals, and include in their standard criteria the addressing of a fuller range of other environmental and health endpoints such as recycled content, use of renewable materials, and more.

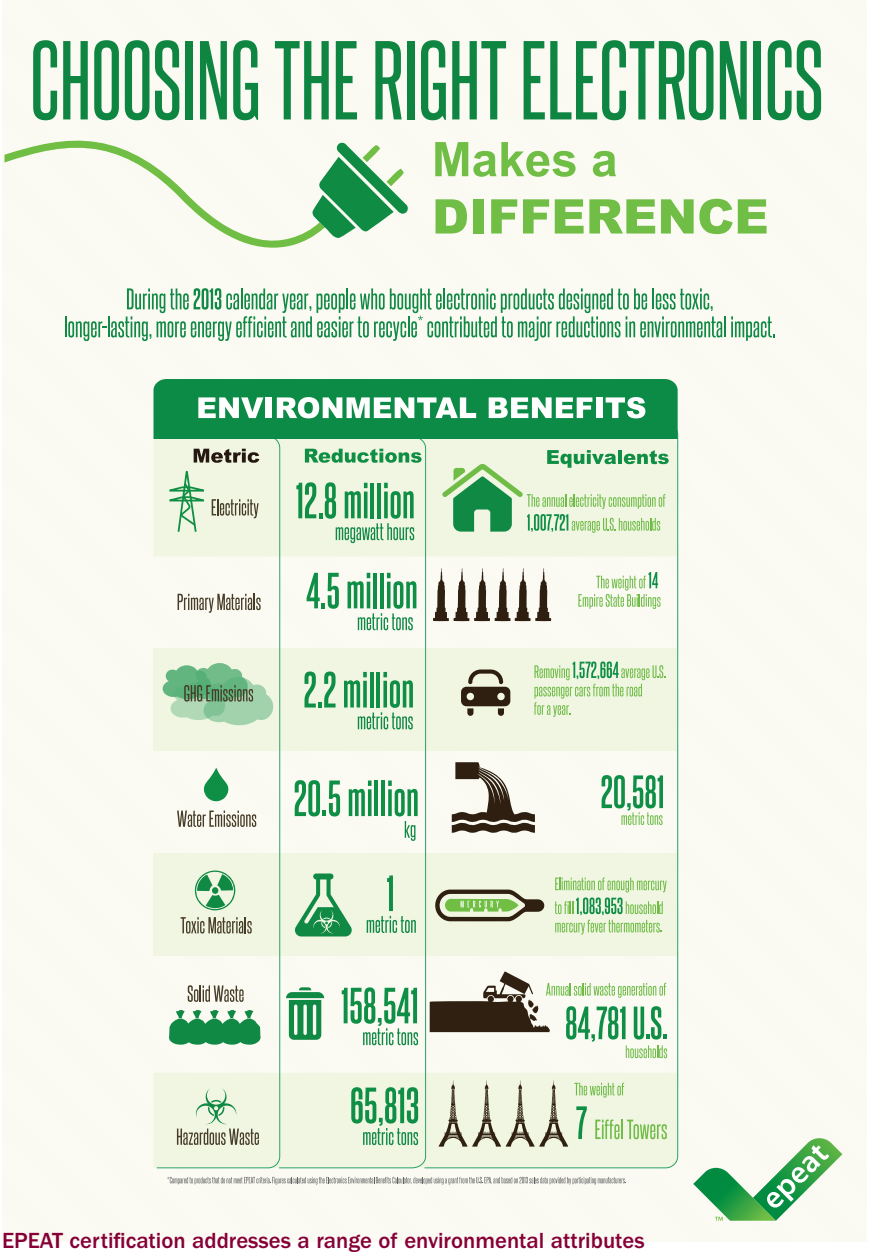
Some certifications look at the entire product lifecycle, while others only look at a specific part of it, such as product use or disposal. Some only give points or credit to products that meet certain low-toxicity criteria—but don't include it as a mandatory requirement.

Some certifications—particularly those that are developed solely by product manufacturers, distributors, or industry trade associations—may claim, often with little or no transparent information to back up the claim, that products are safer or less toxic; these could be a type of "greenwashing."[29] Other certifications can be viewed as relatively weak if the criteria they are based on are not transparent, evenly applied, or rigorous compared to other competing eco-labels in the same category.

Certain certifications may also be misleading if not properly understood. For example, products such as furniture and paint that have been awarded an ecolabel indicating that they are "low-emitting" may still contain chemicals of concern. While these "low-emitting" products are certified to release lower amounts of formaldehyde or other harmful chemicals, they may still cause harm to users over time, as well as toxic chemical-pollution problems from product manufacturing and disposal.

The most credible certifications are made by an accredited (by a member of the International Accreditation Forum[30] to ISO 17065[31] or ISO 17020[32] standards) independent third party. The standards should be clear and publicly available, and include criteria that require the review of lab results provided by the manufacturer, assessment of the chemical ingredients to ensure that they are safe both individually and in combination, and auditing of the manufacturing process. Some of the certification programs, such as EPA's Safer Choice,[33] have made it a requirement that products carrying their label must disclose the types of ingredients they contain.

Just because a product does not carry an ecolabel does not mean it is toxic or bad for the environment. There may be safer, high



EPEAT certification addresses a range of environmental attributes and drives the market for more sustainable electronics.

performing products on the market that have not gone through a certification process, or a certification may not yet exist for that type of product or may be so new that few products have received it. Manufacturers may choose not to have their products go through the certification process due to the time or expense the process takes. Purchasers can make the effort and expense pay off by using their contracts to reward companies that have gone to the trouble to get their products certified by an independent third party.

While requiring a certification is an important first step in purchasing more sustainable products, deferring to certifications lets the standard's developer, in essence, determine for the purchasing organization what "green" is, instead of leaving it to the purchasing organization to set clear priorities based on its own needs and interests and the potential ways its workers and customers might be exposed. In such cases, where certifications do exist to cover the desired products, purchasers can use them as a starting point and add additional chemical restrictions if they want even stronger standards to be applied.

The US Environmental Protection Agency (EPA) has a established a Safer Products Portal[34] that contains information about ecolabels and standards. EPA also recently issued draft guidance[35] to ensure the quality and usability of non-governmental standards and ecolabels for federal procurement efforts; this may be useful for other purchasing professionals and for those setting purchasing policies. A description of some of the more common credible ecolabels can be found in the Tools and Resource Section of this document.

Regardless of whether or not one specifies a product with a sustainability certification, it is still important to have a system in place to verify that chemicals of concern to the purchasing organization are addressed by the underlying standard, and that any products not covered by a certification exclude these substances.

Just because a product does not carry an ecolabel does not mean it is toxic or bad for the environment. There may be safer, high performing products on the market that have not gone through a certification process, or a certification may not yet exist for that type of product or may be so new that few products have received it.

How Six Leading Organizations Are Purchasing Products With Safer Chemistries

This document profiles six organizations—from governmental to private-sector to not-for-profit—that are taking varying approaches to screening and restricting products that contain certain chemicals or groups of chemicals, and developing processes to identify and purchase safer alternatives:

Kaiser Permanente[36] has developed a Chemical Score Card and works with suppliers to eliminate or reduce the purchase of products that expose its workers and patients to toxic chemicals;

Seattle City Light[37] has established a far-reaching policy that reduces the use of hazardous substances, phases out the use of products that pose human health or environmental risks, and increases the use of less harmful alternatives;

Perkins+Will[38] has developed the publicly available and searchable Transparency website that includes a precautionary list of 25 substances of concern commonly found in building and design products, describes why they are of concern, and identifies safer alternatives;

Coop[39] is working with its suppliers to eliminate endocrine disruptors and other chemicals of concern in public and private label products sold in its stores;

National Institutes of Health[40] is developing a process to screen for substances of concern and make it easier to purchase safer products;

Each of these organizations has undertaken significant effort to understand the issues and to build a dialogue and collaboration within and outside of their organizations.

Oregon Environmental Council[41] is working with public and private institutions to develop and implement policies on safer purchasing.

These organizations share an underlying interest in protecting worker and customer health and the environment. While each is advancing safer purchasing in different ways and prioritizing different chemicals or chemical groups, each has also undertaken significant effort to understand the issues and to build a dialogue and collaboration within and outside of their organizations. Their efforts yield key lessons:

Understand Potentially Harmful Substances in the Products Purchased, and Set Priorities:

- evaluate purchases and identify potential exposure pathways that are specific to your own workers, customers, and environmental and public health priorities
- create a list of priority chemicals, groups of chemicals, or chemical functions likely to be in the products and services you purchase

Create Strong Policy Based on Organizational Priorities, From Which Specifications Flow:

- develop a strong policy or policies about chemicals of concern and your desired outcomes
- create clear bid documents and specifications based on that policy

Set Goals and Track Progress:

- be clear and transparent about your desired outcomes
- make sure your suppliers, users, and customers understand program goals
- create processes to collect product chemical ingredient information
- put in place systems to track, evaluate, and report progress over time

Include a Broad Range of Chemicals and Products:

- put in place an approach that sets priorities across a broad range of chemicals, chemical classes, and product categories

Understand the Marketplace and Engage Suppliers:

- engage your suppliers and service-providers to understand where these chemicals might be found, what their functions are in the products, and whether safer alternatives exist or could be developed
- understand that, while safer products for particular product types might not yet be readily available, there is a need for continued pressure on the marketplace to create change

Engage Employees/Users:

- engage your employees and product-users in setting priorities and providing feedback about products
- ensure that users of the new products understand the program and the correct way to use the products
- communicate your progress
- set up systems that continue to function through employee turnover

Commit Resources:

- dedicate the resources to develop the needed policies, screening tools, educational efforts, and build and sustain internal and external relationships
- designate an employee or a group of employees to advocate, educate, search for alternatives, understand environmental trade-offs, engage stakeholders and experts, and move purchases and policies in the right direction

Take a Broad View of Costs and Risks:

- understand that "cost" goes beyond the direct cost of a product and includes impacts on workers, building occupants, and the environment
- consider your costs of managing the impacts of toxic products when comparing them to safer products

Recognize That Understanding and Reducing Harmful Chemicals in Products Is an Ongoing Process:

- recognize that putting systems in place to find and buy safer products cannot be a one-time or periodic effort; purchasing processes must keep up with ever-changing science and product availability
- educate and engage departments across your organization on an ongoing basis to build a culture of awareness around safer chemistry
- regularly evaluate and refine your program as needed

Putting systems in place to find and buy safer products cannot be a one-time or periodic effort.

