

DRIVING INNOVATION

How stronger laws help bring safer chemicals to market

Are innovation and the law at odds? A closer look shows that stronger laws for the management of hazardous chemicals help to drive innovation in chemical and product sectors. Innovation is especially relevant today as the US\$ 4.1 trillion (3.1 trillion euro) global chemical industry faces increasing pressure from consumers, retailers, and investors demanding safer products. At the same time, emerging economies are increasingly well-positioned to become leaders in chemical innovation, potentially leaving Western Europe and the United States behind. Together, all of these forces are instigating changes in how governments, chemical manufacturers, and downstream users of chemicals are working to ensure chemical safety and drive innovation.

The Center for International Environmental Law (CIEL) examined the impact of laws governing hazardous chemicals in terms of their effect on innovation.

Our Results

The prospect of stronger laws with regard to toxic chemicals sparked the invention, development, and adoption of alternatives. For example, in response to stronger laws to protect people and the environment from phthalates, a class of chemicals with hormone (endocrine) disrupting properties, our study of international patent filings shows acceleration in the invention of alternative chemicals and products. Spikes in the patenting of phthalate-alternatives clearly correlate with

Exponential growth in the number of patented inventions for phthalate alternatives beginning in 1999, coinciding with the adoption of stricter rules (as captured by the number of patent families for "non-phthalate" and "phthalate-free" inventions)

the timing of new laws to protect people and wildlife from phthalates. As the stringency of measures increased, so too did the number of inventions disclosed in patent filings by the chemical industry. Similarly, the phase-out of ozone deplet-

"Over-regulation...is seen as an old problem and there is a lot of truth in that. We are working to overcome it. But we also need to recognize that regulation can be a big driver of innovation."

— Peter Droell, Head of Innovation Unit, European Commission

ing substances also illustrates how progressively stricter rules at the global level can drive a sustained effort to invent safer alternatives.

As innovation hinges on the adoption of inventions, stricter laws for hazardous chemicals can also **help to pull inventions into the market, turning an invention into innovation**, as our case studies highlight. Barriers exist that prevent the entry of safer alternatives. Overcoming the inertia of entrenched toxic chemicals typically requires the power of the government. Our findings show that stronger laws enable safer chemicals to overcome barriers to entry, such as economies of scale enjoyed by the current mix of chemicals, the externalization of costs, and the lack of information about chemicals and products on the market today.

FIGURE 1
Spike in Patented Inventions Free of Hazardous Phthalates

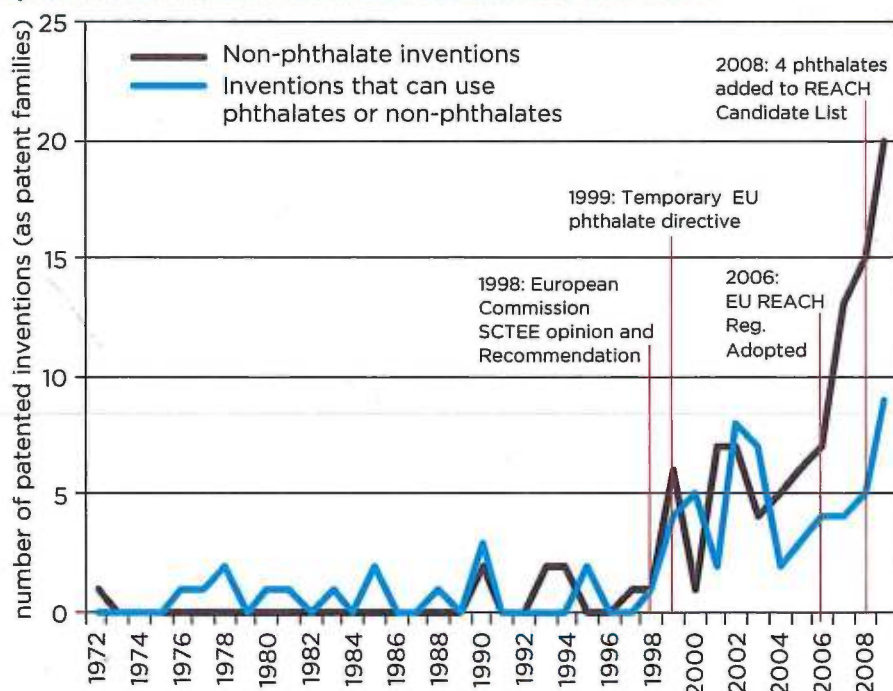
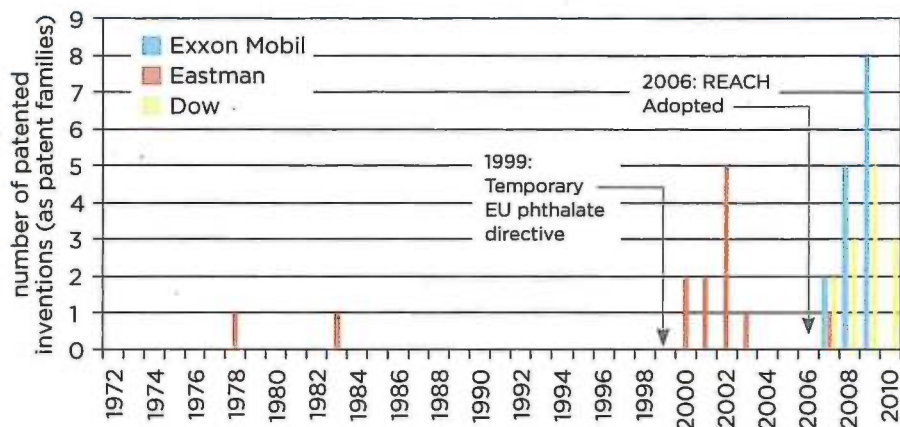


