Accelerating action

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Implementation Programme 2

"Industry Engagement and Action along Value Chains"

Workstream on Green and Sustainable Chemistry Innovation

Green and Sustainable Chemistry in Practice

A compilation of use cases and initiatives

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About this document:

This document presents a non-exhaustive list of cases and initiatives integrating the green and sustainable chemistry principles in different sectors, carried out by various stakeholders. A total of 62 initiatives are identified, organised per type of stakeholder carrying out the initiative (Governments; Industry; Academia and research; Civil society and multi-stakeholder initiatives), the type of activity, the sector(s) it mostly relates to, and the GSC and Green Chemistry (GC) objectives and principles it adheres to).

The use cases were collected through a questionnaire circulated in March 2026 to the members of the Green and Sustainable Chemistry Expert Group convened by UNEP under the Global Framework on Chemicals thematic work stream as well asdesk research of publicly available sources. This first draft was also reviewed by the members of the Expert Group, and is intended to be used as a basis for further expansion.

Green and Sustainable Chemistry in Practice

A compilation of use cases and initiatives

Green and Sustainable Chemistry thematic workstream, Global Framework on Chemicals (UNEP)

Disclaimer

This document presents a non-exhaustive list of use cases and initiatives carried out by various stakeholders, and which are aligned with Green and Sustainable Chemistry principles. The use cases were collected through a questionnaire circulated to the members of the Global Framework on Chemicals thematic work stream on Green and Sustainable Chemistry Expert Group in March 2026, as well as desk research through publicly available sources. The organisations carrying out initiatives have not been contacted directly. This first draft was consulted with members of the Expert Group, and is intended to be used as a basis for further expansion.

Introduction

This compilation gathers concrete examples of green and sustainable chemistry (GSC) in practice, drawn from a stakeholder survey and complemented by desk research. It is intended to accompany the work of the Green and Sustainable Chemistry thematic workstream under the Global Framework on Chemicals (GFC) by showing how the principles of green and sustainable chemistry are already being applied by different actors around the world.

Authoritative assessments, from the second Global Chemicals Outlook to UNEP's Green and Sustainable Chemistry Framework Manual, have set out why safer and more sustainable chemistry is needed and what it should achieve. Yet examples of implementation remain scattered and unevenly documented. Bringing them together in one place helps make the case tangible, share good practice, and inspire further action across sectors and regions.

Each entry is placed in one of four categories according to its lead actor: industry; academia and research; policy and regulation; and civil society and multi-stakeholder initiatives, which include NGOs, intergovernmental organisations, standards setters and platforms. Where relevant, each entry is mapped to the ten Green and Sustainable Chemistry objectives (GSC, codes O1 to O10) set out in UNEP's Framework Manual, and to the 12 Principles of Green Chemistry (GC, codes P1 to P12). Both lists are reproduced at the end of this document.

Entries are also tagged with the sector or sectors to which they are most relevant. The sector categories build on the chemical-intensive sectors UNEP identifies as key for green and sustainable chemistry innovation, namely construction, agriculture, electronics and textiles, and on the sectors identified as priorities for intervention under the GFC given their chemical footprint, namely construction, electronics, textiles, health care and private finance. A small number of further categories have been added to cover the examples included here, and the full list is set out at the end of this document. Many initiatives are relevant to more than one sector, and upstream chemicals and materials innovations often feed several downstream sectors at once.

The examples were selected for relevance to green and sustainable chemistry, the quality and completeness of the available information, and coverage across actor types, sectors and regions, with a preference for more recent initiatives. The final column records whether the entry is based on a survey response, on desk research, or on both, together with a link for further information. The mappings to the principle frameworks and to sectors are an initial assessment based on the information available and are open to refinement. The list is illustrative rather than exhaustive, and inclusion does not imply endorsement.

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1. Industry

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
1	**Ecovon binder-free coconut-husk boards** A Ghanaian start-up making engineered boards from coconut husk and sugarcane bagasse as an alternative to medium-density fibreboard. Because coconut husk has an exceptionally high lignin content, the fibres bind without added formaldehyde resins, and the boards are naturally flame retardant, anti-fungal and biodegradable. The company won a Best Regional Impact award at the ISC3 Innovation Challenge and was ISC3 Start-up of the Month in April 2026.	**Ecovon** Ghana	Founded 2016; ongoing	Substitution; circular economy	Buildings and construction (also furniture and interiors)	**GSC:** O1, O3, O5, O7 **GC:** P4, P7, P10	**Desk research** https://ecovon-gh.com ISC3 case profile (isc3.org)ISC3 innovation feature
2	**AC Biode solvent-free chemical recycling (Plastalyst)** A start-up in Japan and Luxembourg whose Plastalyst technology enables low-temperature, solvent-free chemical recycling of hard-to-recycle plastics into outputs such as monomers, hydrogen and methanol. Selected as a finalist in the ISC3 Innovation Challenge 2025 on sustainable chemistry and climate change.	**AC Biode** Japan / Luxembourg	Ongoing	Process engineering; circular economy	Waste and recycling; chemicals and materials	**GSC:** O4, O7, O10 **GC:** P1, P5, P6	**Desk research** ISC3 case profile (isc3.org))
3	**Merck: continuous manufacturing for KEYTRUDA** Merck developed a continuous manufacturing process for the monoclonal-antibody medicine KEYTRUDA. Compared with the previous batch approach, EPA reports that the process uses substantially smaller equipment and facilities, with approximately 4.5-fold lower energy use, four-fold lower water use and two-fold lower raw-material use. The example demonstrates process intensification at commercial pharmaceutical scale.	**Merck & Co., Inc.** United States / global pharmaceutical supply	Recognised by the U.S. EPA Green Chemistry Challenge in 2024; ongoing implementation	Process engineering; circular economy	Pharmaceuticals	**GSC:** O4, O6, O7, O10 **GC:** P1, P6	**Desk research** U.S. EPA 2024 award profile
4	**Viridis Chemical: renewable ethyl acetate and co-produced hydrogen**	**Viridis Chemical Company**	Commercial process; U.S.	Substitution	Chemicals and materials	**GSC:** O3, O4, O6, O10	**Desk research** U.S. EPA 2024 award profile