Build a Broad Network:

- build partnerships with outside organizations and experts: consumer and advocacy groups; policymakers; universities and other researchers; practitioners in chemistry, public health, toxicology, and/or ecology; and suppliers—for support in research, education, setting priorities, and/or sourcing
- share your lessons with others in order to help move the marketplace

Identifying and screening out toxic substances in purchased products and services and transitioning to safer alternatives can be time-consuming and takes regular monitoring. As the institutions described here have found, though, it is worth the effort in terms of protecting worker, customer, and community health and safety; saving money in other cost areas, such as tracking or disposing of hazardous materials; creating a culture of change around environmental and public-health issues; gaining customer confidence; and increasing the availability and lowering the cost of safer products now and down the road. The organizations profiled here use a variety of tools and resources that help them in their work; these and others are described at the end of this document.

Case Studies

Kaiser Permanente

Program Overview

Kaiser Permanente,[42] one of the nation's largest health plans, uses a scorecard, third party-targeted research into the health effects of chemical exposures, and supplier engagement to identify the chemicals in its products that pose a high risk for its patients and workers and to find and promote the use of safer alternatives.

The *Supplier Sustainability Scorecard*[43] has been used by Kaiser Permanente since 2010. It requires suppliers of medical products to answer a range of questions[44] related to specific chemicals and internal chemicals policies, as well as other social and environmental practices.

In 2013, in addition to the scorecard, as part of its efforts to target high-risk products, the company asked its suppliers to provide full chemical disclosure for two products that could potentially contain chemicals of concern: mattresses and infant skincare products. Chemicals of concern in mattresses include halogenated flame retardants, volatile organic compounds, Bisphenol A (BPA), and phthalates, while skincare products can contain hormone-disrupting fragrances, respiratory irritants, and other toxic chemicals.

Kaiser Permanente's Environmental Health and Safety and Procurement departments work together to implement its safer-chemicals programs through a multidisciplinary Safer Chemicals Working Group. Some examples of Kaiser Permanente's accomplishments are transitioning to rigid endoscopes that use steam instead of chemical sterilization, sourcing PVC-free carpet and PVC- and DEHP-free PCA (Patient Controlled Analgesia) sets, and converting to DEHP-free IV (intravenous) administration sets.

Kaiser Permanente's "Supplier Sustainability Scorecard" requires suppliers of medical products to answer a range of questions related to specific chemicals and internal chemicals policies, as well as other social and environmental practices.

Targeted Chemicals

The program aims to broadly avoid products containing:

- Persistent Bioaccumulative Toxic Compounds
- Bisphenol A (BPA)
- Carcinogens, Mutagens, and Reproductive Toxicants
- Halogenated Flame Retardants
- Mercury
- Phthalates
- Polyvinyl Chloride (PVC)

Products are targeted based on known chemicals of concern (e.g., fragrances in infant care products) and/or the potential for exposure (e.g., DEHP in IV bags).

Program Drivers

Kaiser Permanente's efforts to identify and reduce toxic chemicals are driven by its Environmental Purchasing Program,[45] begun in 2006. Kaiser Permanente's EPP program fits into the company's goal of providing healthcare services in a way that protects and enhances the environment and the health of its employees, members, and communities now and for future generations. The policy requires that the principles of environmentally preferable purchasing be applied to all major purchasing decisions.

Kaiser Permanente found that credible ecolabels and third-party certifications are useful for certain types of products, such as cleaning products, electronics, and paint. However, ecolabels didn't necessarily cover the types of products the hospital typically buys.

Employee Engagement

Kaiser Permanente engages its employees in many ways. The company updates them on the program in general, as well as by product, with newsletters and fliers, and it ties its efforts to impacts on health. Kaiser Permanente has a National Products Council that provides leadership and support in product decision-making and helps translate successes into reliable and eye-catching data. The company also has Sourcing and Standards Teams, comprised of people who would use the new products, and these groups can also test these products. Kaiser Permanente's Environmentally Preferable Purchasing Program staff will meet with these teams when they have a particular product they want to target; they explain why they are targeting this product, what their goals are, and engage with the teams. Finally, the company has Environmental Stewardship Teams that come together and share information on chemicals, water, waste, food, etc. Corporate Communications members are part of the teams and identify ways to engage with the larger Kaiser Permanente community.

Engaging Suppliers

Kaiser Permanente tries to learn what chemicals could potentially be in a product before engaging with its suppliers. It then engages with them to understand the suppliers' chemical policies and, specifically, how they are avoiding substances of concern. There are various points in the process where suppliers can disclose information: pre-sourcing, sourcing, and implementation.

Kaiser Permanente tries to learn what chemicals could potentially be in a product before engaging with its suppliers. It engages with them to understand the suppliers' chemical policies and, specifically, how they are avoiding substances of concern.

Kaiser Permanente will sign nondisclosure agreements with suppliers to ensure that no information is made public but stresses to its suppliers that it is the company's right to know what is in the products it buys.

If a vendor refuses to disclose its chemicals, Kaiser Permanente will assume the worst-case scenario regarding chemical content, and this works against a supplier being chosen as a vendor.

Keeping Up With Changing Science

Kaiser Permanente staff members that engage in safer chemicals work rely on information from credible sources and outside experts, such as the Environmental Working Group,[46] Practice Green Health,[47] Pharos,[48] BizNGO,[49] and Health Care Without Harm.[50] The company believes that collaborating with outside experts is an important component of its success.

Tracking Progress

Kaiser Permanente sets milestones with weightings that are tracked over the years. At the end of a procurement process, which can span multiple years, the company can see how it scored. Where it makes sense, the company also measures the percent of a product or group of products that is free of a chemical, or how many pounds or tons of a chemical are no longer produced/year due to its efforts. There are many complexities to the program that are hard to measure; for example, the requirement that outside contractors buy the same types of products that Kaiser Permanente purchases directly. But Kaiser tries to keep working in smarter ways and developing long-term strategies.

Lessons and Best Practices

- Engaging with outside experts is key—it is helpful in augmenting Kaiser's own knowledge and prioritizing and evaluating information.
- Engaging with third parties working on similar issues, such as ecolabels and trade associations, is also important. It helps build leverage for change in industries, and saves staff time. But it is critical to understand whom the third party is and what criteria it uses so you can understand its limitations and value.
- It is important to communicate with suppliers so they can understand your intent and you can learn from them. It often takes collaboration to achieve goals.
- It's imperative to do the research, talk to experts, and then have good staff in-house to make the decisions. Have an internal process to digest the information, not just accept it.
- You should involve the people who will be using the products, not just the environmental people on staff. Keep them informed of the intent and value of the program. Different interests exist in decision-making, and lines of communication should stay open.
- You should establish clear toxics reduction goals up front. For example, being DEHP-free, rather than just "green."

Seattle City Light

Program Overview

Seattle City Light[51] (SCL) is the electric utility for the City of Seattle and several nearby incorporated and unincorporated areas. It is one of the largest municipal utilities in the country. SCL operations cover energy generation and transmission (90% hydropower, 3% wind), as well as a wide range of associated operations—cleaning, painting, vehicle and road maintenance, dam maintenance, clearing of vegetation, water and wastewater treatment, firefighting, recreational facilities, and protection of wildlife areas, including endangered salmon runs.

In the late 1980s, SCL developed its first policy on chemical use. The policy, along with procedures, was formally adopted by the department in 2003 to reduce the organization's overall use of hazardous materials to the extent practical, phase out use of products that pose human-health or environmental risks, and increase the use of less harmful alternatives. The policy requires workers and managers to select the least hazardous chemicals, based on the following directives:

- Use no carcinogens if safer products can accomplish the work tasks.
- Use chemicals that minimize total worker exposure, based on a combination of toxicity, amounts used, method of use, and total duration of use.
- Use no extremely flammable or explosive chemicals, except in small quantities and with dilution or local exhaust ventilation.
- Use only the least flammable or non-flammable chemicals possible.
- Use no sensitizers, reproductive hazards, corrosives, oxidizers or irritants unless necessary, and use only with proper administrative and/or engineering controls and with Personal Protective Equipment (PPE) approved for use with those chemicals.