FIGURE 2
Stricter Laws Trigger Innovation by Major Chemical Manufacturers



Number of patented inventions by Eastman Chemical (formerly Kodak Eastman), Exxon Mobil and Dow Chemical from 1972–2010 for phthalate alternatives.

BOX 1

Demand for Safer Chemicals

In response to consumer concerns and advocacy campaigns, retailers and producers of consumer products are increasingly demanding other businesses in the value chain ensure that their products are free of hazardous chemicals.

- Global clothing brands, Nike, Addidas, H&M, Zara, and others recently announced plans to remove certain hazardous substances from their supply chain by 2015 or 2020, depending on the chemical. Among hazardous chemicals tested and found in garments were phthalates, nonylphenol ethoxylates (NPEs), and certain amines linked to cancer.
- Johnson & Johnson announced plans to remove certain chemicals of concern from most of its adult toiletries and cosmetic products.



But, businesses that take the lead in developing and using safer chemicals are calling on policymakers to craft policies that help to level the playing field, both at home and at the global level. For example, during a U.S. Senate hearing on the need for stricter laws in the United States, a major chemical formulator, stated: "We believe it is essential for the U.S. chemical management system to keep pace with global developments... and that our government be a global leader in chemical regulatory policy."

Thus, businesses recognize that consumer demand alone is generally insufficient and government action may be required to enable safer alternatives to enter and compete on a level playing field, both at home and abroad.

Claims of confidentiality should be justified, periodically re-justified, and never granted for health and safety information.

To this end, CIEL provides the following recommendations for policy makers in Europe, the United States, and other countries and regions around the world:

1. Ensure the burden of proving chemical safety falls on chemical manufacturers

Requiring that chemical manufacturers generate information about the intrinsic hazards of both existing as well as new chemicals levels the playing field for safer chemicals and enables a more meaningful assessment of alternatives. This information enables regulators to remove entrenched chemicals of concern, downstream users to deselect hazardous chemicals from their supply chain, and chemical manufacturers to innovate towards safer alternatives.

2. Phase-out chemicals with certain intrinsic hazards

Government authorities must possess—and exercise—the power to remove hazardous chemicals from the market based on their intrinsic hazards.

3. Recognize endocrine disruption as an intrinsic hazard that cannot be soundly managed

Endocrine disruption is an intrinsic hazard of certain chemicals, linked to a myriad of adverse effects that have been on the rise over the past several decades. As there is no safe dose of exposure to endocrine disrupting chemicals (EDCs), they should be recognized as a distinct category of chemicals that needs to be phased out globally, similarly to other chemicals with intrinsic hazards.

BOX 2

The REACH Candidate List: A Key Driver of Innovation

According to the European Commission's interim evaluation of the impact of the EU's REACH Regulation on innovation in Europe (REACH Innovation Report), "the Candidate List is a, if not the, major driver for change at present."