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#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	Viridis produces high-purity ethyl acetate from corn-derived bioethanol using a solid-state catalyst. The product is a drop-in alternative to fossil-based ethyl acetate, while hydrogen generated as a co-product supplies part of the plant's energy demand. EPA's award assessment highlights lower environmental impacts than conventional esterification and direct-addition routes.	United States	EPA Green Chemistry Challenge award in 2024			**GC:** P1, P6, P7, P9	
5	**OrganoTex: PFAS-free, biodegradable textile water repellency** OrganoClick's OrganoTex durable water-repellent technology replaces fluorocarbon-based textile treatments with a primarily renewable, biodegradable system inspired by the water-repellent surfaces of plant leaves. The company states that the industrial treatment is PFAS-free, readily biodegradable under OECD 301A and does not contain polyurethanes, isocyanates or other bioaccumulative substances commonly used in textile impregnation.	**OrganoClick AB / OrganoTex** Sweden; marketed internationally	Commercially available; ongoing	Substitution; circular economy	Textiles	**GSC:** O1, O2, O3, O5, O6, O9 **GC:** P4, P7, P10	**Desk research** OrganoClick technical overviewChemSec Marketplace listing
6	**Braskem I'm green bio-based polyethylene** The world's first industrial-scale bio-based polyethylene, produced from sugarcane ethanol and launched in 2010 at Braskem's site in Triunfo, Brazil. It is a drop-in replacement for fossil polyethylene with the same performance, reported to capture around 3 tonnes of CO2 per tonne of resin, and now extends to bio-based EVA and MEG with ISCC PLUS and Bonsucro certification.	**Braskem** Brazil	Since 2010; ongoing	Substitution; circular economy	Chemicals and materials; packaging (also footwear and automotive via EVA)	**GSC:** O3, O4, O5 **GC:** P7, P2	**Desk research** https://braskem.com.br/imgreen
7	**Avantium plant-based PEF (Releaf)** Avantium's YXY technology catalytically converts plant-based sugars into FDCA, the building block for the fully plant-based and recyclable plastic PEF, marketed as Releaf. The company opened the world's first commercial FDCA plant in Delfzijl, the Netherlands, in October 2024, with start-up	**Avantium** Netherlands	Plant opened 2024; sales from 2026	Substitution; research and innovation	Chemicals and materials; packaging; textiles	**GSC:** O3, O5, O7 **GC:** P7, P9, P10	**Desk research** https://avantium.com

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	completing through 2026 and offtake partners including Henkel and Carlsberg.						
8	**LanzaTech carbon recycling to ethanol** A carbon recycling company that uses gas fermentation, with a microbial catalyst rather than chemical catalysts, heat or pressure, to convert industrial waste gases, syngas from municipal solid waste and captured CO2 into ethanol for fuels, chemicals and materials. Commercial plants operate in China and India and, since 2023, at the ArcelorMittal Steelanol site in Ghent, Belgium.	**LanzaTech Global (with partners)** United States; China, India, Belgium, Japan	First plant 2018; ongoing	Process engineering; circular economy	Chemicals and materials; transport and mobility (aviation fuel); waste and recycling	**GSC:** O3, O4, O6, O7 **GC:** P1, P7, P9	**Desk research** https://lanzatech.com
9	**Sherwin-Williams: Sustainability by Design** Under its Sustainability by Design programme, the company assesses chemical formulations from concept to commercialisation against life cycle impacts and incorporates biobased, bio-attributed and recycled materials. Many products carry third-party certifications such as GREENGUARD, Cradle to Cradle and USDA BioPreferred, and the company emphasises low-VOC, low-emission formulations that reduce releases of volatile organic compounds, formaldehyde and aldehydes.	**The Sherwin-Williams Company** United States; global	Ongoing	Product design; substitution	Buildings and construction (coatings)	**GSC:** O1, O5, O6, O10 **GC:** P4, P5, P7	**Desk research** Sherwin-Williams, Sustainability by Design ChemSec ChemScore (2025) Green Programs and VOC Regulations - Sherwin-Williams Global Environmental, Health And Safety Policy
10	**IKEA Chemical Strategy and Restricted Substances List** IKEA has worked to remove substances of concern from its products since the early 1990s, and its 2016 Chemical Strategy set five objectives: better information on chemical content, safety assessment of all products, phase-out of substances and materials of concern, alignment of suppliers to the same standards, and greater awareness of chemical safety. The company applies a Restricted Substances List and has progressively lowered or eliminated	**Inter IKEA / IKEA** Sweden and Netherlands; around 60 countries	Environmental Action Plan since 1992; Chemical Strategy since 2016; ongoing	Substitution; product design; supply chain	Buildings and construction; furniture and interiors	**GSC:** O1, O2, O5, O9 **GC:** P4	**Desk research** IKEA, Our view on chemicals IKEA Restricted Substance List

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	substances such as formaldehyde in its wood-based products.						
11	**Apple: Regulated Substances Specification and chemical prioritisation** Apple operates a Regulated Substances Specification that restricts hazardous substances in its products, packaging and manufacturing beyond regulatory requirements, and has removed substances such as PVC, phthalates, beryllium and brominated flame retardants from many products. It uses full material disclosure and a published protocol for prioritising chemicals in electronics manufacturing by hazard, presence and exposure, and applies green chemistry criteria to identify safer alternatives.	**Apple Inc.** United States; global supply chain	Ongoing (prioritisation protocol published 2018)	Substitution; assessment; product design	Electronics	**GSC:** O1, O2, O5, O9 **GC:** P4	**Desk research** Apple Environmental Progress Report Apple, Prioritizing Chemicals (2018) apple.com/environment
12	**Transene: PFAS-free semiconductor etchants** Transene, a specialty chemicals manufacturer for the electronics industry, worked with the Toxics Use Reduction Institute and a University of Massachusetts Lowell research team over an 18-month project to develop PFAS-free etching solutions for semiconductor manufacturing. The safer alternatives matched the performance of the fluorinated products, lowered cost, and were adopted by more than 90 per cent of the company's customers. It is a documented example of substitution supported by academic and public technical assistance.	**Transene Company** United States (Massachusetts)	18-month project completed 2022-2023; ongoing supply	Substitution; research and innovation	Electronics	**GSC:** O1, O2, O4, O9 **GC:** P4, P5, P12	**Desk research** TURI case study (2023): Transene eliminates PFAS
13	**Proklean Technologies: probiotic biochemicals for textiles** A Chennai-based company, founded in 2012, that uses a proprietary combination of probiotics, fermentation and formulation to produce biodegradable, non-toxic biochemicals replacing conventional chemical auxiliaries such as surfactants and	**Proklean Technologies** India (Chennai)	Since 2012; ongoing	Substitution; process engineering; circular economy	Textiles, leather and footwear (also paper, cleaning)	**GSC:** O1, O3, O5, O6, O7 **GC:** P4, P7	**Desk research** Proklean Technologies (proklean.in) The Case Centre profile