- Use no asphyxiants in enclosed or confined spaces.
- Use no ozone-depleting substances.
- Use no global-warming gases if safer products can accomplish the work tasks.
- Use no persistent, bioaccumulative toxics if safer products can accomplish the work tasks.
- Use no halogenated solvents if safer products can accomplish the work tasks.
- Use no endocrine modifiers if safer products can accomplish the work tasks.
- Use chemicals that will minimize the generation of hazardous wastes.
- Use no chemicals that, when disposed of, create Extremely Hazardous Waste that has a quantity exclusion limit of 2.2 pounds/month.

The policy lays out a 9-step process for selecting safer products:

1. Managers and workers select the least hazardous chemicals (working with specialists in the agency and using the directives above) for a particular product
2. Worker Right to Know (WRTK) coordinator reviews new products prior to purchase
3. E&S, managers, or WRTK coordinators select existing products for review
4. Some exceptions to the chemical-acceptability criteria are allowed (and must include adoption of best management practices to minimize quantities, uses, and risks)
5. Hazardous chemicals are standardized to reduce number of types of chemicals
6. Purchasing decisions are not based solely on purchase cost, but include as the highest priorities worker health and safety, public health and safety, and protecting the environment
7. The minimum amount of hazardous chemicals is purchased (and is not purchased in amounts exceeding user needs)
8. Facilities and operations are designed to reduce the need for chemicals (and consider process changes, improved operations and maintenance practices, product changes, closed-loop recycling, and material substitution)
9. Shifting of health and environmental risks is avoided

An environmental analyst oversees the whole program. Product performance and impact on operations is also evaluated.

SCL has an Environmental Analyst on staff who is constantly evaluating new products and performing alternatives assessments. Any new products that may contain chemical classes of concern will first go to the analyst for approval.

Keeping the Policy Updated

SCL has an Environmental Analyst on staff who is constantly evaluating new products and performing alternatives assessments. Any new products that may contain chemical classes of concern will first go to the analyst for approval.

There has been increasing support from the City of Seattle, which now has a chemical policy and a resolution on Persistent Bioaccumulative Toxins; this adds weight to what SCL is trying to do.

Keeping Up With Changing Science

The Environmental Analyst is responsible for keeping up with the changing science; there is more scientific information available now than when SCL first started this program, which makes this easier to do. The Washington Department of Ecology[52] and the Pacific Northwest Pollution Prevention Resource Center,[53] among other organizations, provide informational resources and testing, and SCL staff follow scientific journals and talk to experts.

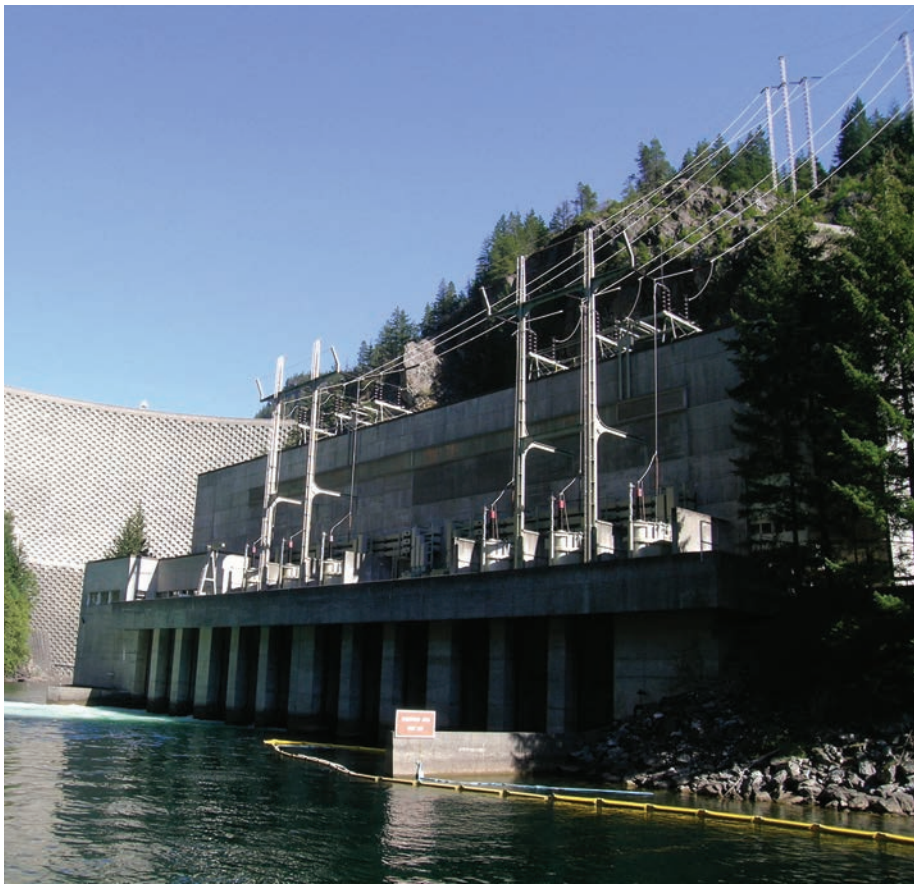
Educating Purchasers

SCL is currently experiencing a 50% turnover of its staff over a five-year period due to the retirement of many long-term employees. To ensure that staff is educated about chemicals in products, SCL requires that an Environmental Hazard Assessment be performed for any project. This involves filling out a Chemical Product Review Form that includes questions about the amount of the chemical needed, worker exposure time, how the material will be handled and product or waste left over, what PPE is needed, etc. Products have to be checked against an approved chemical list. The Chemical Product Review Form is reviewed by the Environmental Division and checked for type of hazard, as well as alternatives.

Challenges

Some of the challenges SCL is facing include:

- Figuring out how the use of gasoline, acetylene, and propane, which are flammable, fits into the policy or could be made safer using engineering controls. SCL has introduced electric cars to help reduce liquid fuel consumption.
- Finding alternatives for ozone-depleting substances for HVAC systems.
- Making sure that one hazard is not being exchanged for another. For example, new breakers and switches use SF_6 gas in place of oil, a shift in hazards. Manufacturers are using less of the gas than earlier versions, though, and it performs better than the oil.
- Finding products that don't void manufacturer warrantees.
- Finding information about performance.
- Getting people who have used certain products for years to change habits.
- Risking damage to expensive equipment if a product doesn't perform well. For example, SCL is considering bio-based turbine oil, but, if a turbine had to be taken off-line, this could cost SCL an estimated $50 million.



Lessons Learned

- Work can be done without using toxic compounds, although sometimes you'll only be using something less bad, rather than completely safe.
- Don't wait for the perfect; do what you can do now.
- Safer alternatives, in most cases, save money, especially when taking into account worker safety, reduction in protective equipment, improved performance, and reduced waste disposal costs.

Next Steps

SCL will continue to evaluate products. Graffiti-removers, machine-shop compounds, automotive products, turbine oils, and coatings are a priority.

Perkins+Will

Program Overview

In 2009, architecture firm Perkins+Will[54] launched its Transparency Site,[55] a platform for materials transparency and information resources, as well as a tool for improving the understanding of potential health and ecological issues associated with certain substances in common building products. The site includes the Precautionary List,[56] a list of 25 substances of concern that the company compiled based on authoritative lists from governmental agencies and other reliable third-party sources. Information on the site can be sorted by chemical name, category (chemical compounds, flame retardants, wood additives, etc.), health effect (carcinogen, asthmagen, reproductive toxicant, etc.), or product type (sorted by specification division). There are also links to articles and other information about certain substances, transparency, material health, and related subjects.

Perkins+Will believes that transparency, and the Precautionary Principle, are best served by greater public knowledge of information currently available, and its internal efforts are targeted towards that end.

The publicly accessible tool helps the firm, and others using it, know what chemicals in products may be problematic, and identify what safer alternatives may be available.

The company has an internal Materials Health Task Force, comprised of architects and interior designers, that maintains the Precautionary List and website, and that advocates for and represents the company's efforts in transparency in products both within and outside of the company. While Perkins+Will does not conduct scientific research of its own, it presents known data in a format useful to the public for consideration and further discussion; the company has recently added the position of Science Fellow to help with this task.

Program research and design began in 2005. The overall goals of the program are to highlight substances listed by reliable sources as having known or suspected health issues, identify where they are found in building products, and identify alternatives.

Drivers

In 2005, Perkins+Will was designing a cancer-treatment center and wondered whether it was possible to design and construct it in a way that did not include products containing substances that were known or suspected carcinogens. The company realized, however, that it was difficult to identify possible carcinogens in building products because of inadequate product ingredient disclosure, and it began to develop the Precautionary List.

The List also furthered the company's support of the Precautionary Principle: that where hazards to human health are suspected, based on reliable studies, action should be taken even in the absence of scientific certainty as to cause and effect.

Perkins+Will believes that transparency, and the Precautionary Principle, are best served by greater public knowledge of information currently available, and its internal efforts are targeted towards that end.

Chemicals Targeted

The program targets products that contain the following 25 chemicals or classes of chemicals:

- Arsenic
- Bisphenol A (BPA)
- Bromochlorodifluoromethane
- Cadmium
- Chlorinated Polyethylene (CPE)
- Chlorinated Polyvinyl Chloride (CPVC)
- Chlorofluorocarbons (CFC)
- Chloroprene (2-chlor-1,3-butadiene)
- Chlorosulfonated Polyethylene (CSPE)
- Copper (for Exterior Material)
- Creosote
- Halogenated & Brominated Flame Retardants
- Hexavalent Chromium (VI)
- Hydrochlorofluorocarbons (HCFC)
- Lead
- Mercury
- Organostannic Compounds
- Pentachlorophenol
- Perfluorocarbons (PFC)
- Phthalates
- Polystyrene
- Polyurethane Foam
- Polyvinyl Chloride (PVC)
- Urea-Formaldehyde
- Volatile Organic Compounds (VOCs)

According to studies by governmental or other reliable public sources, these substances have been linked to a range of known or suspected health problems including cancer, endocrine disruption, neurotoxicity, respiratory disorders, organ failure, and more.

