

## IMPLEMENTING THE CLEAN AIR ACT CREATES AMERICAN JOBS ...

Regulated firms hire workers to produce more environmental control -- much like they hire workers to produce more output. In fact, reducing pollution tends to be more labor intensive than producing many commodities: “We find that increased environmental spending generally does *not* cause a significant change in industry-level employment. Our average across all four industries is a net gain of 1.5 jobs per \$1 million in additional environmental spending.... These effects can be linked to favorable factor shifts—environmental spending is more labor intensive than ordinary production—and relatively inelastic estimated demand.”<sup>1 2</sup>

When the economy is not in full employment, as is the case in today’s economy, the jobs picture changes fundamentally. Regulations could have a positive impact by spurring demand for pollution control investment -- leading to net job creation, as firms place orders for new pollution abatement equipment and services.

A more recent study (2008) by Bezdeka, Wendlinga, and DiPernab found that this spending on environmental protection can be powerful. Bezdeka et al. conclude that the net effect of investments in environmental protection (EP) on employment is positive. The study also compared states by looking at their environmental policies and economic/job growth. They find:

“contrary to conventional wisdom, EP, economic growth, and jobs creation are complementary and compatible: Investments in EP create jobs and displace jobs, but the net effect on employment is positive. Second, environment protection has grown rapidly to become a major sales-generating, job-creating industry—\$300 billion/year and 5 million jobs in 2003. Third, most of the 5 million jobs created are standard jobs for accountants, engineers, computer analysts, clerks, factory workers, etc., and the classic environmental job (environmental engineer, ecologist, etc.) constitutes only a small portion of the jobs created. Most of the persons employed in the jobs created may not even realize that they owe their livelihood to protecting the environment. Fourth, at the state level, the relationship between environmental policies and economic/job growth is positive, not negative. States can have strong economies and simultaneously protect the environment. Finally, environmental jobs are concentrated in manufacturing and professional, information, scientific, and technical services, and are thus disproportionately the types of jobs all states seek to attract.”<sup>3</sup>

Morgenstern, Pizer, and Shih (2002) used plant-level data from four U.S. manufacturing industries and found pollution abatement regulations (and associated expenditures) generally produce a net increase in employment in the regulated industry. They did not look at employment in the pollution abatement industry. Using data from the United Kingdom, Cole and Elliott (2007) also found no evidence that pollution abatement costs have an adverse effect on employment.

Regulations drive the demand for the environmental protection (EP) industry. The EP industry is not a traditional industry such as the auto or banking industry. Instead, it is a composite industry comparable to the

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<sup>1</sup> [Jobs Versus the Environment: An Industry-Level Perspective](#)

Richard D. Morgenstern, William A. Pizer, and Jhih-Shyang Shih

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<sup>2</sup> These results are similar to Berman and Bui (2001) who find that while sharply increased air quality regulation in Los Angeles to reduce NOx emissions resulted in large abatement costs they did not result in substantially reduced employment.

<sup>3</sup> “Environmental protection, the economy, and jobs: National and regional analyses”

Roger H. Bezdek, Robert M. Wendling and Paula DiPerna, [Journal of Environmental Management Volume 86, Issue 1](#), January 2008, Pages 63-79.

tourism industry. It embodies economic activity across many industries in the economy.<sup>4</sup> As noted previously from the Bedezka, et al study, “. . . environmental jobs are concentrated in manufacturing and professional, information, scientific, and technical services . . .”<sup>5</sup>

The costs of environmental protection are spent on the purchase and installation of new equipment, spurring investments in the design, manufacture, installation, and operation of pollution-reducing technologies. All of those activities create jobs for Americans, and work installing or operating pollution controls on American facilities is work that cannot be sent abroad. Going forward, many of the power plants and other facilities that will receive job-creating, pollution-reducing upgrades are concentrated in the very places that currently have the most unemployed workers.

EPA and state regulations fuel the demand for environmental protection industry. Eventually, nearly all of the costs of environmental protection end up as wages for workers. By 2008 the industry was generating approximately \$300 billion in revenues, producing \$43.8 billion in exports, and supporting nearly 1.7 million jobs. Air pollution control equipment alone generated revenues of \$18.3 billion in 2007, including exports of more than \$3 billion.