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	sequestering agents in textile, leather, paper and cleaning applications. Products are registered on the ZDHC Gateway and certified to standards including GOTS and OEKO-TEX Eco Passport, and the company reports lower water use, effluent and carbon footprint than conventional chemistry.						
14	**Tesco Restricted Substances List and pesticide phase-outs** The retailer applies a Restricted Substances List across its own-brand clothing, home and food products, moving beyond legal compliance to adopt Zero Discharge of Hazardous Chemicals guidelines for textiles, ban or restrict certain pesticides, and require suppliers to manage chemical inputs and test for harmful substances. It reports publicly through Detox reports and works through the ZDHC Foundation.	**Tesco PLC** United Kingdom; multiple countries	Ongoing	Supply chain; substitution; assessment	Food and agriculture; textiles (own-brand); consumer products	**GSC:** O1, O2, O6, O9 **GC:** P4 (indirect)	**Desk research** Tesco, Detox Report (2023) Tesco, Sustainability Report (2025) Tesco Standards
15	**Reckitt: green chemistry in consumer health products** Reckitt applies green chemistry principles to its consumer health and hygiene products, using a Restricted Substances List and a Sustainable Innovation Calculator to assess and reduce the carbon, water and plastic impacts of products, and states a target to reduce chemicals of high concern by 65 per cent by 2030 against a 2020 baseline. It has phased out substances such as lilial, lists intentionally added ingredients, and invests in R&D for safer, simpler and more biodegradable alternatives.	**Reckitt** United Kingdom; global	Targets to 2030; ongoing	Product design; substitution	Consumer products; health care (hygiene)	**GSC:** O1, O2, O5, O7 **GC:** P1, P4, P10	**Desk research** Reckitt, Sustainability Areas Reckitt, Ingredient Transparency
16	**Kaiser Permanente: environmentally preferable purchasing** Kaiser Permanente is the largest integrated managed care organization that is currently located across 8 states in the US. It uses its purchasing power through an Environmentally Preferable Purchasing standard to reduce	**Kaiser Permanente** United States (California; 8 states)	Ongoing (purchasing targets to 2025)	Supply chain and procurement; substitution	Health care and pharmaceuticals	**GSC:** O1, O2, O6, O9 **GC:** P4 (indirect)	**Desk research** Kaiser Permanente, Environmentally Preferable Purchasing Standard

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	toxic chemicals in the products it buys, restricting substances such as mercury, PVC, phthalates, certain flame retardants and bisphenol-A in its facilities and supply chain. It encourages suppliers to use lower-hazard chemicals and eliminate chemicals of high concern, and works to move the wider health care market toward safer products.						
17	**Weyerhaeuser: chemical management in wood products** The forestry and wood products company manages chemical risk through its product stewardship programme, eliminating substances such as PCBs, restricting others such as chlorinated solvents, substituting less hazardous alternatives, and providing safety data, supported by a company-wide compliance system.	**Weyerhaeuser Company** United States	Ongoing	Product stewardship; substitution	Buildings and construction (wood products)	**GSC:** O1, O2, O6 **GC:** P4 (indirect)	**Desk research** Weyerhaeuser, Chemical Management Policy Product Stewardship Policy
18	**Skanska: phasing out hazardous substances in construction** The construction group works to phase out hazardous substances, including endocrine-disrupting chemicals, isocyanates and REACH substances of very high concern, with an aspiration of zero hazardous materials in its projects. It develops safer alternatives with suppliers, such as isocyanate-free mortars with Hilti, and advocates for stronger EU chemical criteria.	**Skanska** Sweden; Europe and United States	Ongoing	Substitution; supply chain	Buildings and construction	**GSC:** O1, O2, O5, O9 **GC:** P4	**Desk research** Skanska, Safeguarding the environment Documents for suppliers (incl. Criteria for chemical substances)
19	**Lowe's Safer Chemicals Policy** The home-improvement retailer applies a Safer Chemicals Policy to identify, reduce and eliminate chemicals of concern in the products and packaging it sells, substituting safer alternatives where commercially feasible and encouraging suppliers to disclose ingredients. It has acted to remove substances such as PFAS from residential carpets and rugs.	**Lowe's Companies** United States	Policy since 2018; ongoing	Substitution; supply chain	Buildings and construction; consumer products (retail)	**GSC:** O1, O2, O9 **GC:** P4 (indirect)	**Desk research** Lowe's Safer Chemicals Policy

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20	**The Home Depot: Responsible Chemistry and Chemical Strategy** The retailer's Chemical Strategy targets the removal of specified chemicals of high concern from categories such as paint, flooring, carpet, insulation and cleaning products, promoting ingredient transparency and third-party certification. It has expanded its standards over time, including phasing out PFAS in carpets and rugs.	**The Home Depot** United States	Chemical Strategy since 2017; ongoing	Substitution; supply chain	Buildings and construction; consumer products (retail)	**GSC:** O1, O2, O9 **GC:** P4 (indirect)	**Desk research** Home Depot, Responsible Chemistry Chemical Strategy (2018)
21	**DuluxGroup: chemical risk management in coatings** The paints and coatings company applies a risk management framework that identifies prohibited and high-concern chemicals on toxicological and regulatory grounds and requires actions such as reformulation, alternative sourcing or elimination. Chemical management is embedded in its safety and sustainability policy and annual reporting.	**DuluxGroup (Nippon Paint)** Australia	Framework since 2017; ongoing	Product design; substitution	Buildings and construction (coatings)	**GSC:** O1, O2, O5 **GC:** P4	**Desk research** DuluxGroup, Sustainability Safety and Sustainability Policy (2019)
22	**Google: hazard-based Restricted Substances Specification** Google's Restricted Substances Specification sets requirements for chemicals in products, packaging and manufacturing that are often stricter than regulation, and adds proactive hazard-based rules under which suppliers obtain chemical hazard assessments (for example via ChemFORWARD) for categories such as solvents, flame retardants and PFAS. A Manufacturing Restricted Substances List covers process chemicals.	**Google (Alphabet)** United States; global supply chain	Ongoing (MRSL since 2017)	Substitution; assessment	Electronics	**GSC:** O1, O2, O5, O9 **GC:** P4	**Desk research** Google, Safer chemistry Proactive safer chemistry
23	**Fairphone: hazardous-substance elimination in modular phones** Fairphone designs modular, repairable smartphones and works to reduce hazardous substances beyond RoHS and REACH, collecting full material disclosures from suppliers and maintaining a Restricted Substances List. It has substituted	**Fairphone** Netherlands; manufacturing in China	Ongoing	Substitution; product design; circular economy	Electronics	**GSC:** O1, O2, O7, O9 **GC:** P4, P5	**Desk research** Fairphone, Safety and Hazardous Materials Fairphone Restricted Substances List