Building Partnerships

Perkins+Will recognizes that transitioning the marketplace to make safer building products more widely available will not happen unless a wide range of stakeholders are involved—from design firms to manufacturers to contractors to property owners.

The firm builds support for healthier building products by engaging the building industry as a whole, including other architects and designers, and others more generally engaged

in advocating for transparency in building products.

Perkins+Will also strives to educate its clients as key partners through its publications and takes a collaborative, rather than confrontational, approach with manufacturers to address their concerns and encourage change.

Keeping Up With Changing Science

Keeping up with changing science is a challenge. The Precautionary List cites scientific and governmental sources that are reviewed and updated on a continual basis. Information related to a substance can change due to updated research findings, such as with California Proposition 65,[57] one of the site's many referenced sources.

Tracking Progress

In addition to reviewing materials against the Precautionary List, Perkins+Will tracks projected water and energy consumption of buildings in design and compares portfolio metrics over time. Lack of material transparency has been the biggest and most complex tracking challenge for them; at this point, it is not possible to avoid all substances on the List in projects, or even locate all the instances of the substances in products. With greater disclosure from manufacturers, the firm expects to see improved results.

Lessons Learned

- When you really commit, you can change the market. This process does not happen quickly, and those involved need to be ready for the commitment.
- It's important to keep advocating, and to secure buy-in from project stakeholders, or your goals won't be met. Material health issues are not over when the specification is done; supply chains are complex, employees turn over, and materials can change the moment before installation.
- Project tools are needed that allow project teams to track building material ingredients and the impact of substitutions during the construction process.
- Collaboration yields better results. Working with manufacturers and suppliers can't be a relationship of "meet my demands."
- Transparency is key, yet slow to happen. It will take time to yield complete market transformation.
- Advocating outside the typical "green" circles provides the most rewarding results by transforming minds and opinions.

Danish Retailer, Coop

Program Overview

Coop[58] is the largest retailer of fast-moving consumer goods in Denmark. Coop has 1.2 million members (close to ¼ of the population of Denmark), and the company holds close to 40% of retail market share. The company, established in 1884, has 1200 stores and 35,000 employees. Social responsibility has been part of Coop's DNA since its inception.

Coop's health and environmental initiatives include restrictions and bans on endocrine-disrupting chemicals, allergens, and more. They cover all 3000 products in the company's three private labels—Änglamark (highest environmental ranking), Coop (goods of high quality which give "value for money"), and X-tra (discount line)—as well as brand-named products. Coop's efforts are driven by the company's vision to be the best and most responsible place to shop and work. Denmark and the other Nordic countries have demanding consumers, NGOs, and authorities, and Coop wants to be a first mover in that marketplace. These countries are ahead of many European countries in terms of phasing out of harmful chemicals. However, Coop goes farther where it thinks the government efforts aren't enough.

Coop works closely with the company's sister stores in Norway and Sweden, sharing quality requirements for food, cosmetics, and detergents and cleaning, and also co-owning a company, Coop Trading, that sources and buys

these products for the three private-label brands described above.

Coop's goals are to:

- Secure the highest level of safety for the consumer and environment,
- Maintain its role as first mover in the market,
- Give the consumer the opportunity to make a responsible choice,
- Cover all of its private label products, and
- Protect its reputation and good will.

Targeted Chemicals

Coop began removing chemicals of concern from products sold in its stores starting in 2001, with a ban on packaging containing PVC and phthalates. Since then, it has removed from cosmetics hormone disruptors, including triclosan and other antibacterials, nonylphenol ethoxylates (NPEO), alkyl phenol ethoxylates (APEO), BHA parabens, phthalates, and others. It has also removed 26 fragrances[59] from cleaning products and cosmetics that were identified as being of concern by the EU. Coop has banned PVC and phthalates from products and equipment for children under age three, textiles, footwear, bags, furniture, bicycles, fitness equipment, kitchenware, and other products. The company started phasing out pesticides in 2008, with a total ban in 2014. It removed BPA from baby bottles in 2009.

Exemptions can be granted, but they are not easy to get. For example, Colgate Total toothpaste was given an exemption that allows it to continue to contain triclosan, but, as of March, 2013, it must contain the label: "containing triclosan, only to prevent paradentose."

Enforcement

Coop checks packaging and products for compliance and does testing, as well.

Supplier Engagement

All chemical and quality requirements are listed in supplier trade agreements. Suppliers must sign and document that they are meeting requirements.

Keeping Up With Changing Science

Coop uses risk assessment and the precautionary principle when it adopts a new requirement. Its staff consults with government authorities and NGOs, follows discussions in the EU and globally, attends seminars, and talks to experts.

The evidence has to be as solid as possible before a policy is executed. Coop has many examples where it has executed a quality requirement that later became an EU requirement.

Finding acceptable substitutes is still a challenge—Coop has a list of substances of high concern, but it does not have a list of acceptable substitutes.

Measuring Success and Tracking Progress

Coop's programs have been a commercial success: they have saved money, and they have also helped the company gain a market edge because its customers trust that its products are the safest that they can be. As an example, Coop removed baby wipes from its stores that contained methylisothiazolinone (MI), a preservative linked to rashes. As a result of doing so and the related press, baby-wipe sales in Coop stores were higher than before it removed these products. In another example, Coop's own Änglamark brands of sunblock, face creams, and other cosmetics sell better than the comparative name brands it sells. Änglamark brand items are recognized by over 90% of the Danish population, which knows that this is Coop's ecolabel.

Lessons Learned

- Companies and organizations should look at what their biggest chemicals of concern are and find substitutions.
- Sales can increase if consumers know you are a brand they can trust.
- Consumer education must be an ongoing endeavor.
- Ecolabels help customers make informed decisions and give customers a choice.
- There is always more that needs to be done!

National Institutes of Health

Program Overview

The National Institutes of Health[60] (NIH) is a large federal research and funding agency with billions of dollars in spending and tens of thousands of products purchased each year across its research and clinical units. In order to help NIH employees and grantees identify greener alternatives to commonly procured items, NIH is rolling out a suite of tools under its Substances of Concern (SOC) Initiative.[61] The SOC Initiative was launched in 2013 under the NIH Environmental Management System (EMS) and identifies 350 chemicals in 60 chemical groups. These 350 chemicals comprise the NIH "substances of concern." SOC chemicals may be purchased directly or are contained or released by a service or product anywhere throughout its life cycle—in the supply chain; during use; and at the end of its useful life in reuse, recycling or final disposal.

An assessment of alternatives for each chemical listed on the SOC is currently underway. The assessment will consider uses at NIH of each chemical listed in the SOC. The following information will be identified for each SOC:

1. The preferred alternative(s) for each chemical for a particular use;
2. Availability of the alternative in the commercial market;
3. Reduction strategy for each chemical; and
4. Analysis and discussion of the reasons that this alternative is preferred over the chemical on the SOC. Discussion should include how the alternative mitigates human and environmental health issues and demonstrate that the alternative is itself a safer, less toxic alternative.

In order to help NIH employees and grantees identify greener alternatives to commonly procured items, NIH is rolling out a suite of tools under its Substances of Concern (SOC) Initiative.

NIH is also in the process of identifying the types of products in which SOCs are found and breaking these out by use and application based on the following categories:

- Facility Construction and Renovation
- Facility Operation and Maintenance (janitorial, shop, landscaping, utilities, general maintenance)
- Interior Finishes and Furnishings
- Biomedical Research Laboratory Applications (chemical and equipment)
- Clinical/Pharmaceutical Center Applications
- Veterinary Applications
- Office Operations
- Food Services
- Transportation/Automotive

The goals of the SOC include:

- Create tools and processes that easily and quickly help purchasers identify products that may contain an SOC. Users will be able to use the database to view products with better alternatives and make purchasing

decisions without having to become experts in chemicals or other areas of sustainability.
- Provide NIH staff and grantees with tools for green purchasing. NIH grantees are required to comply with federal green purchasing rules, and the SOC will be one set of tools to help them make more sustainable purchasing decisions.
- Create tools that are friendly and automated so that they can be replicated by other departments, grantees, or anyone else interested in developing something similar.

The program received the 2014 GreenGov Presidential Award for Green Innovation.

SOC is part of a larger effort in federal Sustainable Acquisitions. As such, NIH is working with the General Services Administration (GSA), to develop a Green Procurement Compilation (GPC) and related Sustainable Facilities Tool[62] that provides guidance to purchasers based on their role as a Facility Manager, Procurement Professional, Leasing Specialist, or Project Manager. NIH proposed and developed the first listings for healthcare-related products and the first listings of alternatives to products containing mercury, phthalates, and latex, which were added to the GPC. The tool explains different aspects of sustainability, has links to federal requirements that mandate alternatives, and describes what types of sustainability activities (toxic substance reduction, energy efficiency, recycled content, etc.) can be taken in various workplace settings. The site includes diagrams of these workplaces that allow users to click on different products and learn about sustainable-purchasing considerations, legal requirements for buying them, and more. This tool is available to the general public.

