



# Government Can: Stimulate Innovation and Enhance Competitiveness

**R**ecent research has shown that effective regulations can enhance business efficiency and competitiveness and stimulate innovation, despite the often-heard argument that government regulations burden the economy.

Private businesses do not always automatically develop the most efficient or innovative technologies or processes. “Many of society’s important economic and technological choices are path dependent. A technology that gains a slight lead early in its history may solidify that lead by gaining market share and lowering prices, ‘locking out’ other technologies that might be equally or more efficient if adopted on a large scale.<sup>1</sup> By this principle, many industries use unnecessarily dangerous materials or

technologies simply because this is the way the industries first developed. **The fact that a certain material or technology is used widely does not necessarily indicate that it is ideally suited for the uses in question.** It may simply mean that this material or technology enjoyed an initial advantage that “‘locked it in’ as the material or technology of choice in the future.”<sup>2</sup>

## ▶ **Government Can Stimulate Innovation**

Government policies can play an important role in helping industry to make profitable and successful innovations that can benefit both the business and the public. “Strategic interventions can be particularly important in overcoming the artificial advantage gained by certain materials and technologies through path-dependent development.”<sup>3</sup> Nicholas Ashford, Ph.D., J.D., Professor of



# DRY CLEANERS IN CALIFORNIA

## A Model for Financing Cleaner Production

California has created a program to help dry cleaners reduce or eliminate use of perchloroethylene (“perc”) by purchasing safer equipment. Under a 2003 law, a fee of \$3 per gallon is levied on “perc” sold in California, starting in January 2004. The fee is set to increase by \$1 per gallon each year through 2013, to a maximum of \$12 per gallon. Funds collected through this fee will be used to establish a trust fund to help cleaners make the transition to safer cleaning technologies. Most funds will go to provide grants of \$10,000 each to cleaners switching to wet cleaning and carbon dioxide cleaning systems; the remainder are designated for use in a demonstration program. Thus, the fee will simultaneously create a disincentive for perc use and make it easier for businesses to switch to safer alternatives.<sup>10</sup>



Technology and Policy at the Massachusetts Institute of Technology (MIT) concludes that “in a number of MIT studies beginning in 1979, it was found that **regulation could stimulate significant fundamental changes in product and process technology which benefited the industrial innovator, provided the regulations were stringent and focused.**”<sup>4</sup> Dr. Ashford supports the “thesis that health, safety, and environmental goals can be co-optimized with economic growth through technological innovation.”<sup>5</sup>

Dr. Michael Porter, an authority on competition and economic development at Harvard Business School, has made the case that in the absence of regulations, businesses do not always choose the most efficient means of production. **Well-designed environmental and health and safety regulations can turn companies’ attention to efficiencies that would not otherwise have been identified.**

**“Regulation can be an important tool—maybe the most important tool—both to stimulate radical and environmentally superior technology and to yield economic benefits to innovating firms”**

— Nicholas Ashford, Ph.D., J.D., Massachusetts Institute of Technology<sup>6</sup>

He cites the example of a Massachusetts jewelry company that faced the possibility of having to close down because it had violated permits for discharge of toxic substances into water. As a response to the government action, the company developed a closed-loop, zero-discharge

system for the water used in its jewelry plating process. Water purified through this system was 40 times cleaner than city water. In addition, jewelry plating through this system was of higher quality than before. The innovations catalyzed by the need to comply with water quality standards made the business as a whole more competitive.<sup>7</sup>

Dr. Porter concludes, **“Sometimes environmental regulations actually guide companies toward lower-cost production technologies that were not previously identified or explored.”**<sup>8</sup>

### ► Market Signals Insufficient

An extensive overview of the incentives and barriers to substitution prepared for the European Union concluded that well-designed regulatory signals are needed to encourage substitution because market forces alone often fail to provide a competitive advantage for the safer product.<sup>9</sup> Market forces are only useful when the consumer is aware of the environmental impact of purchasing a specific product. When markets are too far away from consumers to be influenced by their demands, such as the case of some large corporations, regulation must drive the development of safer products.

### ► Government Can Save Companies Money

Government regulations designed to effectively reduce the use of toxic chemicals can also save busi-

nesses money. The Toxics Use Reduction Act of Massachusetts required over 550 companies to assess toxic use reduction options with technical help supplied by university and government experts. Toxics use reduction strategies included material substitution and product reformulation. Within ten years industry reduced the use of toxic chemicals by 40%, byproduct waste by 58% and toxic emissions by 80%. **A financial analysis reveals that the same companies saved a total of 14 million dollars over this period through the adoption of more efficient and safer processes.**<sup>11</sup>