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	substances such as benzene and n-hexane in manufacturing with safer alternatives.						
24	**Dell: Materials Restricted for Use specification** Dell restricts hazardous substances in its products and supply chain through its Materials Restricted for Use specification, going beyond REACH and RoHS, auditing suppliers and developing safer alternatives, while integrating recycled content such as ocean-bound plastics. It encourages joint chemical-safety committees at supplier facilities.	**Dell Technologies** United States; global	Ongoing	Substitution; supply chain; circular economy	Electronics	**GSC:** O1, O2, O7, O9 **GC:** P4 (indirect)	**Desk research** Dell, Chemical Use Policy
25	**HP: Materials and Chemical Management Policy** HP manages chemicals across design, manufacturing and end-of-life through its Materials and Chemical Management Policy and its annually updated General Specification for the Environment, which restricts substances and drives replacement with safer alternatives. It participates in the Chemical Footprint Project to benchmark and improve chemical management.	**HP Inc.** United States; global	Ongoing	Substitution; assessment	Electronics	**GSC:** O1, O2, O5, O9 **GC:** P4	**Desk research** HP Materials and Chemical Management Policy HP Standard 011 (General Specification)
26	**Samsung Electronics: chemical lifecycle management** Samsung integrates chemical management into its environmental strategy, restricting and replacing hazardous substances across its supply chain and products, monitoring chemicals from raw material to disposal, and publishing standards for the control of substances used in products. It has invested in treatment facilities to reduce process emissions and improve worker safety.	**Samsung Electronics** South Korea; global	Ongoing	Substitution; assessment; process engineering	Electronics	**GSC:** O1, O4, O6, O9 **GC:** P4 (indirect)	**Desk research** Samsung, Transparency in Chemical Management Standards for Control of Substances
27	**Sony: precautionary chemical management (Road to Zero)** Under its Road to Zero environmental plan, Sony applies a precautionary, risk-based	**Sony Group** Japan; global	Ongoing (Road to Zero to 2050)	Substitution; assessment	Electronics	**GSC:** O1, O2, O6, O9 **GC:** P4 (indirect)	**Desk research** Sony, Road to Zero Green Management 2030 Sony, Management Regulations For The

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	approach that seeks to minimise or eliminate substances that may harm health or the environment, going beyond RoHS and REACH by restricting substances proactively. Requirements are enforced through internal standards such as its controlled-substances specification for parts and materials.						Environment-Related Substances To Be Controlled Which Are Included In Parts And Materials
28	**Tarkett: material health and phthalate-free flooring** A global flooring manufacturer that has applied Cradle to Cradle principles since 2010, working with the assessment agency EPEA to evaluate the material health of its more than 3,000 raw materials and design out substances of concern. It was the first flooring manufacturer to eliminate ortho-phthalates, reaching 100 per cent phthalate-free vinyl production across Europe, North America, Serbia and China by 2019 using plasticizers safe enough for children's toys and food contact, alongside low-VOC formulations, published Material Health Statements, and its ReStart take-back scheme for closed-loop recycling.	**Tarkett Group** France; global	Cradle to Cradle since 2010; phthalate-free by 2019; ongoing	Substitution; product design; circular economy	Buildings and construction (flooring)	**GSC:** O1, O2, O5, O7 **GC:** P4, P10 (indirect)	**Desk research** Tarkett, Healthy Impacts Phthalate-free floors Cradle to Cradle certifications
29	**H&M Group: Safe-by-Design chemical management** H&M Group works to eliminate hazardous substances through restricted-substance lists aligned with the ZDHC Manufacturing Restricted Substances List and AFIRM, supplier compliance and wastewater treatment, and has phased out substances such as PFAS. It promotes a Safe-by-Design, class-based approach and advocates for industry-wide chemical transparency and regulation.	**H&M Group** Sweden; global supply chain	Ongoing	Substitution; supply chain; assessment	Textiles, leather and footwear	**GSC:** O1, O2, O6, O9 **GC:** P4 (indirect)	**Desk research** H&M Group, Chemicals Chemical restrictions
30	**Inditex: Clear to Wear and zero discharge** Inditex applies its Clear to Wear health standard, a restricted-substances list that	**Inditex** Spain; global supply chain	Ongoing (Clear to Wear updated 2025)	Substitution; supply chain; assessment	Textiles, leather and footwear	**GSC:** O1, O2, O6, O9 **GC:** P4 (indirect)	**Desk research** Inditex, Clear to Wear Inditex, Sustainability

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	limits or bans harmful chemicals such as azo dyes, heavy metals, phthalates and flame retardants in finished garments, alongside its Green to Wear standard for processes. It is a long-standing ZDHC contributor working toward zero discharge of hazardous chemicals.						
31	**Nike: designing out chemicals of concern** Nike's chemistry provisions include a restricted-substances list, ZDHC-aligned wastewater guidelines and a manufacturing restricted-substances list, with efforts to identify and design out chemicals of concern and to address microfibres. Chemistry requirements are embedded in its supplier code and product standards.	**Nike** United States; global supply chain	Ongoing	Substitution; supply chain; product design	Textiles, leather and footwear	**GSC:** O1, O2, O6, O9 **GC:** P4 (indirect)	**Desk research** Nike, Eliminate hazardous chemicals Nike Restricted Substances List
32	**Adidas: control and monitoring of hazardous substances (A-01)** Adidas's restricted-substances policy (A-01), introduced in 1998, controls and monitors hazardous substances in materials and finished goods beyond legal requirements, updated annually and mandatory for suppliers, alongside a manufacturing restricted-substances list. The company reports progress toward eliminating hazardous chemical discharge in its supply chain.	**Adidas** Germany; global supply chain	Since 1998; ongoing	Substitution; supply chain; assessment	Textiles, leather and footwear	**GSC:** O1, O2, O6, O9 **GC:** P4 (indirect)	**Desk research** adidas, Control and monitoring of hazardous substances (2023) adidas, Policies
33	**Patagonia: PFAS elimination in apparel** Patagonia works with partners such as bluesign for chemical management and has committed to making all new styles without intentionally added PFAS, while innovating the chemistry used in dyeing, wicking and finishing to improve safety for workers, consumers and the environment. It favours recycled and organic materials over virgin petroleum inputs.	**Patagonia** United States; global supply chain	Ongoing	Substitution; product design	Textiles, leather and footwear	**GSC:** O1, O2, O5, O9 **GC:** P4 (indirect)	**Desk research** Patagonia, PFAS Patagonia, Materials and chemistry