Targeted Chemicals

This program covers products and services that contain or emit a substance of concern. NIH defines[63] Substances of Concern as meeting all of the following three criteria: 1) Having significant use in facilities or mission activities, 2) Posing significant risk in terms of human health, safety, security, or the environment, in meeting NIH's research mission, facing regulatory restrictions, or depleting scarce resources, and 3) Having safer, existing alternatives.

The 60 Substances of Concern groups[64] that are initially covered are: Acids (inorganic), Acids (organic), Acrylates, Alcohols, Aldehydes, Alkanes, Amides, Amines, Anhydrides, Antimony, Aromatic Solvents, Arsenic and its Compounds, Asbestiform Minerals, Benzidine Dyes, Bisphenols, Cadmium and its Compounds, Chlorinated Solvents, Chlorofluorocarbons, Chromates, Citrus Oils and Derivatives, Climate Super Pollutants, Coal Tar Pitch Derivatives, Copper and its Compounds, Dioxin-like Chemicals, Ethidium Bromide, Ethylene Oxide, Flame Retardants (Brominated, BFRs), Flame Retardants (Chlorinated, CFRs), Flame Retardants (Organophosphate), Furans, Glycol Ethers, Halogenated Organic Acid, Halogenated Plastics, Helium, Hydrochlorofluorocarbons (HCFCs), Hydrofluorocarbons (HFCs of F-gases), Isocyanates, Lactams, Latex, Lead and its Compounds, Mercury and its Compounds, Methane, Nanomaterials, N-Dansyl-3-aminobenzeneboronic Acid, Nitriles, Nitrogen Oxides, Organotin Compounds,

NIH defines Substances of Concern as meeting all of the following three criteria: 1) Having significant use in facilities or mission activities, 2) Posing significant risk in terms of human health, safety, security, or the environment, in meeting NIH's research mission, facing regulatory restrictions, or depleting scarce resources, and 3) Having safer, existing alternatives.

Ozone, Perfluorinated Chemicals (PFCs), Phenolic Compounds, Phosphates (Inorganic), Phthalates, Polynitroaromatic Compounds, Polystyrene (PS) Foam, Polyurethane Foam, Quaternary Ammonium Compounds (QACs or Quats), Siloxanes, Sodium Azide, Sulfur Hexafluoride, Trichloroacetic Acid.

Program Drivers

One of NIH's drivers is their mission of protecting public health—the Department of Health and Human Services, which houses the NIH, has established health, human-services, and environmental-justice goals that NIH programs help in meeting. Another key driver was the cost of managing hazardous waste and clean-up associated with toxic lab chemicals. In addition, in 2009, building on previous federal statutes and orders related to pollution prevention, President Obama signed Executive Order 13514,[65] Federal Leadership in Environmental, Energy, and Economic Performance. This Executive Order (EO) led to amendments to the Federal Acquisition Regulations and requires contractor compliance with an agency's Environmental Management System (EMS). This linkage with EMS, along with Federal Pollution Prevention requirements, is a primary source of authority for the NIH and other federal agencies to develop these initiatives.

EO 13514 required federal agencies to use their purchasing power to create and drive markets for more sustainable products through, among other things,

- Reducing and minimizing the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of;
- Increasing agency use of acceptable alternative chemicals and processes in keeping with the agency's procurement policies, and decreasing agency use of chemicals where such decrease will assist the agency in achieving greenhouse gas emission-reduction targets;
- Chemical inventory-reporting in accordance with the requirements of sections 301 through 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (42 U.S.C. 11001 *et seq.*); and

- Requiring that 95% of all new contract actions, including task and delivery orders, meet sustainable acquisition requirements, including non-toxic or less toxic alternatives where such products and services meet agency performance requirements.

This EO coincided with efforts by the General Services Administration to develop advanced tools for purchasing, which have allowed NIH to piggyback on to those tools.

EO 13514 was replaced in March, 2015 with EO 13693.[66] Guidance on procurement for this new EO from the Office of Management and Budget and the Council on Environmental Quality will be forthcoming.

Keeping Up With Changing Science

In many cases, NIH is the organization generating and/or supporting research on hazardous substances; the products of their research include knowledge about the impacts of potentially toxic materials on humans, animals, and the environment. In other cases, NIH helps to collect, organize, and disseminate information on chemicals and substances from NIH research, as well as, other agencies and organizations including the U.S. Environmental Protection Agency (EPA), Food and Drug Administration (FDA), and the International Agency for Research on Cancer (IARC). The NIH's National Library of Medicine (NLM) is the world's largest medical library. NLM maintains and provides access to millions of pieces of biomedical information and resources including the Hazardous Substances Data Bank (HSDB). HSDB is a database that provides information on the toxicology and environmental fate of potentially hazardous chemicals. HSDB is a part of TOXNET, a collection of databases on toxicology, hazardous chemicals, environmental health, and toxic releases. This resource is updated continuously to reflect new publications, emerging science, and changing regulations and guidance related to hazardous chemicals.

Challenges

There are many challenges associated with a program of this scope. One challenge is how to structure the program to get results—given the scale of the possibilities, what is the best way to identify priority products? Another is that of continually integrating new data into purchasing decisions and prioritizing it, as well as finding suitable alternatives. Yet another is balancing the trade-offs between the various environmental attributes of the product—for example, a high-energy efficient freezer may contain a Substance of Concern. It is also difficult to put all the data into a usable format for purchasers, as well as identify the right keywords for searches. Additional challenges include:

- Basic terms such as "toxic product" and "less toxic" have not been clearly defined in procurement regulations. Do these terms refer to human toxicity, animal toxicity, and/or environmental toxicity?
- Emissions, toxicity, and other risks must be evaluated throughout the product's entire life cycle, from the supply chain, to use, and to recycling or disposal at the end of its useful life. Such data is rarely available.
- Some substances are used in diverse applications, which may pose significantly different hazards and risks. Accordingly, restrictions and guidance on safer alternatives must be use-specific.
- Selection of "less toxic" services and products requires the application of uniform and objective procedures for data collection and protocols for comparative toxicology that have not been developed.
- There is a need to continually review and update the substances, products, services, and alternatives.

The NIH describes these and other challenges on its website.[67]

Lessons Learned

Because the program is so new and still scaling up, NIH does not yet have concrete lessons to share. However, how the challenges above are addressed over the months and years will yield useful lessons for others.

Oregon Environmental Council and the Healthy Purchasing Coalition

Program Overview

The Oregon Environmental Council[68] (OEC), a not-for-profit organization, facilitates the Healthy Purchasing Coalition.[69] The Coalition, formed in 2013, is a group of governments, universities, ports, businesses, and nonprofits in Oregon that focuses on integrating human health, chemical hazard, and safer alternatives into purchasing decisions that influence buildings and indoor environments. Coalition members, who have varying levels of expertise and resources in this area of purchasing, agree to implement a framework[70] with six elements:

1. ***Review organization policies:*** to determine whether existing policy will enable their organization to integrate chemical hazard disclosure, avoidance, and green chemistry innovation into purchasing decisions.

2. ***Identify pilot projects or contracts (goods or services):*** to test healthy purchasing in its organization and identify staff champions to lead the pilots.

3. ***Integrate healthy purchasing elements, beyond what organizations are already doing, into contracts:*** elements of transparency, hazard avoidance, and safer alternatives must be in at least three pilot contracts or specifications over the next two years.

Examples of how this can be done include:

- incorporating the use of Health Product Declarations (HPDs) into building materials selection or construction and capital improvement-related projects,
- avoiding products that contain restricted substances or chemicals of concern based on inherent hazard,
- specifying a relevant third-party certification that features hazard criteria, and
- providing the opportunity for proposers to describe how green chemistry innovation is used for the good or service.

4. ***Establish market feedback loops:*** by promoting healthy purchasing elements in vendor outreach, market research, and solicitations, and by providing feedback to vendors that unsuccessfully address healthy purchasing in proposals.

5. ***Set goals and measure progress over time using simple measures that could include***:
   - the number of contracts in which healthy purchasing elements were included,
   - the number of different departments using healthy purchasing elements in contracts,
   - the amount spent on contracts where healthy purchasing elements were included, or
   - the quantity of products purchased that contain no chemicals of high concern.

6. ***Share with other coalition members:*** including successes and failures. Member organizations also commit to having at least one staff representative designated to participate in coalition communications.

Members of the coalition include Multnomah County; Portland State University; the municipalities of Portland, Eugene, Corvallis, and Hillsboro; Portland Community College; the Port of Portland; and the Portland Development Commission.

The Healthy Purchasing Coalition is focused on buying goods and services that avoid hazardous chemicals and use safer alternatives. Its initial focus is on products that can impact the indoor environment.

Drivers

In September 2012, the Portland city council and Multnomah County board of commissioners passed resolutions creating a Healthy Purchasing Initiative. To leverage this commitment, the Oregon Environmental Council convened other organizations in the state to collaborate on this work as a coalition to maximize the investment of time and resources.

Separately, the Governor issued an Executive Order in 2012. EO-12-05[71] established the *Oregon Green Chemistry Innovation Initiative*, which aims to catalyze Oregon's development of innovative products and processes through green chemistry. While it does not require action by local governments, it provides an opportunity for state and local efforts in safer purchasing to support and complement each other. The EO has been helpful in spurring involvement with the Healthy Purchasing Coalition. The Oregon Environmental Council helps connect the state and local efforts.