For example, Acushnet Rubber Company in New Bedford, a firm that designs and manufactures products for the automotive, safety, electrical and office machinery industries, has realized significant cost savings by taking an active approach to toxics use reduction.<sup>12</sup> Acushnet asked its suppliers to replace the grease coating on metal parts with a water-based lubricant, thereby eliminating their use of the neurotoxin and probable carcinogen trichloroethylene (TCE) as a solvent for cleaning about 80% of its parts. For the remaining 20%, Acushnet used a two-step aqueous cleaner to replace TCE. By changing cleaning processes, Acushnet was able to achieve savings of \$20,000 in chemical costs, \$50,000 in labor costs, and \$14,000 in energy costs annually. Thanks to additional savings from decreased chemical tracking and hazardous materials worker training, annual savings total \$100,000.<sup>13</sup>

## ► **Government Can Help Local Companies Compete**

Tufts economist Frank Ackerman studied the potential impact of changing regulations in other countries to the Massachusetts economy and concluded:

“Two-fifths of all international exports from Massachusetts businesses go to the European Union (EU), which has high and rising environmental standards. Thus, Massachusetts exports will be affected by policies such as the new EU directive on electrical and electronic waste, requiring the phase-out of several chemical hazards in all electronics sold in Europe, and REACH, the new EU chemicals policy, requiring a precautionary approach to chemical hazards. Additional strict environmental policies are likely to be adopted in the next few years in the EU and Japan, markets that are far too big to ignore. **To remain competitive in these crucial markets, the state’s businesses will have to meet higher environmental standards than the ones being set in Washington today.**”<sup>14</sup>

Governments in other countries are helping their industries to update their products and processes to meet these new safety standards. For example, the United Kingdom, Germany, Denmark, and Sweden have given specific industries information and guidance on techniques for implementing safer substitutes.<sup>15</sup>





## ► **Government Can Choose Efficient Policies**

The current U. S. regulatory system is very inefficient at achieving safer products, workplaces and communities. Since the 1980's, the U.S. government has studied and attempted to predict and quantify the risks posed by pollution. Tools such as “risk assessments” and “cost benefit analysis” are used in an attempt to quantify the risks and manage the risks to an “acceptable level.” Many who have studied this regulatory system have criticized its inefficiencies and the problems of trying to quantify risk with so many unknowns. Joel Tickner, Sc.D., Professor of Work Environment at the University of Massachusetts-Lowell, points out, that besides the myriad of difficulties of adequately predicting impacts in the real world, “**risk assessments can also be expensive and time-consuming, tying up limited agency resources** in developing detailed understanding about risk, while similar resource investments could be used to develop and implement safer processes, materials, and products. For example, while a typical two-year cancer bioassay for a single chemical may cost several million dollars, currently the entire federal government budget for green chemistry—the design

of safer and cleaner chemicals—is about the same amount.”<sup>16</sup>

## ► **Government Can Focus on Solutions**

Government policies that focus on finding and implementing safer alternatives to chemicals we already know are dangerous can reorient the process to focus on solutions rather than problems.<sup>17</sup> Tickner concludes:

“Rather than examine the risks of one bad option, alternatives assessment focuses on choices and opportunities: it draws attention to what a government agency or proponent of an activity *could be* doing rather than to determining the acceptability of a potentially harmful activity. For example, chlorinated solvents provide a service of degreasing and cleaning (as in Acushnet Rubber Company above). Once we understand this service, it is possible to think of a range of alternatives such as ultrasonic cleaning or less toxic aqueous cleaners—or even redesigning a metal part so that the need for cleaning is eliminated altogether. Further, focusing on seeking safer alternatives may also allow decision makers to partially

bypass contentious and costly debates over proof of harm and causality and instead dedicate scarce public health resources to solutions.”<sup>18</sup>

## ► Government Can Correct Economic Incentives

Governments have a critical role to play in shaping the marketplace to encourage practices that benefit rather than harm society. Governments need to send the right economic signals to firms, but many current U.S. policies encourage toxic chemical use, rather than discourage it.

For example, a study in Louisiana found that the overwhelming majority of state tax exemptions in the 1980s went to four narrow industries, all high in toxic emissions and pollutants: utilities, chemical plants, oil refineries, and pulp and paper mills. Dow Chemical received over \$33.5 million and still created

no permanent jobs in the state. In contrast, in 1996 Denmark shifted revenue by lifting some of the taxes on wages and increasing by the same amount a tax on carbon emissions, pesticides and chlorinated solvent use.<sup>19</sup>

Such “green taxes” have been found to be effective in using market forces to provide correct signals to industry.<sup>20</sup> Dr. Ashford of MIT promotes “the strategic value of the combined interventions of regulation and economic incentives for directed innovation-driven pollution prevention.”<sup>21</sup>

In some instances, a well-designed fee on the use of toxic chemicals can help to generate the funds for direct government assistance to industry.<sup>21</sup> This was the case in the successful Massachusetts Toxics Use Reduction program described above, and a California program to assist dry cleaners to switch to safer alternatives.

## Endnotes

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