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#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
34	**New Balance: Product Chemistry Program** New Balance's Product Chemistry Program applies a restricted-substances framework across footwear, apparel, accessories and equipment made directly or through contractors and licensees, phasing out substances such as PFAS and collaborating through ZDHC and AFIRM. It has set a public target to eliminate hazardous chemical use and discharge.	**New Balance** United States; global supply chain	Ongoing	Substitution; supply chain	Textiles, leather and footwear	**GSC:** O1, O2, O6, O9 **GC:** P4 (indirect)	**Desk research** New Balance, Product Chemistry Restricted Substances Manual (2025)
35	**Bayer: product stewardship and pesticide management** Bayer frames its approach around Responsible Care and product stewardship, testing products for toxicity and exposure, committing to phase out crop-protection products containing WHO Class 1a and 1b active ingredients, and discontinuing candidate actives with undesirable properties early in development. Its inclusion reflects this stated stewardship approach rather than an endorsement, and the company has faced criticism over the absence of phase-out plans for contested substances such as glyphosate.	**Bayer** Germany; global	Ongoing	Product stewardship; assessment	Agriculture and food	**GSC:** O1, O2, O9 **GC:** P4 (indirect)	**Desk research** Bayer, Product stewardship Highly hazardous pesticides management
36	**Ovomas SAS: circular production and eggshell valorization** Ovomas SAS transforms eggshell waste generated by its liquid-egg operations into USP-grade calcium citrate tetrahydrate and valorizes the eggshell membrane for nutraceutical applications. By returning these waste streams to the productive cycle, the company reduces conventional waste-disposal needs. Its approach combines applied research, resource efficiency, and value creation, positioning circularity as an integral part of its innovation strategy.	**Ambato Ecuador**	Ongoing	Circular Economy	Chemicals and materials Agriculture and food Waste and recycling	**GSC:** O3, O4, O7, O10 **GC:** P1	**Questionnaire + desk research** https://ovomas.com/ https://www.linkedin.com/company/ovomas/posts/

2. Academia and research

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#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
36	**UNEP and UNITAR e-course on Green and Sustainable Chemistry** A free, self-paced online course developed by UNITAR in partnership with UNEP, building directly on the Green and Sustainable Chemistry Framework Manual. Four modules, around two hours in total, cover what GSC is and why it is needed, its links to the 2030 Agenda and circularity, the ten objectives and how stakeholders can apply them, and the policies, life cycle approaches, business models and metrics that create an enabling environment. A certificate of completion is awarded on passing the final quiz.	**UNITAR, in partnership with UNEP** Web-based; global	Ongoing; open enrolment	Capacity building; education	Cross-sector (education)	**GSC:** O1-O10 (overview of all objectives) **GC:** n/a (education)	**Desk research** https://event.unitar.org/full-catalog/green-and-sustainable-chemistry
37	**Global survey of secondary school chemistry teachers on GSC and circular economy** An IUPAC-supported global survey documenting how secondary school chemistry teachers use green and sustainable chemistry and circular economy practical activities, generating country and regional evidence and building a network of chemistry education academics across 57 countries in 37 languages. It is complemented by hands-on professional development workshops in cities including Lisbon, Melbourne, Dar es Salaam, Berlin and Erzurum.	**School of Education, Deakin University** Australia; global	2023-2026	Capacity building	Cross-sector (education)	**GSC:** O10 **GC:** n/a (education)	**Questionnaire** https://iupac.org/project/2023-002-2-050
38	**Educator workshops on systems thinking in chemistry for sustainability** In-service and pre-service educator workshops, with co-designed teaching resources, that build systems-thinking approaches into chemistry teaching around the ethical, environmental and	**School of Education, Deakin University** Australia	2020-present	Capacity building	Cross-sector (education)	**GSC:** O10 **GC:** n/a (education)	**Questionnaire** https://iupac.org/project/2020-014-3-050

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#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	economic dimensions of sustainable chemical processes. The programme runs two to three workshops a year, reaching 50 to 100 teachers, and feeds into international efforts under IUPAC.						
39	**Green Chemistry Centre of Excellence, University of York** A long-standing academic centre for green and sustainable chemistry research and training, specialising in renewable feedstocks, safer bio-based solvents (including the Cyrene solvent developed with Circa), microwave valorisation of waste biomass, and design for reuse and degradation. Its Biorenewables Development Centre supports scale-up with industry, and its Royal Society of Chemistry accredited MSc trains specialists in the field.	**University of York** United Kingdom	Ongoing	Research and innovation; capacity building	Chemicals and materials; cross-sector (education, pharmaceuticals, electronics)	**GSC:** O3, O4, O5, O10 **GC:** P5, P7, P10	**Desk research** https://york.ac.uk/chemistry/research/green
40	**Mercury- and cyanide-free gold recovery pilot** Universidad Pontificia Bolivariana reported a pilot plant for artisanal and small-scale gold mining that seeks to avoid mercury and cyanide by applying a biotechnological alternative. The initiative combined technical development with social, environmental and technology-management components and was supported by the Government of Antioquia. It is a useful Global South example, although current operating status and quantified outcomes require confirmation.	**Universidad Pontificia Bolivariana; Government of Antioquia; mining-community partners** Colombia	Research recognised by U.S. EPA in 2024; development and scale-up ongoing	Research and innovation; capacity building	Mining	**GSC:** O1, O2, O4, O6, O8, O9, O10 **GC:** P3, P4, P12	**Desk research** UNEP compilation of illustrative examples
41	**University of Delaware: renewable lubricant base oils** Professor Dionisios Vlachos and collaborators developed routes to lubricant base oils from biomass-derived sugars rather than petroleum. The	**University of Delaware** United States	Pilot reported to UNEP in 2020; current status to be verified	Research and innovation; capacity building	Chemicals and materials	**GSC:** O3, O4, O5, O10 **GC:** P3, P7, P9	**Desk research** U.S. EPA 2024 award profile