- Registration of chemicals under REACH is projected to have an impact on substitution as some chemicals may not be registered or produced at lower volumes, reducing supply—a "trigger" for innovation. Communication of information about hazardous chemicals along the supply chain made the strongest contribution to stimulating the conception of new products.
- The REACH Candidate List identifies a chemical as being a Substance of Very High Concern (SVHC) based on information about its intrinsic properties, such as: whether it causes cancer, creates genetic mutations, negatively affects reproduction (CMRs); persists in the environment, accumulates in living organisms, and/or are toxic (PBTs or vPvBs); or rises to an equivalent level of concern, such as endocrine disruption.
- The REACH Innovation Report suggests that the Candidate List is driving innovation through substitution, reformulation, and withdrawal.



As more information is provided about the intrinsic hazards of chemicals within the scope of REACH, the Candidate List stands to continue to drive innovation in the chemical industry. With broad criteria for identifying endocrine disrupting chemicals and information about endocrine disrupting properties of chemicals, it stands to reason that the Candidate List will further drive innovation.

4. Internalize the costs of hazardous chemicals

Not only would this lead downstream users to shift to alternatives with lower costs, but this would in turn incentivize chemical manufacturers to invest in the research and development of safer alternatives.

5. Promote access to information

Inventors need access to information about chemical hazards and exposures to develop safer solutions. Regulators need

access to hazard and exposure information to restrict the use of hazardous chemicals, enabling the entry of safer alternatives. Claims of confidentiality should be justified, periodically re-justified, and never granted for health and safety information, to enable the development of safer alternatives.

6. Craft stronger international laws to ensure a level playing field at the global level

Only a narrow sliver of chemicals of concern on the market are covered under legally binding global treaties throughout their lifecycle. A broader international regime to cover a wider range of hazardous chemicals and chemical-related risks is required to create a level playing field for businesses operating in a globalized world.

"Stronger laws present an opportunity to prevent exposure to hazardous chemicals, while accelerating product innovation, job creation, and economic growth."

— Howard Williams, V.P. and General Manager of Construction Specialties, a multinational manufacturer of building materials





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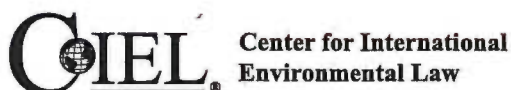
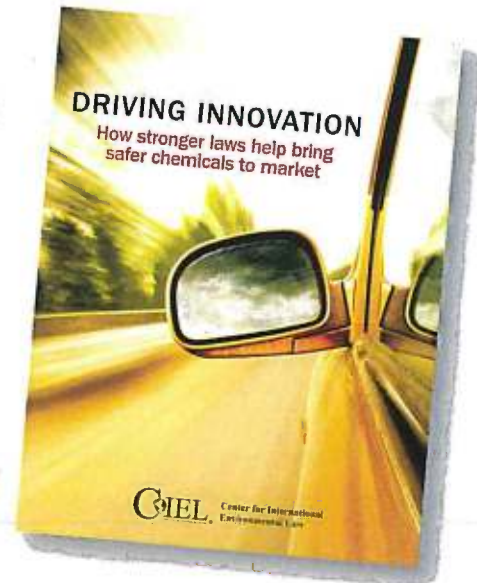
Are innovation and the law at odds? Our study finds that stricter rules over hazardous chemicals can not only drive innovation, but also create a safer marketplace. The study shows how stronger laws spur the innovation of safer alternatives and can pull safer alternatives into the market, enabling them to overcome barriers to entry. But, policies must be in place to ensure that alternatives do not also have intrinsic hazards, to better ensure that innovation leads to safer chemicals and products.

Read the full report to learn more about:

- regulations that accelerated the innovation of alternatives to hazardous chemicals.
- removing barriers that prevent the entry of safer alternatives into the marketplace.
- companies that are increasing efforts to innovate as a result of stronger laws.
- why investors and businesses are increasingly turning to green chemistry.

Download the full report at

http://ciel.org/Publications/Innovation_Chemical_Feb2013.pdf



1350 Connecticut Avenue NW, Suite #1100
Washington, DC 20036 USA
(202) 785-8700, www.ciel.org

Founded in 1989, the Center for International Environmental Law (CIEL) uses international law and institutions to protect the environment, promote human health, and ensure a just and sustainable society.

This report was authored by Baskut Tuncak, Staff Attorney at the Center for International Environmental Law (CIEL) with contributions by Daryl Ditz, David Azoulay and Carroll Muffett.