Coalition Priorities

The Healthy Purchasing Coalition is focused on buying goods and services that avoid hazardous chemicals and use safer alternatives. Its initial focus is on products that can impact the indoor environment, such as cleaning products, furniture, and other building products that contain chemicals with priority hazard endpoints as identified by the Green Screen for Safer Chemicals (Environmental Fate, Environmental Health, and Human Health Group 1).[72]

Success To Date

In the short period of time since forming the Coalition, much has been accomplished. There have been changes in purchasing policies, design guidelines, default specifications, contract language, and solicitations that have been issued with an emphasis on hazard reduction. In addition, vendor letters have been sent out regarding flame retardants in furniture.

Some examples of success are that one member is now considering specifying third party-certified cleaning products for the first time; the Port of Portland sustainable purchasing policy has begun to incorporate health elements; Portland State University building-design guidelines are being revised to include an evaluation of chemical hazards in material selection; Portland Community College is looking at integrating health information into default construction contracts, templates, and guidance documents; Multnomah County is providing training for procurement professionals on integrating human health into solicitations; and the City of Portland is starting to require that vendors for cleaning services submit Health Product Declarations[73] (HPDs) for products. This is a unique application of the HPD, which is a standard format for reporting product content and associated health impacts for building products.

Another major outcome is that since the EO was issued, the State of Oregon's Department of Administration has taken the lead on negotiating two multi-state contracts that feature low-toxicity products certified by ecolabels unless no credible ecolabels were available for the product categories. The first is a two-state contract[74] (in collaboration with the State of Washington) for green cleaning supplies. The second is a multi-state contract for office supplies that offers two nationally available price agreements for "green" office supplies. The specifications require, among other things, that no products on the contract may contain PVC (vinyl), Bisphenol-A, polystyrene, fluorinated stain-resistant chemicals or antimicrobial ingredients (except in approved disinfectants and sanitizers), or other chemicals of concern.

Keeping Up With Changing Science

OEC staff keep up with the latest science, distill it, and share it with Coalition members. They do this through reading journals, talking to experts in various agencies, and talking to other NGOs, such as the Center for Environmental Health,[75] Clean Production Action,[76] Healthy Building Network,[77] Green Science Policy Institute,[78] Collaborative on Health and the Environment,[79] International Living Future Institute,[80] and Health Care Without Harm.[81] One of the fundamental values of the OEC is to base decision-making on the best available science and to find solutions. This keeps the organization credible.

One of the fundamental values of the Oregon Environmental Council is to base decision-making on the best available science and to find solutions. This keeps the organization credible.

Challenges

Some of the challenges OEC is grappling with include those of how to implement the work, integrate human-health considerations and green-chemistry innovation into procurement decision-making, incentivize hazard assessment by market actors, get data as well as program feedback from vendors, and develop metrics to measure progress. Also, Coalition members often have control over only a small handful of contracts in their organizations, and this limits the depth and reach of the program. OEC is looking at creating standard contract language and templates that incorporate health and hazard information, and is focusing on raising awareness and training in organizations. Finally, purchasers are used to focusing on quality, performance, risk avoidance, and price, not on chemical hazards and health.

Lessons Learned

- Procurement professionals are committed to the responsible use of public funds and are frequently open to new, innovative approaches to getting the best overall value.
- Chemical hazards and impacts to human health are issues that are directly related to product performance, not simply categories under the concept of sustainability.
- Organizations working in coalition need a balance between ease of implementation and opportunities for demonstrating leadership.
- Transparency in the marketplace is critical for creating demand for safer alternatives designed using green chemistry.
- Purchasing third-party certified products represents an easy starting point for organizations, but these certifications do not necessarily increase transparency in the marketplace or appear to drive green chemistry application by manufacturers.
- Coalitions are an important vehicle for sharing challenges and successes while reducing real and perceived risks associated with trying something new.
- Vendors should be engaged in these issues during the pre-bid conference so that they know what they should be asking of their suppliers.
- It helps to have a third party, such as the OEC, as a convener, connector, and advocate.
- Successful coalition building relies on relationships—trust and track record-building take time.
- Developing specific tasks and objectives for coalition organizations is critical to ensuring implementation and accountability.

Resources and Tools

Many resources are available to help purchasers understand chemical hazards and the availability of safer products and how to buy them. Below is a listing of just some of these resources, many of which were identified by the leaders profiled in this report. This is not meant to be a comprehensive list. Those making purchasing policies or decisions should talk to their peers, trade associations, government environmental and health agencies, local public health and environmental organizations, university researchers, and others to find the right kind of information and assistance to meet their needs.

Sources of Information on Hazardous Substances and Safer Alternatives

California Prop 65[82]

Prop 65 is California's law to protect the state's drinking-water sources from being contaminated with chemicals known to cause cancer, birth defects, or other reproductive harm. The state keeps an updated list of chemicals that trigger a warning on products because of these hazards.

California Safer Consumer Products Program[83]

The California Department of Toxic Sustances Control's Safer Consumer Products Program strives to reduce toxic chemicals in products consumers buy and use. It identifies specific products containing potentially harmful chemicals and asks manufacturers to answer two questions: 1) Is this chemical necessary? 2) Is there a safer alternative? The site links to the program's list of chemicals of concern, as well as priority products where those chemicals may be found.

ChemHat—Chemical Hazard and Alternatives Toolbox[84]

ChemHat is a database where users can search for hazard information on chemicals based on authoritative lists of chemicals. ChemHAT was created to answer the questions: "Can this chemical in my workplace affect my health?" and "Are there safer alternatives?"

Collaborative on Health and the Environment[85]

The Collaborative on Health and the Environment's (CHE's) primary mission is to strengthen the science dialogue on environmental factors impacting human health and to facilitate collaborative, multi-factorial, prevention-oriented efforts to address environmental health concerns. CHE maintains a database of information on links between chemicals and a range of health impacts.

Green Science Policy Institute[86]

The Green Science Policy Institute's mission is to facilitate responsible use of chemicals to protect human and ecological health. The Institute educates and builds partnerships among scientists, regulators, businesses, and public-interest groups to develop innovative

solutions for reducing harmful chemicals in products. The Institute is working with institutional purchasers to substitute six classes[87] of chemicals of concern in products, including highly fluorinated chemicals, anti-microbials, flame retardants, bisphenols and phthalates, organic solvents, certain metals.

Hazardous Substances Data Bank (HSDB)[88]

HSDB is a toxicology database on the National Library of Medicine's[89] (NLM) Toxicology Data Network[90] (TOXNET®). It focuses on the toxicology of potentially hazardous chemicals. It contains information on human exposure, industrial hygiene, emergency handling procedures, environmental fate, regulatory requirements, nanomaterials, and related areas. HSDB is produced by the National Library of Medicine, part of the National Institutes of Health.

Health Care Without Harm[91]

Health Care Without Harm is a global network of health professionals, community groups, health-affected constituencies, and others that maintains information on chemicals of concern in the health care sector, as well as available alternatives.

Healthy Building Network [92]

The Healthy Building Network was founded in 2000 to reduce the use of hazardous chemicals in building products as a means of improving human health and the environment. It operates the Pharos Database, containing hazard information on thousands of products used in the building industry.

Interstate Clearinghouse on Chemicals[93]

The Interstate Clearinghouse on Chemicals (IC2) is an association of state, local, and tribal governments that promotes a clean environment, healthy communities, and a vital economy through the development and use of safer chemicals and products. The IC2 hosts a list of chemicals of concern in various states, evaluations of alternatives, and a database of state chemicals policies.

Occupational Safety and Health Administration—Transitioning to Safer Chemicals Toolkit[94]

OSHA has developed this step-by-step toolkit to provide employers and workers with information, methods, tools, and guidance on using informed substitution in the workplace. The toolkit provides case studies and links to assist firms and others in transitioning to safer chemicals.

OECD Subsitution and Alternatives Assessment Tool Selector[95]

The OECD Substitution and Alternatives Assessment Toolbox (SAAT) is a compilation of resources relevant to chemical substitution and alternatives assessments, including lists of chemicals of concern, tools for evaluating alternatives, and case examples.

P+W Transparency Site[96]

The Transparency Site includes a list of 25 substances of concern and the places these might be found in building and design products, as well as alternatives. Information on the site can be sorted by chemical name, category (chemical compounds, flame retardants, wood additives, etc.), health effect (carcinogen, asthmagen, reproductive toxicant, etc.), or product type (sorted by specification division).

SUBSPORT—Substitution Support Portal[97]

SUBSPORT is a multilingual platform for information exchange on alternative substances and technologies, as well as tools and guidance for substance evaluation and substitution management. The SUBSPORT portal contains lists of chemicals of concern, case studies, and tools for evaluating chemical hazards and alternatives.

Toxics Use Reduction Institute, UMass Lowell[98]

The Massachusetts Toxics Use Reduction Act establishes a Toxic or Hazardous Substance list and information about chemical hazards for substances covered under the Act. The Toxics Use Reduction Institute (TURI) at the University

of Massachusetts Lowell provides resources and tools to reduce or substitute substances covered under the act.

