25 Years Preventing Pollution: A Retrospective Report

Introduction

The Pollution Prevention (P2) Act, passed 25 years ago, represented a paradigm shift in our nation's approach to solving pollution problems. In clear terms, the Act called for industry, government, and the public to look upstream in manufacturing processes – to prevent sources of pollution rather than use end-of-pipe reduction or clean-up strategies. To contextualize the Act within a larger history of pollution prevention, this report seeks to answer a few questions: Where did the conceptual shift from control to prevention come from? What has been the Act's impact or legacy? And what's next?

Contents

The Roots of Pollution Prevention

In the 1960s and 70s, Americans became increasingly aware of the ways pollution was destroying the country's air, water, and land. A series of landmark environmental statutes – including the Clean Water Act, the Clean Air Act, and the Resource Conservation and Recovery Act (RCRA) - helped stem frightening tides of pollution. Because of the urgency of the problem, these acts were reactive; in practice, they focused on controlling pollution, and often on one media at a time. Such attempts at control, and the limits of these attempts, spawned the concept of pollution prevention.

Both businesses and governments increasingly recognized the costliness of achieving and ensuring compliance. At the same time, a handful of innovators shined lights on the efficiency of prevention as a strategy. The company 3M, for example, began a Pollution Prevention Pays Program (3P) in 1975. Over the last 40 years, 3M estimates that the program has saved nearly $1.9 billion dollars. Other early adopters of the philosophy, like North Carolina's Pollution Prevention Pays Program, demonstrated its economic and environmental benefits. Such programs:

- Saved businesses money;
- Reduced the throughput of raw materials; and
- Reduced both worker risks and the risks to environmental and public health.

Roots of P2

The undeniable success of both private and state prevention programs facilitated a national embrace of two goals previously seen as incompatible: environmental quality and economoic productivity. A series of 1980s federal reports on waste reduction – both from the Office of Technology Assessment (OTA) and the Environmental Protection Agency (EPA) – recognized how those two goals could be, and should be, accomplished together. A 1987 OTA report, for example, stated, "[This] study shows how the competitiveness of American industry and environmental protection can be improved by devoting more resources to waste reduction and thus quickly reducing the costs of pollution control."

The Pollution Prevention Act went one step further; it placed prevention firmly at the top of the waste management pyramid. The only strategy better than reduction, the Act suggests, is to prevent waste in the first place. In a 1993 Public Policy Statement, EPA Administrator Carol Browner explained the shift toward valuing prevention:

> "When EPA was created in the early 1970's, our work had to focus first on controlling and cleaning up the most immediate problems. Those efforts have yielded major reductions in pollution in which we should all take pride. Over time, however, we have learned that traditional 'end-of-pipe' approaches not only can be expensive and less than fully effective, but sometimes transfer pollution from one medium to another ... Pollution prevention has the exciting potential for both protecting the environment and strengthening economic growth through more efficient manufacturing and raw material use."

Instead of commanding reductions, the Pollution Prevention Act aimed to help businesses assess their own pollution problems and be active participants in solving problems. As Madeline Sten, the founding executive director of the Pacific Northwest Pollution Prevention Resource Center (PPRC) said, "The concept of pollution prevention took businesses out of the position of being victimized and put them into position of being problem solvers."

