

The Economic Benefits of a Green Chemical Industry in the United States

Renewing Manufacturing Jobs While Protecting Health and the Environment

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Commissioned by
BLUEGREEN
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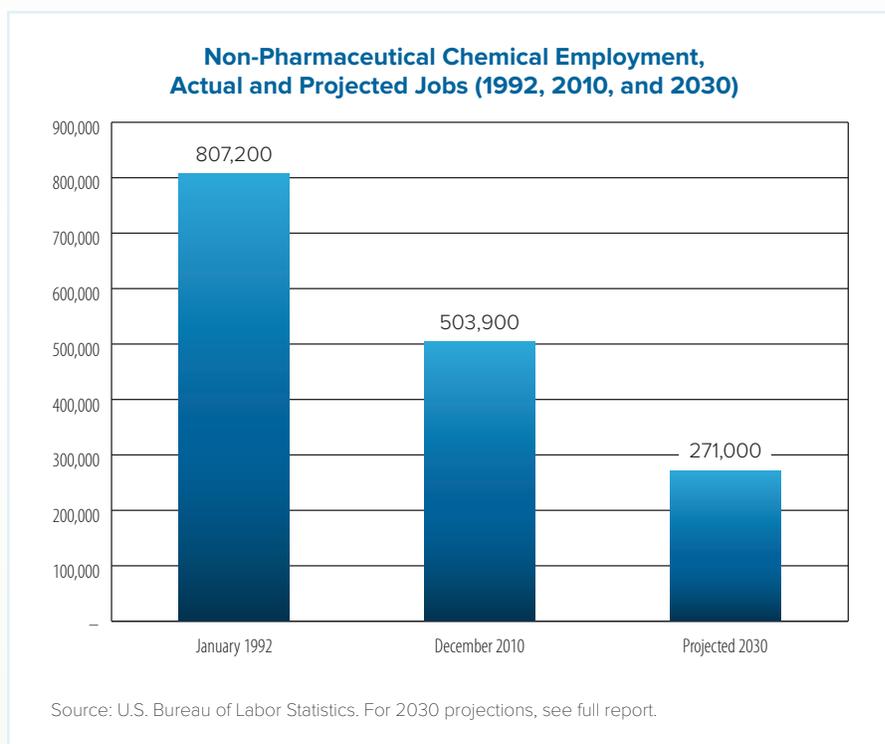
EXECUTIVE SUMMARY

A shift to the production of chemicals that are safer for workers, the environment and human health, supported by reform of the 1976 Toxic Substances Control Act (TSCA), can create American jobs and new market opportunities, reversing the decline in employment that has occurred over the past 20 years.

If we do not modernize U.S. chemical regulations, the analysis in this report shows that the chemical industry can be expected to continue its current model of competitiveness based on cost-cutting practices that eliminate jobs and minimize innovation:

- Research and development (R&D) spending in the chemical industry is currently just 1.5 percent of sales, less than 45 percent of the average for the U.S. manufacturing sector as a whole.
- Since 1992, the chemical industry, excluding pharmaceuticals, has eliminated more than 300,000 jobs. Employment in the chemical industry fell 38 percent between 1992 and 2010, even as the value of production expanded an average of four percent per year.
- If these trends continue, the present number of jobs in non-pharmaceutical chemicals will be effectively cut in half by 2030 and more than 230,000 additional jobs will disappear. These job losses will occur despite expectations that global production will expand by 4.5 percent on average each year over the next decade.

These job losses are not inevitable. New market opportunities demonstrate how to reverse negative employment trends and put people to work in the chemical industry in the United States. This report estimates that if, for example, 20 percent of current production were to shift from petrochemical-based plastics to bio-based plastics, 104,000 additional jobs would be created in the U.S. economy even if the output of the plastics sector remained unchanged.