US Environmental Protection Agency—ChemView[99]

EPA's ChemView database combines information on chemical hazards and safer alternatives from multiple sources into a single searchable interface. The site contains information EPA receives and develops about chemicals including those on EPA's Safer Chemical Ingredient List.[100]

Information on Sustainable Purchasing Guidelines and Specifications

Responsible Purchasing Network[101]

RPN is a non-profit international network of buyers that has developed a wide array of resources that can make it easier for institutional purchasers to identify, specify, and buy low-toxicity goods and services. This includes purchasing guides that recommend specifications and procurement strategies for specific product categories, such as low-emitting furniture, low-toxicity architectural and traffic paint, low-mercury lighting equipment, and safer alternatives to polystyrene foodservice ware. RPN's website and webinars also highlight certifications—and cooperative purchasing opportunities—for low-toxicity products such as cleaners, hand soaps, floor maintenance chemicals, office supplies, and more.

Sustainable Purchasing Leadership Council[102]

The SPLC is a non-profit organization whose mission is to support and recognize purchasing leadership that accelerates the transition to a prosperous and sustainable future. The Council's *Guidance for Leadership in Sustainable Purchasing Version 1.0* is a handbook for strategic sustainable purchasing and serves as the basis for a future *Rating System for Leadership in Sustainable Purchasing* that rewards organizations that demonstrate leadership in sustainable purchasing.

Information to Help Understand Ecolabels and Standards

Challenge the Label[103]

The site describes what sustainability claims are and how to determine if a sustainability claim is credible. It is part of the ISEAL Alliance[104] a non-governmental organization whose mission is to strengthen sustainability standards systems for the benefit of people and the environment.

Environmental Protection Agency (EPA) Greener Products Portal[105]

The EPA Greener Products Portal is designed to help the user navigate the increasingly important and complex world of greener products. It allows users to search for EPA programs related to greener products based on the type of user and his or her specific product interests. It also links to additional greener products information from EPA and other sources, and includes an introduction to ecolabels and standards.

Independent Third Party Ecolabels*

Cradle to Cradle Certified Product Standard[107]

The Cradle to Cradle Products Innovation Institute administers the Cradle to Cradle Certified Product Standard, which provides designers and manufacturers with criteria and requirements for continually improving what products are made of and how they are made. Categories include apparel, shoes, and accessories; home and office supply; interior design and furniture; and more.

EPEAT[108]

The Green Electronics Council manages the Electronic Products Environmental Assessment Tool (EPEAT), a global rating system for greener electronics. EPEAT can be used by purchasers, manufacturers, resellers, and others to identify environmentally preferable devices. The EPEAT system combines strict, comprehensive criteria for design, production, energy use, and recycling with ongoing independent verification of manufacturer claims.

* A more comprehensive list of credible third party ecolabels can be found at http://www.responsiblepurchasing.org/publications/index.php and at http://www.epa.gov/greenerproducts/programs/index.html

Green Good Housekeeping Seal[109]

The Good Housekeeping Institute (GHI) reviews and verifies a range of data related to the product's measurable environmental impact for its *Green Good Housekeeping Seal*. Reduction of water and energy use in manufacturing and product usage, ingredient, and product safety; reduction in packaging; and the brand's corporate social responsibility are among factors considered. Categories include cleaning products, beauty products, paints and coatings, appliances and electronics, paper goods, building products, and food and beverages.

GreenGuard and EcoLogo[110]

Underwriters Laboratory is the exclusive provider of GREENGUARD Certification for products that meet stringent chemical emissions requirements, and ECOLOGO Certification for products that meet multi-attribute, lifecycle-based sustainability standards.

Green Seal[106]

Green Seal develops lifecycle-based sustainability standards for products, services, and companies and offers third-party certification for those that meet the criteria in the standard. Product categories include household products, construction materials and equipment, paints and coatings, printing and writing paper, cleaning products, and more.

Safer Choice[111]

The US Environmental Protection Agency administers the Safer Choice program (formerly Design for Environment, DfE), a label that covers over 2,000 products. In addition to safer ingredients, Safer Choice includes requirements for performance, packaging, pH, and volatile organic compounds.

Tools for Evaluating Chemical Hazards in Products and Safer Alternatives

CleanGredients[119]

CleanGredients is an online database of chemical products (a.k.a. "ingredients") used primarily to formulate residential, institutional, industrial, and janitorial cleaning products that have been pre-approved to meet the U.S. EPA's Safer Choice Standard.

GreenScreen for Safer Chemicals[118]

GreenScreen for Safer Chemicals is a method of comparative Chemical Hazard Assessment (CHA) that can be used for identifying chemicals of high concern and safer alternatives. GreenScreen was developed by and is a project of Clean Production Action.

Health Product Declaration (HPD)[112]

The HPD is a standard format for reporting product content and associated health information for building products and materials.

Material IQ[117]

Developed by the non-profit Green Blue Institute, MiQ provides third-party-validated toxicity data and information about other sustainability attributes to end-users and purchasers.

SciVera Lens[113]

SciVera, a third party solutions provider, collects and assesses product-ingredient information and makes this automated assessment available to subscribers of its service.

WercSmart,[114] GreenWercs,[115] and Good Guide[116]

UL Environment has these three tools to help understand and assess product ingredients. WercSmart and GreenWercs collect data from product suppliers that can be used by purchasers to identify and screen out chemicals of concern. GoodGuide evaluates products for health, environmental, and social issues, and provides a summary score and detailed ratings. GoodGuide rates over 250,000 products. Purchaser preferences can be prioritized.

Endnotes

1 Great Lakes Regional Pollution Prevention Roundtable. Projects Database, PbT-Free Purchasing In The Great Lakes States. http://www.glrppr.org/projects/project_detail.cfm?project_id=97

2 State of California, Department of General Services, California Lamp Contract, 1-06-62-31, March 2006, https://www.bidsync.com/DPXViewer/1-06-62-31.pdf?ac=view&contid=3612&docid=956088

3 City and County of San Francisco, Comprehensive Report on Safer Disinfectant Products, April 2014, http://www.sfapproved.org/comprehensive-report-safer-disinfectant-products

4 Melton, P. Healthcare Giants Boycott Furniture Containing Flame Retardants, Building Green, January 8, 2015, https://www2.buildinggreen.com/article/healthcare-giants-boycott-furniture-containing-flame-retardants?woo_campaign= ND150112&woo_content=readmore&mc_cid= c78aafca92&mc_eid=dcf9bd01c6

5 Landrigan, P et al. Environmental Pollutants and Disease in American Children: Estimates of Morbidity, Mortality, and Costs for Lead Poisoning, Asthma, Cancer, and Developmental Disabilities. Environmental Health Perspectives 110(7): 721–728, 2002, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240919

6 Tresande, L. Further Limiting Bisphenol A In Food Uses Could Provide Health And Economic Benefits. Health Affairs 33(2):316-23, 2014, http://content.healthaffairs.org/content/early/2014/01/16/hlthaff.2013.0686

7 Prins, G et al. Serum Bisphenol A Pharmacokinetics and Prostate Neoplastic Responses Following Oral and Subcutaneous Exposures in Neonatal Sprague-Dawley Rats. Reproductive Toxicology 31(1): 1–9, 2010, http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3033961

8 Betancourt, A. In Utero Exposure to Bisphenol A Shifts the Window of Susceptibility for Mammary Carcinogenesis in the Rat. Environmental Health Perspectives 118(11):1614-9, 2010, http://www.ncbi.nlm.nih.gov/pubmed/20675265

9 Donohue, KM. Prenatal and Postnatal Bisphenol A Exposure and Asthma Development Among Inner-city Children. Journal of Allergy and Clinical Immunology 131(3):736-42, 2013, http://www.ncbi.nlm.nih.gov/pubmed/23452902

10 Vandenberg, V et al. Bisphenol-A and the Treat Divide: A Review of Controversies in the Field of Endocrine Disruption. Endocrine Reviews 30(1): 75–95, 2009, http://www.ncbi.nlm.nih.gov/pubmed/19074586

11 Lathi, R et al. Conjugated Bisphenol A in Maternal Serum in Relation to Miscarriage Risk. Fertility and Sterility 02(1):123-8, 2014, http://www.ncbi.nlm.nih.gov/pubmed/24746738

12 Harley, K et al. Prenatal and Early Childhood Bisphenol A Concentrations and Behavior in School-aged Children. Environmental Research 126:43-50, 2013, http://www.ncbi.nlm.nih.gov/pubmed/23870093

13 Thompson, R et al. Plastics, the Environment and Human Health: Current Consensus and Future Trends. Philosophical Transactions Royal Society B 364, 2153–2166, 2009, http://rstb.royalsocietypublishing.org/content/364/1526/2153.short

14 Brown, P and Cordner, A. Lessons Learned From Flame Retardant Use And Regulation Could Enhance Future Control Of Potentially Hazardous Chemicals. Health Affairs 30(5), 906-914, 2011, http://content.healthaffairs.org/content/30/5/906.full

15 Janssen, S et al. About the Toxicant and Disease Database, Collaborative on Health and Environment, http://www.healthandenvironment.org/tddb_about

16 http://www.greenseal.org

17 http://www.epa.gov/dfe

18 http://www.c2ccertified.org

19 Underwriters Laboratories, Ecologo Product Certification, http://industries.ul.com/environment/certificationvalidation-marks/ecologo-product-certification

20 US Department of Agriculture, Welcome to the National Organic Program, http://www.ams.usda.gov/AMSv1.0/nop

21 http://www.epeat.net/about-epeat

22 http://levelcertified.org

23 Global Ecolabelling Network, What is Ecolabelling, http://www.globalecolabelling.net/what_is_ecolabelling/index.htm

24 http://www.greenseal.org

25 http://www.c2ccertified.org

26 Underwriters Laboratories, Ecologo Product Certification, http://industries.ul.com/environment/certificationvalidation-marks/ecologo-product-certification