Many environmental technology industry jobs are high-tech such as engineering and computer-aided design; others involve traditional manufacturing, transport, and communication. Jobs related to Clean Air Act implementation are widely dispersed throughout the states and occur in many sectors of the economy. Spurred by the implementation of the CAA, the U.S. boilermaker population grew by approximately 35 percent, or 6,700 boilermakers, in just two years, between 1999 and 2001, according to data from the International Brotherhood of Boilermakers. The creation of additional jobs has continued. Over the past seven years the Institute for Clean Air Companies (ICAC) estimates that implementation of just one rule – the Clean Air Interstate Rule Phase 1 – resulted in 200,000 jobs in the air pollution control industry.

An example can illustrate the job-creation from environmental protection regulations. The table below presents the average employment impacts associated with the manufacture, installation and operation of a scrubber for a series of model scrubbers (*Jason Price, Nadav Tanners, Jim Neumann (IEc) and Roy Oomen (ERG), Employment Impacts Associated with the manufacture, Installation and Operation of Scrubbers, Memo to Ellen Kurlansky, January 15, 2010*)

**EXHIBIT 1. SUMMARY OF EMPLOYMENT IMPACTS PER MODEL SCRUBBER**

MODEL SCRUBBER	MODEL SCRUBBER DESCRIPTION	ONE-TIME EMPLOYMENT IMPACTS (ANNUAL EQUIVALENT FTEs) <sup>2</sup>	RECURRING ANNUAL EMPLOYMENT IMPACTS (FTEs PER YEAR) <sup>3</sup>
Model Scrubber 1	Medium/Large Utility Boilers	848 - 1,001	103
Model Scrubber 2	Small Utility Boilers	409 - 493	39

<sup>4</sup> More specifically, according to the OECD (1999, p. 9), the EP industry “. . . consists of activities which produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air, and soil, as well as problems related to waste, noise and eco-systems. This includes cleaner technologies, products and services that reduce environmental risk and minimize pollution and resource use.”

<sup>5</sup> “Environmental protection, the economy, and jobs: National and regional analyses” Roger H. Bezdek, Robert M. Wendling and Paula DiPerna, [Journal of Environmental Management Volume 86, Issue 1](#), January 2008, Pages 63-79.

Model Scrubber 3A <sup>1</sup>	Large Industrial/ Institutional Boilers (method 1)	333 - 400	29
Model Scrubber 3B <sup>1</sup>	Large Industrial/ Institutional Boilers (method 2)	77 - 91	16
Model Scrubber 4	Small- and Medium-Sized Industrial/Institutional Boilers	40 - 48	6
Notes: 1. As described in later sections of this document, Model Scrubbers 3A and 3B are different analytic variants of the same model scrubber. Both represent scrubbers at large industrial boilers, but we estimate employment impacts for Model Scrubber 3A based on one methodology and Model Scrubber 3B based on another. 2. One-time employment impacts reflect the labor required for the manufacturing and installation of each model scrubber, including the labor required to produce scrubber components (e.g., the absorber vessel) that scrubber makers purchase from other firms. 3. Recurring employment impacts include labor required for the operation, maintenance, and administrative support for each scrubber over its full lifetime of operation.			

The story doesn't stop there. The steel that goes into abatement equipment is produced by steel workers. Pumps, filters, pipes, ductwork, fans, and other equipment all must be purchased and transported to the facility – and those industries hire even more workers to provide goods and services to the EP industry.