The U.S. needs to catch up with changes happening elsewhere in the world, respond to the demand for safer, healthier products, improve the information that is available to the public, and support legislative and market efforts to move the chemical industry in new innovative directions. By taking these steps towards sustainable production, the U.S. chemical industry will become more competitive by:

- lowering handling and disposal costs for the chemical industry and downstream users;
- ensuring access to important global markets;
- reducing waste by using inputs more efficiently and curtailing future cost pressures by using fewer non-renewable fossil fuel inputs;
- meeting demands from consumers for safer products more effectively;
- protecting shareholder value; and
- encouraging research and the development of innovative products.

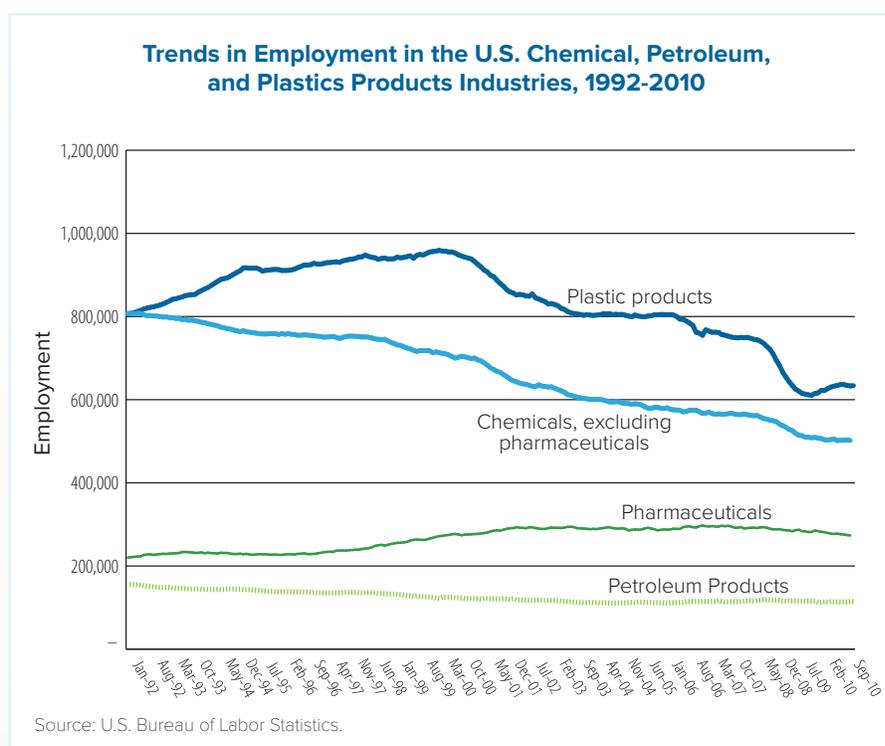


CREATING AN EFFECTIVE REGULATORY SYSTEM IN THE UNITED STATES

The outdated TSCA regulates many of the chemicals used in industrial production and consumer products. However, under TSCA, the ability of the Environmental Protection Agency (EPA) to oversee the development and marketing of chemicals is constrained. The EPA is required to demonstrate that products are harmful before regulating them. Moreover, TSCA grandfathered in about 62,000 chemicals which were in use prior to 1979. The end result is that the information available on chemicals is limited or non-existent and many remain virtually unregulated.

A failure to reform TSCA has a number of implications for the future of the U.S. chemical industry and the U.S. economy:

- The U.S. regulatory framework lags far behind other countries and regions, such as the European Union and Canada, with consequences for access to important markets.
- TSCA fails to address the problem that significant costs associated with hazardous chemicals are being imposed on consumers and downstream users.
- Consumers, investors, workers, and businesses have inadequate information on chemical products, limiting their ability to make informed decisions and creating market failures.
- TSCA perpetuates perverse incentives that hamstring innovation and cause producers to favor existing chemicals rather than investing in safer alternatives.