27 http://www.epeat.net

28 http://www2.epa.gov/saferchoice

29 Underwriters Laboratories, The Sins of Greenwashing, http://sinsofgreenwashing.com/findings/the-seven-sins

30 http://www.iaf.nu

31 ISO, Conformity Assessment—Requirements for Bodies Certifying Products, Processes and Services, ISO/IEC 17065:2012, http://www.iso.org/iso/catalogue_detail.htm?csnumber=46568

32 ISO, Conformity Assessment—Requirements for the Operation of Various Types of Bodies Performing Inspection, ISO/IEC 17020:2012, http://www.iso.org/iso/catalogue_detail?csnumber=52994

33 http://www2.epa.gov/saferchoice

34 US EPA, Greener Products, Introduction to Eco-Labels and Standards, http://www.epa.gov/greenerproducts/standards/index.html

35 US EPA, Draft Guidelines for Product Environ-mental Performance Standards and Ecolabels for Voluntary Use in Federal Procurement, March 2015, http://www.epa.gov/epp/draftGuidelines

36 https://healthy.kaiserpermanente.org/html/kaiser/index.shtml

37 http://www.seattle.gov/light

38 http://perkinswill.com

39 https://webshop.coop.dk

40 http://www.nih.gov

41 http://oeconline.org/about

42 https://healthy.kaiserpermanente.org/html/kaiser/index.shtml

43 Kaiser Permanente, Environmentally Preferable Purchasing (EPP) Principles and Supplier Sustainability Scorecard, https://xnet.kp.org/compliance/supplier/ep/policies.html

44 Kaiser Permanente, Sustainability Scorecard for Medical Products, http://share.kaiserpermanente.org/media_assets/pdf/communitybenefit/assets/pdf/our_work/global/es/ES_Kaiser%20Permanente%20Sustainability%20Scorecard%20Generation%20II.pdf

45 Kaiser Permanente, In the Community, Environmental Stewardship, Safer Chemicals, http://share.kaiserpermanente.org/article/evironmental-stewardship-safer-chemicals

46 http://www.ewg.org

47 https://practicegreenhealth.org

48 https://www.pharosproject.net

49 http://www.bizngo.org

50 https://noharm.org

51 http://www.seattle.gov/light

52 http://www.ecy.wa.gov

53 http://www.pprc.org

54 http://perkinswill.com

55 Perkins+Will, Transparency, http://transparency.perkinswill.com

56 Perkins+Will, Encouraging Material Health in the Built Environment, Precautionary List, http://transparency.perkinswill.com/Home/PrecautionaryList

57 California Office of Health Hazard Assessment, Proposition 65 In Plain Language, http://oehha.ca.gov/prop65/background/p65plain.html

58 https://webshop.coop.dk

59 European Commission, Enterprise, List of the 26 allergenic substances which must be labelled on the packaging of detergents if added at concentrations exceeding 0,01%, 2012, http://ec.europa.eu/enterprise/sectors/chemicals/files/legislation/allergenic_subst_en.pdf

60 http://www.nih.gov

61 National Institutes of Health, Introducing the NIH Substances of Concern (SoC) Reduction Initiative, http://nems.nih.gov/soc/Pages/SoC.aspx

62 US General Services Administration, SFTool—What do I do here?, https://sftool.gov/home/about

63 National Institutes of Health, Office of Research Facilities, Criteria for Listing Substances of Concern, http://orf.od.nih.gov/EnvironmentalProtection/Pages/Criteria-for-Listing-Substances-of-Concern.aspx

64 National Institutes of Health, National Environmental Management System, SoC Groups, http://nems.nih.gov/soc/Pages/SoC-Groups.aspx

65 The White House Office, Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance, October 5, 2009, https://www.fedcenter.gov/programs/eo13514

66 The White House, Executive Order 13693—Planning for Federal Sustainability in the Next Decade, March 25, 2015, http://www.gpo.gov/fdsys/pkg/FR-2015-03-25/pdf/2015-07016.pdf

67 National Institutes of Health, National Environmental Management Systems, Implementation Challenges, http://nems.nih.gov/soc/Pages/Implementation%20Challenges.aspx

68 http://oeconline.org

69 Oregon Environmental Council, Healthy Purchasing: Collaborating for Change, http://oeconline.org/healthy-purchasing-collaborating-for-change

70 Oregon Environmental Council, Healthy Purchasing Coalition, Framework Implementation Checklist, http://oeconline.org/wp-content/uploads/2014/12/HPC_Checklist-Dec2014.pdf

71 Office of the Governor, State of Oregon, Executive Order 12-05, Fostering Environmentally Friendly Purchasing and Product Design, April 27, 2012, http://stage.oeconline.org/wp/wp-content/uploads/2014/10/OR-Green-Chem-EO_12-05.pdf

72 http://www.greenscreenchemicals.org/method/full-greenscreen-method

73 http://hpdcollaborative.org

74 Oregon Department of Administrative Services, Press Release, Two-state Effort Reduces Public Exposure to Toxic Chemicals, July 30, 2013, http://www.oregon.gov/DAS/docs/news_releases/GreenCleanRelease073013.pdf

75 http://www.ceh.org

76 http://www.cleanproduction.org

77 http://www.healthybuilding.net

78 http://greensciencepolicy.org

79 http://www.healthandenvironment.org

80 http://living-future.org

81 https://noharm.org

82 http://oehha.ca.gov/prop65/prop65_list/Newlist.html

83 http://www.dtsc.ca.gov/SCP/index.cfm

84 http://www.chemhat.org
85 http://www.healthandenvironment.org
86 http://greensciencepolicy.org
87 http://www.sixclasses.org
88 http://www.nlm.nih.gov/pubs/factsheets/hsdbfs.html
89 http://www.nlm.nih.gov/nlmhome.html
90 http://toxnet.nlm.nih.gov
91 https://noharm.org
92 https://www.healthybuilding.net
93 http://www.theic2.org/chemicals-concern
94 https://www.osha.gov/dsg/safer_chemicals/index.html
95 http://www.oecdsaatoolbox.org
96 http://transparency.perkinswill.com
97 http://www.subsport.eu
98 http://www.turi.org
99 http://www.epa.gov/oppt/existingchemicals/pubs/chemview.html
100 http://www2.epa.gov/saferchoice/safer-ingredients
101 http://www.responsiblepurchasing.org
102 https://www.sustainablepurchasing.org
103 http://www.challengethelabel.org
104 http://www.isealalliance.org
105 http://www.epa.gov/greenerproducts/index.html
106 http://www.greenseal.org
107 http://www.c2ccertified.org
108 http://greenelectronicscouncil.org
109 http://www.goodhousekeeping.com/institute/about-the-institute/a17832/about-green-good-housekeeping-seal
110 http://industries.ul.com/environment
111 http://www2.epa.gov/saferchoice
112 http://hpdcollaborative.org
113 http://www.scivera.com/products.php#SVLCSA
114 http://www.thewercs.com/products-and-services/wercsmart-retail
115 http://www.thewercs.com/products-and-services/greenwercs
116 http://www.goodguide.com/about/ratings
117 http://www.materialiq.com
118 http://www.greenscreenchemicals.org
119 http://www.cleangredients.org/about

PROJECT SPONSORS

Lowell Center for Sustainable Production, UMass Lowell

The Lowell Center for Sustainable Production promotes communities, workplaces, and products to be healthy, humane, and respectful of natural systems.

The Lowell Center promotes environmentally sound systems of production and consumption by using rigorous science and innovative strategies to develop practical solutions. It works collaboratively with citizen groups, workers, businesses, institutions, and governments to build healthy work environments, thriving communities, and viable businesses and institutions that support a more sustainable world. www.sustainableproduction.org

Green Electronics Council

The Green Electronics Council is a non-profit organization that works with stakeholders around the world to inspire and catalyze environmental leadership throughout the lifecycle of electronic technologies. GEC supports stakeholders to develop both a shared vision of green electronics as the cornerstone of a healthy and vibrant world and the practical tools to realize that vision. GEC supports the production of consensus-based environmental leadership standards and operates EPEAT, the definitive global rating system for greener electronics. www.GreenElectronicsCouncil.org

Responsible Purchasing Network

RPN is an international network of buyers dedicated to socially responsible and environmentally sustainable purchasing. It is a membership organization that provides institutional purchasers with cutting-edge procurement tools and resources designed to save money, conserve resources, reduce waste, and improve efficiency.

Officially founded in 2005, RPN is a program that is advised by a voluntary Steering Committee of leading procurement stakeholders from government, industry, educational institutions, standards-setting organizations, and related organizations. www.responsiblepurchasing.org

Sustainable Purchasing Leadership Council

The Sustainable Purchasing Leadership Council (SPLC) is a 501(c)(3) charitable organization whose mission is to support and recognize purchasing leadership that accelerates the transition to a prosperous, socially just, and sustainable future. The Council's programs and community of practice will help institutional purchasers to *understand* the social, environmental, and economic lifecycle impacts of their purchased goods and services; *prioritize* opportunities to improve the lifecycle impacts of goods and services, and *benchmark* progress toward goals. The Council provides a collaborative space for organizations and individuals to improve clarity and promote consistency in defining and measuring sustainable purchasing. www.sustainablepurchasing.org