**... ESPECIALLY UNDER TODAY'S ECONOMIC CONDITIONS.**

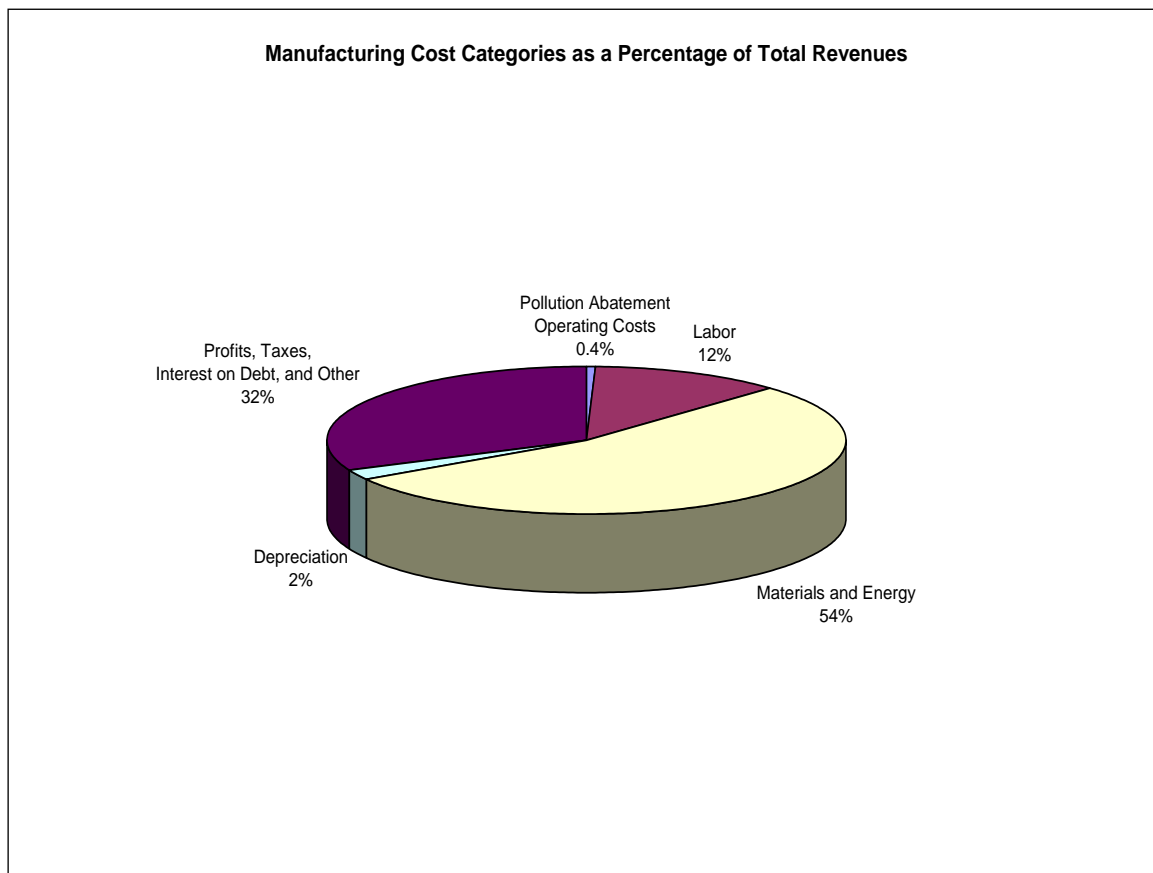
Many news agencies are reporting that cash reserves of large companies are at the highest point in 40 years. The Wall Street Journal reported in December that U.S. companies were sitting on \$1.93 trillion in cash and other liquid assets at the end of September, up from \$1.8 trillion at the end of June.

The cash buildup by nonfinancial institutions reflects the cautious approach many companies are taking to the expansion of plants and equipment and hiring of workers as tough economic conditions remain. National Public Radio's Jeremy Hobson reported in late December that "The money is stored in bank accounts -- getting very little interest -- or in low-risk Treasury bills. Think of it as a rainy day fund for companies that are still nervous about the economy." Howard Silverblatt, a senior index analyst at Standard and Poors, says: "Just look at the quarterly reports and you'll see that businesses large and small are hoarding cash."

Looming uncertainty about future environmental regulations can provide some motivation for mounting cash reserves, as companies save for future compliance expenditures. Companies may also be reluctant to build new plants that may or may not meet future environmental regulatory requirements. Conversely, regulations that are promulgated can spur companies to use these cash reserves to order new pollution abatement equipment and services, and build new plants that are cleaner and more efficient, knowing what it will take to comply with regulations.

## **IMPLEMENTING THE CLEAN AIR ACT DOES NOT IMPOSE HARDSHIP ON U.S. BUSINESSES.**

The U.S. Census Bureau has conducted an annual survey of manufacturers to measure Pollution Abatement Costs and Expenditures (PACE).<sup>6</sup> From this statistically-based PACE survey, Census estimates total pollution abatement costs by industry in the U.S. The PACE survey results suggest that environmental regulations cannot be blamed for harming industry. Most industries incur abatement costs that are less than 1 percent of their total cost. Hence, even small changes in wage rates, capital costs or raw material costs are likely to have a much larger impact than any changes in environmental regulation. Reducing abatement costs by 10 percent will only reduce the total costs faced by industry by less than 1 tenth of 1 percent. Conversely, lowering capital costs by 10 percent could reduce total costs by 5 percent (assuming capital costs are 50 percent of total costs).



The PACE survey also allows us to look at costs over time. As a percent of GDP, abatement costs have been remarkably constant over time, and always less than 0.3% of GDP. Unfortunately, the PACE survey was discontinued and no additional data is available. Considering the historical data, it is unlikely that environmental regulation will have a significant negative impact on GDP.