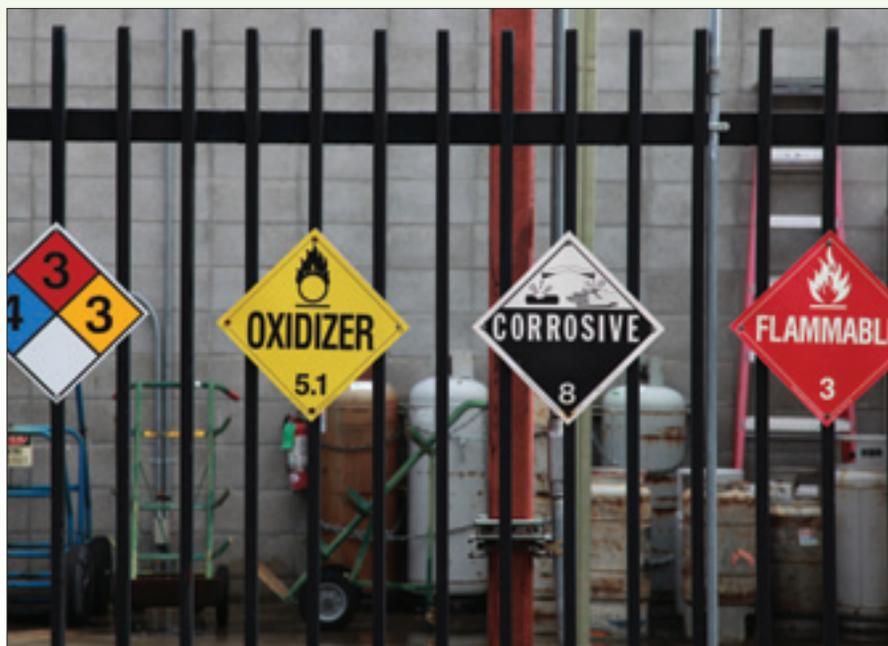


The U.S. chemical industry is at a crossroads. We can either follow the path of weak and inappropriate regulation — and continue to produce potentially hazardous chemicals while manufacturing jobs disappear — or we can move toward disclosure, regulation and sustainability, thereby encouraging innovation, creating stability for businesses and investors and new markets for safe and sustainable chemicals.

CHANGING THE BASIS OF COMPETITIVENESS

While it is frequently argued that imposing new standards on the chemical industry will damage competitiveness and cost the U.S. economy jobs, this report finds instead that appropriately designed regulations support innovation, productivity, and employment.

Because the chemical industry passes significant costs onto consumers and users of chemicals, traditional chemical production looks more competitive than it actually is. Even low-end estimates of the health costs of exposure to hazardous chemicals amount to billions of dollars. In terms of children's health outcomes, chemical exposure has been estimated to play a significant role in 100 percent of the cases of lead poisoning, 10 to 35 percent of asthma cases, two to 10 percent of certain cancers, and five to 20 percent of neurological problems. In California, with regard to deaths specifically linked to occupational health and safety factors, 80 to 90 percent of cancer deaths, 100 percent of pneumoconiosis (occupational lung disease) deaths, 40 to 50 percent of deaths associated with neurological disorders, and 40 to 50 percent of deaths associated with renal disorders are attributable to chemical exposures.



The costs to the chemical industry itself of managing the substances used in the production of its products are sizeable. The chemical industry has the largest pollution abatement costs of any manufacturing sector — an estimated \$5.2 billion in 2005. Environmental performance also affects

shareholder value. Negative environmental outcomes, measured in terms of environmental lawsuits and toxic releases, reduce the market value of an average firm in the U.S. chemical industry by an estimated 31.2 percent of the replacement value of assets — or approximately \$200 billion.

Estimated Pollution Abatement Costs By Industry, 2005 (\$ in millions).