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	approach avoids corrosive acids and uses heterogeneous catalysis to produce several classes of lubricant molecules with performance reported as comparable or superior to conventional base oils. The work received the U.S. EPA's 2024 Academic Award.						
42	**Beyond Benign: Green Chemistry Commitment and teaching community** A US non-profit that embeds green chemistry and toxicology in higher and secondary education. Its Green Chemistry Commitment unites more than 260 institutions across 35 countries around integrating green chemistry into curricula, and its open-access Green Chemistry Teaching and Learning Community shares educational resources. The programme reaches well over a million students a year and received a Royal Society of Chemistry 2025 Horizon Prize for Education.	**Beyond Benign** United States; global network	Commitment since 2013; ongoing	Capacity building; education	Cross-sector (education)	**GSC:** O10 **GC:** n/a (education)	**Desk research** Beyond Benign, Green Chemistry Commitment Green Chemistry Teaching and Learning Community
43	**Green & Sustainable Chemistry Network (GSCN), Japan** A network established in 2000 by Japanese chemical societies, associations and national research institutes, now hosted within the Japan Association for Chemical Innovation, to promote green and sustainable chemistry across academia, industry and government. It runs an annual JACI/GSC symposium, supports education and international collaboration, and co-hosts the biennial International Conference on Green and Sustainable Chemistry.	**GSCN, Japan Association for Chemical Innovation (JACI)** Japan	Since 2000; ongoing	Fora; capacity building; research and innovation	Cross-sector	**GSC:** O4, O5, O10 **GC:** Cross-cutting	**Desk research** GSCN, JACI
44	**Yale Center for Green Chemistry and Green Engineering** An interdisciplinary academic centre, directed by Paul Anastas who co-	**Yale University** United States; Global South (with UNIDO)	Ongoing; UNIDO programme from 2023	Research and innovation; capacity building	Chemicals and materials; cross-sector	**GSC:** O1, O2, O4, O10 **GC:** P4	**Desk research** Yale Center for Green Chemistry & Green Engineering About the Center (UNIDO programme)

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	authored the 12 principles of green chemistry, that designs safer chemicals and materials and builds molecular-design and toxicity-prediction tools. It runs a six-year, USD 12.6 million Global Greenchem Innovation and Network Programme with UNIDO to build green chemistry capacity in the Global South.						

3. Policy and regulation

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
45	**EU Safe and Sustainable by Design framework** A voluntary framework developed by the European Commission's Joint Research Centre under the EU Chemicals Strategy for Sustainability to steer innovation in chemicals and materials toward safer and more sustainable options across their life cycle. First proposed in 2022 and supporting a Commission Recommendation the same year, it was revised in December 2025 following extensive testing with stakeholders.	**European Commission (Joint Research Centre)** European Union	2022; revised 2025	Policy and framework	Cross-sector (all chemicals and materials)	**GSC:** O1, O2, O5, O10 **GC:** P4, P10	**Desk research** SSbD Framework
46	**EU universal PFAS restriction proposal (REACH)** A proposal submitted in January 2023 by Denmark, Germany, the Netherlands, Norway and Sweden to restrict around 10,000 per- and polyfluoroalkyl substances across the EU and EEA under REACH, one of the broadest chemical restrictions attempted. After a consultation generating more than 5,600 comments, an updated background document was issued in August 2025 and ECHA's scientific committees are assessing it sector by sector, with final	**Denmark, Germany, Netherlands, Norway, Sweden; ECHA** European Union	2023 proposal; opinions expected 2026	Policy and regulation; substitution	Cross-sector (notably textiles, electronics, construction, packaging, health care)	**GSC:** O1, O2, O6, O9 **GC:** P4 (indirect)	**Desk research** ECHA proposal

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	opinions expected by the end of 2026 ahead of a Commission decision.						
47	**California Safer Consumer Products programme** A regulatory programme run by California's Department of Toxic Substances Control under the state's Green Chemistry Initiative. It lists candidate chemicals of concern, designates product-chemical combinations as priority products, and requires manufacturers to carry out an alternatives analysis to identify safer substitutes, with responses that can include reformulation, disclosure, use restrictions or product redesign.	**California Department of Toxic Substances Control** United States (California)	Regulations since 2013; ongoing	Policy and regulation; substitution	Consumer products (incl. personal care, cleaning, building products)	**GSC:** O1, O2, O9 **GC:** P4 (indirect)	**Desk research** https://dtsc.ca.gov/scp
48	**Belgium Builds Back Circular (BBBC) investment fund** A federal circular economy investment fund financed through NextGenerationEU under Belgium's National Recovery and Resilience Plan, jointly managed by the FPS Public Health (ecodesign) and the FPS Economy (substitution of hazardous substances). Ecodesign calls in 2022 and 2023 funded 24 projects and a substitution call at the end of 2023 selected 9 more, with 14.3 million euros invested in total, mostly in projects led by SMEs, start-ups and research centres.	**FPS Public Health and FPS Economy** Belgium	2022-2026 (funding expires May 2026)	Policy and financing; research and innovation; circular economy	Cross-sector (health care, energy, textiles, electronics, furniture, mobility)	**GSC:** O1, O2, O5, O7 **GC:** P1, P4, P10	**Questionnaire + desk research** https://health.belgium.be/en/circular
49	**Canada: Chemicals Management Plan (informed substitution)** A government-wide programme launched in 2006 to prioritise and act on substances of concern across Canadian legislation, now emphasising informed substitution, the considered transition from a chemical of concern to safer alternatives. The 2023 modernisation of the Canadian Environmental Protection Act (Bill S-5) encourages safer alternatives and uses	**Environment and Climate Change Canada; Health Canada** Canada	Since 2006; CEPA modernised 2023	Policy and regulation; substitution	Cross-sector	**GSC:** O1, O2, O9, O10 **GC:** P4 (indirect)	**Desk research** Canada, transition to safer chemicals