Sources: Economic Report of the President, Executive Office of the President and Pollution Abatement Costs and Expenditures Survey, U.S. Census Bureau

<sup>6</sup> The PACE survey was conducted annually between 1973 and 1994 (with the exception of 1987), but was discontinued after 1994 by the U.S. Census Bureau for budgetary reasons. EPA helped fund the survey to collect data for 1999 and 2005, but resource constraints have prevented further surveys. Data from 1999 is not included because it is not directly comparable to other years. See <http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/pace2005.html#whatare>.

Because the composition of the US economy has changed during this period away from heavy industry and to a more service-oriented economy, another way to examine trends is to focus more exclusively on how pollution expenditures for affected manufacturing industries in the US relate to their overall level of economic activity. The share of total revenues devoted to pollution abatement expenses by US manufacturing has been small (ranging between 0.4%-0.6%) since 1980, despite a substantial increase in the number and scope of environmental regulations impacting this sector of the US economy.

Focusing further on the most heavily regulated industries among US manufacturers, pollution abatement costs remain a small part of total revenue. Even for these industries, the share of revenue devoted to financing pollution abatement costs reached a high of 2% (petroleum sector in 1994), and has typically been observed to lie between 1.0-1.5% for these industries since 1980.

In the long run, environmental compliance can spur innovation. Economists such as Michael Porter of the Harvard Business School have argued that environmental regulations, by forcing firms to reexamine their production processes, often lead to improved processes which lower production costs and make the firm more competitive – saving jobs in the long run. Many pollutants represent waste for the firm – product or inputs that are lost into the environment – reducing this waste leads to a more efficient operation.

In addition, many of the reported costs of environmental regulation occur when firms invest in new capital equipment, thoroughly redesigned to be both cleaner and more productive. Many of these investments in new more efficient equipment would have happened sooner or later regardless of the environmental regulation. So a primary effect of regulation is to speed up the investment process. While scrapping of equipment that still has a useful life does entail costs to the firm, that cost is limited to an early capital expenditure. As a result, compliance costs are often overstated – since much of the investment would have happened in a few years anyway. There can be additional costs for “end of the pipe” control equipment which would not have happened.

These savings were confirmed in a study by Resources for the Future which asked how much \$1 spent on “environmental protection” really costs an industry. By which they meant to determine how much of the investment in pollution control was truly long term additional costs and how much was simply speeding up investments that would have happened quickly anyway or resulted in cost saving process improvements. For some industries, specifically steel, the answer was little more than \$1, due to the diversion of capital from other uses but for other firms, notably plastics, the industry actually saved money as productivity was boosted. On average, the study concluded, \$1 spent on environmental pollution control reflected a real expense of 13 cents. This means that compliance costs for firms and their economic impact are overstated, on average by a factor of seven.

## **IMPLEMENTING THE CLEAN AIR ACT STRENGTHENS U.S. COMPETITIVENESS.**

Improvements in mercury control technologies for waste incinerators led the way for innovations in sorbent technologies and other multi-pollutant controls for power plants, and these innovations have helped U.S. companies become a world leader in these technologies. (ICF prepared for EPA) 2005.<sup>7</sup>

The Clean Air Act is one of the reasons for the dramatic growth since the early 1970s in the U.S. environmental technologies industry, and in its workforce. By 2008 the industry was generating approximately \$300 billion in revenues, producing \$44 billion in exports, and supporting nearly 1.7 million

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<sup>7</sup> The Clean Air Act Amendments: Spurring Innovation and Growth While Cleaning the Air.  
[http://www.icfi.com/Markets/Environment/doc\\_files/caaa-success.pdf](http://www.icfi.com/Markets/Environment/doc_files/caaa-success.pdf)

jobs. Air pollution control equipment alone generated revenues of \$18 billion in 2007, including exports of more than \$3 billion.<sup>8</sup>

Environmental technology exports help the U.S. balance of trade, generating a \$20 billion surplus in 2007. Environmental technology exports have grown dramatically from less than \$10 billion in 1990 to about \$39 billion in 2007, and the U.S. share of foreign environmental technology markets has been increasing. (ITA) Environmental technology export growth to China between 2002 and 2004 was 125 percent.<sup>9</sup> According to the Department of Commerce, “The U.S. is regarded as a world leader in many environmental technology categories including: engineering, design, construction and consulting services; ... stationary and mobile source air pollution monitoring and control equipment; ... and information systems/software for environmental management analysis.” (ITA FY2010 Industry Assessment) This is a growing and significant international market. The Heads of the European Environmental Agencies estimate that the world market for environmental goods and services is worth 425bn Euros (\$552 billion) and is likely to grow to 565bn Euros (\$734 billion) by 2010.<sup>10</sup> This figure is comparable with those for the aerospace and pharmaceutical industries.