Sector	Total	Treatment	Prevention	Recycling	Disposal
Food manufacturing	\$1,572.8	\$859.1	\$172.7	\$108.0	\$433.0
Wood products	\$566.6	\$310.3	\$128.3	\$31.3	\$96.7
Paper manufacturing	\$1,796.2	\$1,072.0	\$189.4	\$118.6	\$416.2
Printing and publishing	\$238.8	\$111.6	\$35.9	\$35.5	\$55.8
Petroleum and coal products	\$3,746.1	\$1,896.2	\$1,294.1	\$273.6	\$282.2
Chemical manufacturing	\$5,217.2	\$2,757.9	\$809.6	\$417.2	\$1,232.5
Plastic products	\$503.2	\$214.0	\$79.4	\$50.2	\$159.6
Non-metallic mineral prod.	\$696.0	\$398.0	\$125.6	\$50.5	\$121.9
Metal manufacturing	\$2,291.1	\$1,238.3	\$273.2	\$219.3	\$560.4
Fabricated metals	\$763.3	\$353.1	\$84.1	\$92.4	\$233.8
Machinery	\$315.8	\$108.4	\$49.8	\$34.3	\$123.2
Computers & electronics	\$623.8	\$338.4	\$54.5	\$63.9	\$167.0
Electrical equipment	\$190.8	\$80.8	\$28.6	\$20.7	\$60.7
Transportation equipment	\$1,319.1	\$592.8	\$173.0	\$157.3	\$396.1
Other sectors	\$836.8	\$431.9	\$101.2	\$75.5	\$227.9
All industries	\$20,677.6	\$10,762.8	\$3,599.4	\$1,748.3	\$4,567.0

Source: Pollution Abatement Costs and Expenditures (U.S. Census Department, 2008).

Instead of undermining growth and employment, regulatory reform will provide consumers, investors, and workers with better information on chemical products, helping to create new markets which can shift the chemical industry onto a more sustainable growth path. Greener and more sustainable chemistry will boost competitiveness in the industry and the U.S. economy by reducing the costs associated with producing and using chemical products.

REGULATORY REFORM CAN SUPPORT INNOVATION

The National Science Foundation estimates that research and development (R&D) spending in the chemical industry, excluding pharmaceuticals, is just 1.5 percent of sales, compared to 7.6 percent of sales for computers and electronics, another high-tech sector, and 3.4 percent of sales for the U.S. manufacturing sector as a whole. TSCA contributes to low R&D spending by reducing incentives for industry to innovate, since many of the existing chemicals grandfathered in under TSCA face fewer regulations. The current regulatory environment makes the playing field more unbalanced since it is difficult for the EPA to regulate chemicals

of high concern. Potentially hazardous chemicals remain on the market, while new chemicals enter without adequate testing, undermining incentives to develop safer alternatives. Regulatory reform must level the playing field between new and existing chemicals in order to encourage innovation while maintaining core protections for all chemical products.

Although the right regulatory framework can support innovation in the chemical industry, it is insufficient to foster the growth of green chemistry alone. Complementary policies are needed. These include policies that provide incentives to invest in sustainable chemistry, educational programs, and public support for research, development, and technological innovation.

Research and Development Expenditures by Sector, 2008.

	Total R&D Spending (\$ in millions)	R&D Spending as a % of Sales Revenue
SELECTED MANUFACTURING		
All manufacturing	\$233,326	3.4%
Food	\$4,000	0.9%
Computer/electronics	\$69,737	7.6%
Chemicals (non-pharm.)	\$10,452	1.5%
Pharmaceuticals	\$69,516	13.1%
Plastics	\$3,335	1.3%
Transportation equipment	\$38,221	2.9%
SELECTED NON-MANUFACTURING		
Software development	\$35,070	11.1%
Healthcare	\$1,217	4.0%

Source: National Science Foundation (2010).





SUSTAINABLE CHEMISTRY AND JOB CREATION

Job shedding can be turned around by boosting demand for U.S. products through innovative alternatives and by increasing the job creation potential of the chemical industry.