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#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	class-based assessment to avoid regrettable substitutions.						
50	**Sweden: A Non-Toxic Environment and Centre for Chemical Substitution** Sweden's national environmental objective A Non-Toxic Environment, driven by the Swedish Chemicals Agency (KEMI), guides an action plan under which Sweden is among the EU's most active proposers of restrictions on hazardous substances, supported by the PRIO substitution tool. The government-commissioned Swedish Centre for Chemical Substitution, hosted by RISE, helps companies and public bodies identify unwanted substances and find safer alternatives.	**Swedish Chemicals Agency (KEMI); RISE** Sweden	Objective to 2030; ongoing	Policy and regulation; substitution support	Cross-sector	**GSC:** O1, O2, O7, O9 **GC:** P4 (indirect)	**Desk research** KEMI, A Non-Toxic Environment Swedish Centre for Chemical Substitution (RISE)
51	**US EPA Safer Choice and Green Chemistry Challenge Awards** Two long-running US Environmental Protection Agency programmes. The Safer Choice label certifies cleaning and other products whose ingredients meet safer-chemistry criteria, helping consumers and institutions choose safer products, while the Green Chemistry Challenge Awards, running since 1996, recognise innovations that design out hazards in chemical products and processes.	**US Environmental Protection Agency** United States	Awards since 1996; Safer Choice ongoing	Policy; market-based label; recognition	Cross-sector; consumer products	**GSC:** O1, O2, O5, O10 **GC:** P4	**Desk research** EPA Safer Choice EPA Green Chemistry Challenge
52	**Japan: Green and Sustainable Chemistry Awards** National awards presented since 2001 through the Green & Sustainable Chemistry Network under JACI, recognising research, development and commercialisation that advance green and sustainable chemistry. Three ministerial awards are conferred, by the Ministers of Economy, Trade and Industry; Education, Culture, Sports, Science and Technology; and the Environment. Past winners include	**JACI / GSCN; Japanese ministries** Japan	Since 2001; annual	Policy; recognition	Cross-sector	**GSC:** O4, O5, O10 **GC:** P1, P9	**Desk research** GSCN, GSC Awards

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	phosgene-free polycarbonate production from carbon dioxide and reduced-rinse laundry detergents.						

4. Civil society and multi-stakeholder

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
53	**Toward Zero Exposure (Clean Electronics Production Network)** A programme convening brands, suppliers, worker representatives, NGOs and academia across the electronics industry to reduce worker exposure to hazardous process chemicals. It identifies priority chemicals for elimination or substitution, provides a free standardised process-chemicals data collection tool, and offers worker surveys on chemical safety and training across the global supply chain.	**Clean Electronics Production Network** United States; global	Ongoing	Assessment; capacity building; substitution	Electronics	**GSC:** O1, O2, O6, O9 **GC:** P4, P12 (indirect)	**Questionnaire** https://towardzeroexposure.org Priority chemicalsWorker survey
54	**International Sustainable Chemistry Collaborative Centre (ISC3)** An international centre advancing the transition to sustainable chemistry across chemical value chains, taking a multi-stakeholder approach across policy, industry, academia and civil society. It contributes to international chemicals policy, supports start-ups and innovation, and delivers professional and academic training. Established in 2017 on the initiative of the German environment ministry and the German Environment Agency, hosted by GIZ and supported by DECHEMA.	**ISC3** Germany; global	2017-ongoing (Phase III 2025-2028)	Innovation; capacity building; policy; circular economy	Cross-sector (chemicals and downstream value chains)	**GSC:** O3, O4, O5, O7, O10 **GC:** Cross-cutting	**Questionnaire + desk research** https://isc3.org
55	**OECD Working Party on Risk Management (substitution and alternatives assessment)** An OECD body whose work includes alternatives assessment and the substitution of harmful chemicals, promoting informed	**OECD** France; international	Ongoing	Fora; guidance documents	Cross-sector (notably plastics and PFAS uses)	**GSC:** O1, O2, O10 **GC:** P4 (indirect)	**Questionnaire + desk research** https://oecdsaatoolbox.org

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	decision-making, policy coherence across countries and the market uptake of safer alternatives, alongside broader work on sustainable chemistry, plastics and PFAS. It brings together governments, industry and NGOs and maintains the Substitution and Alternatives Assessment Toolbox.						
56	**GRI Sustainability Reporting Standards (health, safety, waste, pollution)** Globally used sustainability reporting standards that help organisations disclose their impacts, including standards on occupational health and safety, waste, and the agriculture, aquaculture and fishing sectors, with air pollution, soil pollution and critical-incident standards in development. Used by around 14,000 organisations in 100 countries, they improve transparency on chemical-related impacts for investors and communities.	**GRI (Global Reporting Initiative)** Netherlands; global	Ongoing (new standards expected 2027)	Standards; assessment and monitoring	Cross-sector; finance (investor disclosure); agriculture and food	**GSC:** O6, O9 **GC:** P11 (indirect)	**Questionnaire** https://globalreporting.org
57	**ZDHC Roadmap to Zero (textiles, leather, footwear)** A multi-stakeholder programme run by the ZDHC Foundation with brands, manufacturers and chemical suppliers to eliminate hazardous chemicals from textile, apparel, leather and footwear supply chains. It guides the industry through a Manufacturing Restricted Substances List, shared data platforms and wastewater and air-emission guidelines, driving substitution toward safer chemistry in a GFC high-impact sector.	**ZDHC Foundation** Netherlands; global	Ongoing	Supply chain; substitution; assessment	Textiles, leather and footwear	**GSC:** O1, O2, O6, O9 **GC:** P4, P12 (indirect)	**Desk research** https://roadmaptozero.com
58	**Systems Thinking, Sustainability and Chemical Industry (IOCD and IUPAC)** A joint IOCD and IUPAC project creating a channel for chemical companies to collaborate on sustainability challenges. It is developing a policy White Paper on the enabling environment for systems thinking in industry, together with representative case	**IOCD, with IUPAC** Belgium; global	2025-2028	Policy; capacity building	Chemicals and materials; cross-sector (education)	**GSC:** O4, O5, O10 **GC:** Cross-cutting	**Questionnaire + desk research** https://iupac.org/project/2025-004-2-041

#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	studies that unpack the factors, options and trade-offs in selected industrial systems and will be turned into education and professional development resources.						
59	**IPEN (International Pollutants Elimination Network)** A global network of more than 600 public interest organisations in over 120 countries, largely low- and middle-income nations, working for a toxics-free future. It helped shape the Stockholm Convention and remains active in the Rotterdam, Basel and Minamata treaties and the plastics treaty negotiations, runs a Global Lead Paint Elimination Campaign, and supports safer materials and substitution while ensuring the voices of affected communities are heard.	**IPEN** Sweden-registered; global (LMIC focus)	Since 1998; ongoing	Advocacy; assessment; capacity building	Cross-sector (Global South focus)	**GSC:** O1, O6, O8, O9 **GC:** P4 (indirect)	**Desk research** IPEN
60	**ChemSec: SIN List, Marketplace and ChemScore** A Swedish non-profit that accelerates the substitution of hazardous chemicals with safer alternatives. It maintains the SIN (Substitute It Now) List of substances of concern, the Marketplace database of commercially available safer alternatives, and ChemScore, which ranks chemical producers on their management of hazardous substances for investors and buyers.	**ChemSec (International Chemical Secretariat)** Sweden; global reach	Since 2002; ongoing	Substitution; assessment; advocacy	Cross-sector; finance (investor tools)	**GSC:** O1, O2, O5 **GC:** P4	**Desk research** ChemSec Marketplace ChemScore
61	**Clean Production Action: GreenScreen and Chemical Footprint Project** A US non-profit providing tools and collaborations for safer chemistry. GreenScreen for Safer Chemicals is an open hazard-assessment method and product certification used by companies and governments to identify chemicals of concern and select safer alternatives, and the Chemical Footprint Project benchmarks and discloses companies' progress on safer chemicals for investors and purchasers. It	**Clean Production Action** United States	Ongoing	Assessment tools; benchmarking; multi-stakeholder	Cross-sector; finance (investor disclosure)	**GSC:** O1, O2, O5 **GC:** P4	**Desk research** Clean Production Action GreenScreen for Safer Chemicals