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In December 2010, fourteen business organizations representing over 60,000 firms wrote President Obama and Congressional leaders urging them to support EPA’s mission and to reject efforts to block, delay or weaken implementation of the Clean Air Act. In their letter, the groups note that studies consistently show that the economic benefits of implementing the Act far exceed the costs of controlling air pollutant emissions. Furthermore, the Clean Air Act has sparked technological innovation and the U.S. air pollution control industry generated revenues of \$18.3 billion in 2007 (including more than \$3 billion in exports). The same month 8 major utilities sent a letter to the editor of the Wall Street Journal saying, “Contrary to claims that EPA’s agenda will have negative economic consequences, our companies’ experience complying with air quality regulations demonstrates that regulations can yield important economic benefits, including job creation, while maintaining reliability.”

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<sup>8</sup> DOC International Trade Administration. “Environmental Technologies Industries: FY2010 Industry Assessment. [http://web.ita.doc.gov/ete/eteinfo.nsf/068f3801d047f26e85256883006ffa54/4878b7e2fc08ac6d85256883006c452c/\\$FILE/Full%20Environmental%20Industries%20Assessment%202010.pdf](http://web.ita.doc.gov/ete/eteinfo.nsf/068f3801d047f26e85256883006ffa54/4878b7e2fc08ac6d85256883006c452c/$FILE/Full%20Environmental%20Industries%20Assessment%202010.pdf)

<sup>9</sup> DOC’s International Trade Administration “Energy and Environment Export News,” August 2005. Pg. 7. <http://www.ita.doc.gov/media/publications/pdf/eeen02.pdf>

<sup>10</sup> Network of Heads of the European Environment Protection Agencies. 2005. "The Contribution of Good Environmental Regulation to Competitiveness." [http://www.foeeurope.org/activities/sustainable\\_europe/Environment\\_Competitiveness\\_European\\_Environment\\_Protection\\_Agencies.pdf](http://www.foeeurope.org/activities/sustainable_europe/Environment_Competitiveness_European_Environment_Protection_Agencies.pdf)

## **IMPLEMENTING THE CLEAN AIR ACT INCREASES U.S. GDP.**

A series of studies done by Professor Dale Jorgenson of Harvard, demonstrates how implementing the Clean Air Act (CAA) actually increased the size of the US economy. Professor Jorgenson found that even after correcting for the diverting of resources to purchase and operate air pollution abatement equipment, the lower demand for health care and the more productive workforce actually increased the size of the economy. And while the economy grows, the U.S. enjoys better health and a cleaner environment. So rather than the CAA being a drag on the US economy, it allowed a “better protected” economy to grow at a faster rate than it would have otherwise in a “less protected” state.

By the mid-2000s, the health and ecological benefits continues to grow, and GDP is as much as 1.5% higher than it would be without enactment of the 1970 CAA. Looking out to the end of the century (2100), the model results approach equilibrium with GDP estimated to be as much as 2% higher as a consequence of enactment of the CAA.

## **PROTECTING PUBLIC HEALTH BY IMPLEMENTING THE CLEAN AIR ACT HAS OTHER ECONOMIC BENEFITS.**

According to the current, public draft of an EPA report entitled “The Benefits and Costs of the Clean Air Act: 1990 to 2020,”<sup>11</sup> the benefits of Clean Air Act rules are expected to reach nearly \$2 trillion in 2020 – exceeding costs by more than 30 to 1.

Studies of environmentally-related illness (e.g., Landrigan, et al 2002) provide an indicator of the costs of not regulating – or the potential benefits to be gained from regulating. Landrigan, et al. estimated the contribution of environmental pollutants to the costs of pediatric disease in American children. They look at only a subset of types of illness and there are uncertainties, but the effects are potentially large. To quote: “Total annual costs are estimated to be \$54.9 billion (range \$48.8-64.8 billion): \$43.4 billion for lead poisoning, \$2.0 billion for asthma, \$0.3 billion for childhood cancer, and \$9.2 billion for neurobehavioral disorders. This sum amounts to 2.8 percent of total U.S. health care costs.”<sup>12</sup>

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<sup>11</sup> <http://www.epa.gov/oar/sect812/aug10/fullreport.pdf>

<sup>12</sup> Landrigan PJ, Schechter CB, Lipton JM, Fahs MC, and Schwarz J. 2002. Environmental Pollutants and Disease in America’s Children: Estimates of Morbidity, Mortality, and Costs for Lead Poisoning, Asthma, Cancer, and Developmental Disabilities. Environmental Health Perspectives. Vol 110, No 7, pp 721-8.