This decline in employment in the U.S. chemical industry has been driven by a number of factors. Efforts to compete on the basis of labor costs have reduced job opportunities in the sector by lowering the number of workers hired to produce a given level of output. In addition, jobs have been moving off-shore. In 2008, an estimated 627,100 employees worked producing chemical products in majority-owned foreign affiliates of U.S. companies, compared to total employment within the U.S. of 847,100 that same year, including non-pharmaceutical and pharmaceutical chemicals.

The job-shedding trends in the chemical industry can be turned around by boosting demand for U.S. products through innovative alternatives and by increasing the job creation potential of the chemical industry. In many cases, greener alternatives generate more jobs for a given level of output. Therefore, changing the composition of production to include greener products can, in itself, create jobs.

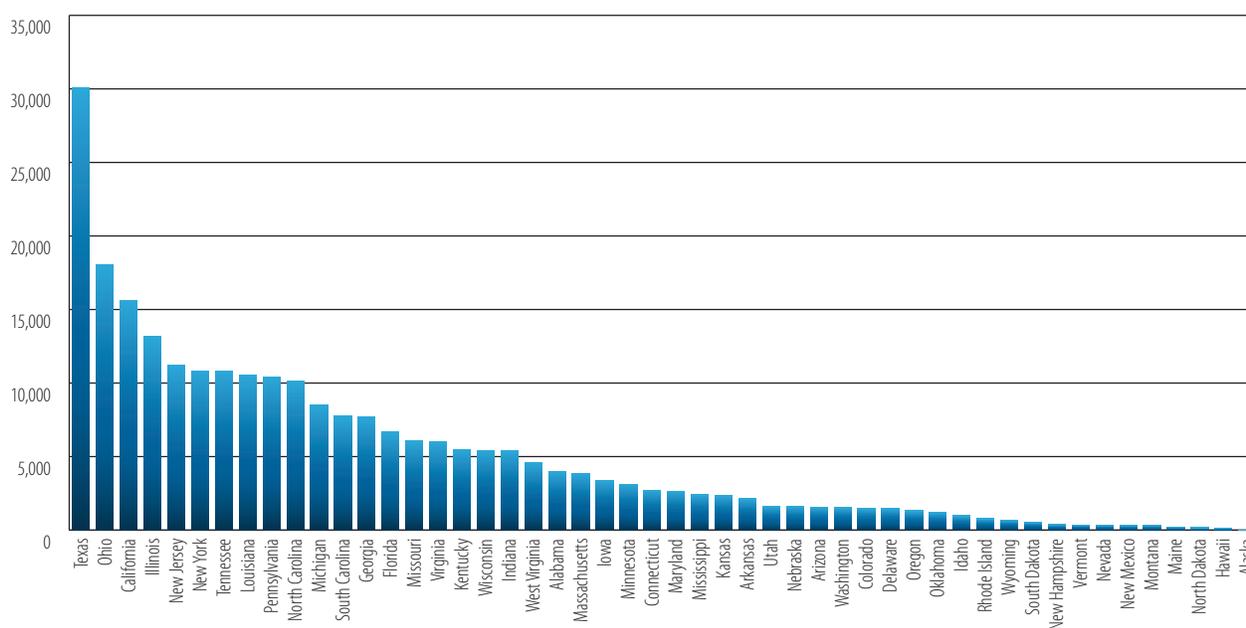
Regulatory reforms are unlikely to undermine this job creation potential. Impact assessments of the chemical regulations adopted in the European Union (REACH) have estimated that the direct costs of registering and testing chemicals were expected to be less than one percent of sales. Such costs are only incurred once for each product. The U.S. chemical industry has the capacity to absorb once-off costs of this magnitude without jeopardizing jobs. Importantly, these cost estimates do not take into account the wide-ranging benefits associated with reform. The benefits of a more sustainable chemical industry extend beyond job creation and include less pollution, better health outcomes, a stronger foundation for the long-run sustainability of the U.S. economy, technological innovation, and markets that work better for consumers, workers, investors, and businesses.