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#	Initiative and description	Lead organisation and location	Timeline / status	Activity type	Most relevant sector(s)	GSC objectives / GC principles	Source and more information
	also runs the BizNGO business-NGO collaboration.						
62	**Health Care Without Harm: safer chemicals in health care** A global NGO that harnesses the purchasing power of hospitals and health systems to reduce hazardous chemicals and adopt safer alternatives, through guidance on chemicals of concern, PVC/DEHP and mercury elimination, and sustainable procurement. With UNDP it developed the Sustainable Procurement Index for Health and criteria to identify chemicals of high concern to avoid in health products, connecting directly to the sound management of chemicals under SAICM and the GFC.	**Health Care Without Harm (and Practice Greenhealth)** United States; global	25+ years; ongoing	Supply chain and procurement; substitution; advocacy	Health care and pharmaceuticals	**GSC:** O1, O2, O6, O9 **GC:** P4 (indirect)	**Desk research** Health Care Without Harm, Chemicals Sustainable procurement

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Conclusion and next steps

Taken together, the examples show that green and sustainable chemistry is being advanced across the whole value chain and by every type of actor. They span the substitution of hazardous substances, renewable and waste-based feedstocks, safer production processes, circular and service-based models, education and skills, sustainability reporting, and enabling policy and finance. They also reach beyond any single region, with initiatives from Europe, the Americas, Africa and Asia alongside global platforms.

Across sectors and actors, the cases show that green and sustainable chemistry is being put into practice throughout the value chain, from upstream chemicals and materials to electronics, textiles, construction, health care, food and consumer products, and by every type of actor, from companies and researchers to governments and civil society. The private sector accounts for the largest share of activity, though much of it takes the form of restricted-substances lists and product-stewardship programmes, which signal direction and commitment more than they demonstrate measured outcomes. Where finance appears, it does so mainly through investor-facing tools that reward safer chemistry, such as the Chemical Footprint Project and ChemScore, suggesting a lever that remains underused. The thinnest areas, primary agriculture and national policy in low- and middle-income countries, point to where the greatest value could be added next.

This compilation is best treated as a living resource. Expanding it through continued stakeholder input and desk research, and connecting it to the GFC's knowledge management and sector implementation programmes, would help turn a set of examples into a shared evidence base. Stakeholders are encouraged to submit further initiatives and to draw on these examples when designing and financing their own action.

Reference: classifications used

Green and Sustainable Chemistry objectives (GSC)

Code	Objective
O1	Minimize chemical hazards
O2	Avoid regrettable substitutions and alternatives
O3	Sustainable sourcing of feedstocks and resources
O4	Advance sustainable production processes
O5	Advance sustainable products
O6	Minimize chemical releases and pollution
O7	Enable non-toxic circularity
O8	Maximize societal benefits
O9	Protect workers, consumers and vulnerable populations
O10	Develop solutions for sustainability challenges

Summarised from the 10 Objectives and Guiding Considerations in UNEP's Green and Sustainable Chemistry: Framework Manual (Chapter 3)

Principles of Green Chemistry (GC)

Code	Principle
P1	Prevention (prevent waste)
P2	Atom economy
P3	Less hazardous chemical syntheses
P4	Designing safer chemicals
P5	Safer solvents and auxiliaries

Code	Principle
P6	Design for energy efficiency
P7	Use of renewable feedstocks
P8	Reduce derivatives
P9	Catalysis
P10	Design for degradation
P11	Real-time analysis for pollution prevention
P12	Inherently safer chemistry for accident prevention

Anastas and Warner (1998); see ACS, 12 Principles of Green Chemistry.

Sector categories

Sector	Scope and basis
Agriculture and food	Crop protection, fertilizers, food production and processing. A UNEP key industrial sector.
Buildings and construction	Construction materials, coatings, insulation and interiors. A UNEP key industrial sector and a GFC priority sector.
Electronics	Electronic and electrical equipment, semiconductors and e-waste. A UNEP key industrial sector and a GFC priority sector.
Textiles, leather and footwear	Fibres, dyeing and finishing, apparel and footwear. A UNEP key industrial sector and a GFC priority sector.
Health care and pharmaceuticals	Medical products and devices, pharmaceutical manufacture and health care settings. A GFC priority sector.
Finance	Investment, disclosure and financing of the chemicals transition. A GFC priority sector.
Chemicals and materials	Upstream production of chemicals, polymers and materials that feed multiple downstream sectors.
Packaging	Packaging materials and applications, including food contact.
Transport and mobility	Automotive, aviation and fuels.
Consumer products	Personal care, cleaning and other household products.
Waste and recycling	Collection, recycling and recovery of materials at end of life.
Cross-sector	Initiatives that apply across the economy, including education, standards, reporting and horizontal policy frameworks.

There is no single published UNEP or IOMC sector classification. The categories above therefore combine the chemical-intensive sectors UNEP identifies as key for green and sustainable chemistry innovation with the priority sectors identified under the GFC, and add a small number of further categories needed to describe the examples in this compilation. They can be aligned with the GFC sector implementation programmes as those develop.

Note on sources: entries marked 'Questionnaire' come from the stakeholder survey; those marked 'Desk research' were compiled from public sources including organisation websites, published corporate sustainability and chemical-management disclosures, national chemicals agencies, NGO and academic networks, ECHA, the EU Joint Research Centre, UNITAR, ISC3 and TURI, accessed in 2026. Entries marked 'Questionnaire + desk research' combine a survey response with details or links verified independently. Statuses, figures and links should be checked before publication.

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