RECOMMENDATIONS

Three major recommendations for building a stronger chemical industry emerge out of this study:

1. *Reform TSCA to create an effective new regulatory environment that reduces hazards and supports innovation and competitiveness.* The reforms should require a minimum data set on all new and existing chemicals sufficient to determine safety. They should shift the burden of proof, so that industry would need to show that their chemicals are safe, instead of the EPA proving that there is harm. The unfair advantage given to chemicals grandfathered in under TSCA must end and be replaced by reforms that support innovation and provide access to information that allows consumers, downstream users, and shareholders to make better decisions without compromising fundamental safety standards.
2. *Implement complementary policies to promote innovation, commercialization, and the development of human resources to create a greener and safer chemical industry.* The federal government has supported innovative developments in agriculture, biotechnology, computers and the internet. Similar support will help build a green chemical industry. Strategies include implementing policies, such as tax incentives that spur investment in sustainable chemistry, support green chemistry education, and scale up public support for technological innovation. Government programs can facilitate coordination between industry, academic researchers, and innovative managers, critical for the successful development and transfer of technologies.
3. *Disseminate environmental and health-related information on the chemical industry as widely as possible to improve the choices available to consumers, workers, downstream users, and investors and to mobilize investment in emerging opportunities.* If new markets and investment opportunities are to be realized, consumers, workers, and businesses need as much information as possible on the ongoing environmental damage and health hazards associated with all chemicals and the possibilities that exist to develop alternatives. TSCA reforms should also insure that the relevant information generated by better regulations is readily accessible and disseminated as widely as possible.

Job Losses in Non-Pharmaceutical Chemicals by State, 2030, 'Business as Usual Scenario'



Source: See full report and endnotes. Job losses are relative to the average level of employment in 2009.

The Political Economy Research Institute (PERI) www.peri.umass.edu promotes human and ecological well-being through our original research. Our approach is to translate what we learn into workable policy proposals that are capable of improving life on our planet today and in the future. In the words of the late Professor Robert Heilbroner, we at PERI “strive to make a workable science out of morality.”



Established in 1998, PERI is an independent unit of the University of Massachusetts, Amherst, with close ties to the Department of Economics. PERI staff frequently work collaboratively with faculty members and graduate students from the University of Massachusetts, and other economists from around the world. Many of these colleagues have become PERI Research Associates. Since its founding, PERI has become a leading source of research and policy initiatives on issues of globalization, unemployment, financial market instability, central bank policy, living wages and decent work, and the economics of peace, development, and the environment. James Heintz, PERI Associate Research Professor, is the primary author of this report.

The BlueGreen Alliance www.bluegreenalliance.org is a national, strategic partnership between labor unions and environmental organizations dedicated to expanding the number and quality of jobs in the green economy.



Launched in 2006 by the United Steelworkers and the Sierra Club, this unique labor-environmental collaboration has grown to include the Communications Workers of America (CWA), Natural Resources Defense Council (NRDC), Service Employees International Union (SEIU), National Wildlife Federation (NWF), Laborers’ International Union of North America (LIUNA), Union of Concerned Scientists (UCS), Utility Workers Union of America (UWUA), American Federation of Teachers (AFT), Amalgamated Transit Union (ATU), Sheet Metal Workers’ International Association, United Auto Workers and the United Food and Commercial Workers (UFCW). The Blue Green Alliance unites more than 14 million members and supporters in pursuit of good jobs, a clean environment and a green economy.

The Blue Green Alliance works on issues ranging from energy and climate change to transportation to workers’ rights and green chemistry. This report was commissioned by the Chemicals, Public Health and Green Chemistry program of the BlueGreen Alliance. Charlotte Brody, that program’s director, played a pivotal role in supporting the research that went into this report.

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