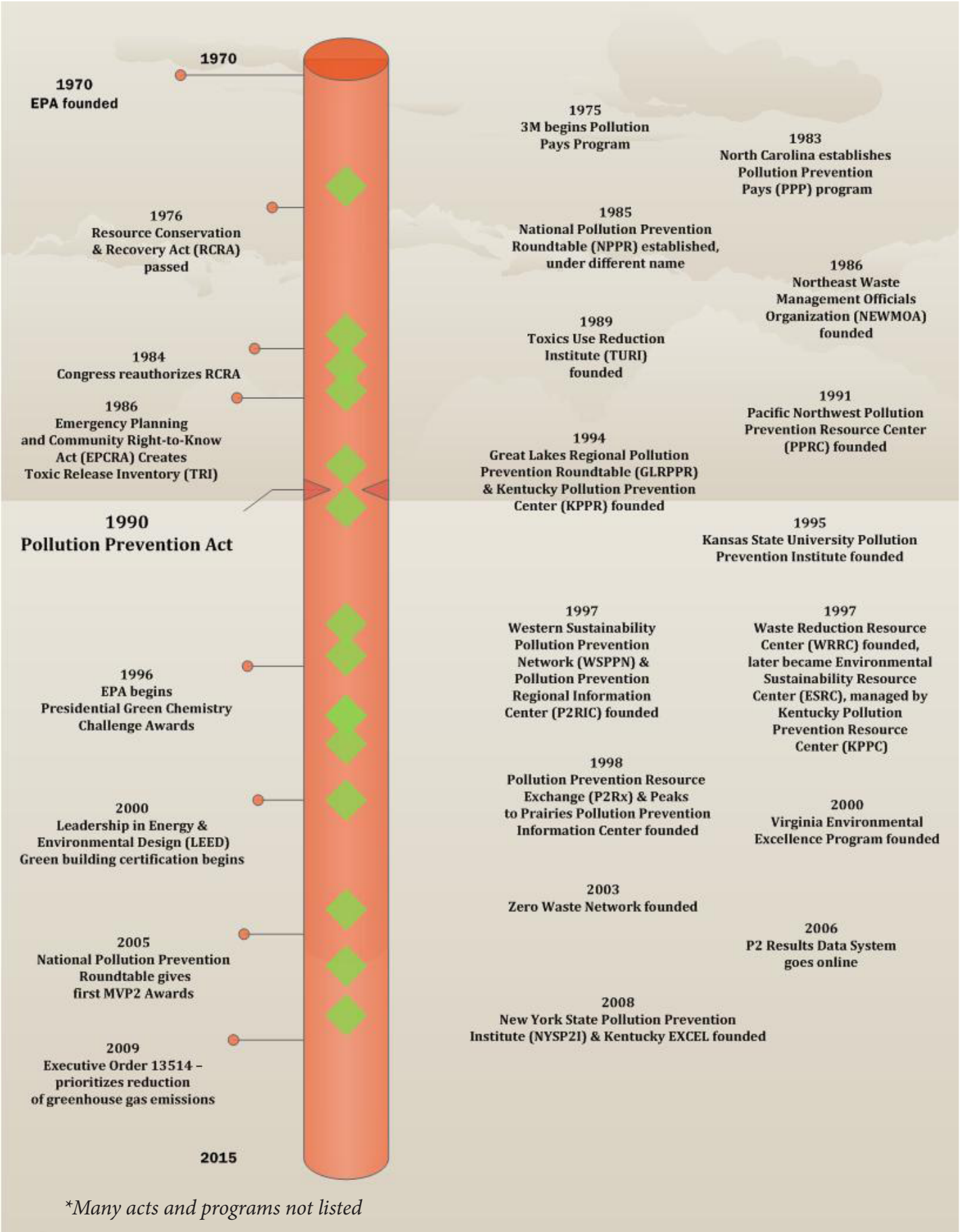
The Act Itself

SEC. 6602. FINDINGS AND POLICY.

(a) FINDINGS—
The Congress finds that:
(1) The United States of America annually produces millions of tons of pollution and spends tens of billions of dollars per year controlling this pollution.
(2) There are significant opportunities for industry to reduce or prevent pollution at the source through cost-effective changes in production, operation, and raw materials use. Such changes offer industry substantial savings in reduced raw material, pollution control, and liability costs as well as help protect the environment and reduce risks to worker health and safety.
(3) The opportunities for source reduction are often not realized because existing regulations, and the industrial resources they require for compliance, focus upon treatment and disposal, rather than source reduction; existing regulations do not emphasize multi-media management of pollution; and businesses need information and technical assistance to overcome institutional barriers to the adoption of source reduction practices.
(4) Source reduction is fundamentally different and more desirable than waste management and pollution control. The Environmental Protection Agency needs to address the historical lack of attention to source reduction.
(5) As a first step in preventing pollution through source reduction, the Environmental Protection Agency must establish a source reduction program which collects and disseminates information, provides financial assistance to States, and implements the other activities provided for in this subtitle.

(b) POLICY. —
The Congress hereby declares it to be the national policy of the United States that pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

Pollution Prevention Timeline



**Many acts and programs not listed*

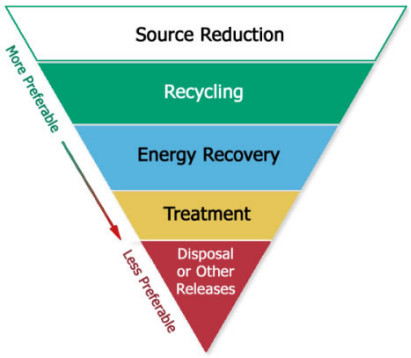


Image courtesy EPA

" The Congress hereby declares it to be the national policy of the United States that pollution should be prevented or reduced at the source whenever feasible."
- Pollution Prevention Act, 1990

The Pollution Prevention Act promoted investment in non-regulatory ways to improve source control - to harmonize environmental protection with economic growth. Around the country, state governments and universities created cooperative and innovative technical assistance programs to help businesses become more sustainable. Such programs took many forms: intern programs; technology transfer and development centers; performance tracking programs; and resource centers. Their actions and successes are detailed in the following section of this report.

Photo courtesy Iowa DNR

The Act's Legacy: P2 Success Stories from Around the Country

The Pollution Prevention Act lacked the regulatory teeth to force businesses toward cleaner processes and products. But by stipulating a new approach to pollution, the act helped establish the roots of more cooperative and multimedia approaches to solving problems. Throughout the country, state and local governments invested in finding win-win opportunities, in implementing changes that had positive environmental and economic impacts.

Those investments have succeeded in many different ways. In addition to producing results - pounds of air pollutants avoided or watts of energy saved - those investments have perhaps more importantly helped change the culture of businesses and institutions throughout the country.

Jim Jones, the current Assistant Administrator for the EPA's Office of Chemical Safety and Pollution Prevention, describes this cultural shift. "In 1990, the Pollution Prevention Act tasked EPA with establishing a grant program to teach state and local governments and businesses about the benefits of pollution prevention," Jones said. "Over time, businesses, colleges, and even sports teams have realized that with pollution prevention they can achieve their corporate objectives and help save the environment, all while improving their bottom lines. From clean energy initiatives to programs that promote the uses of safer chemicals, pollution prevention or sustainability is now part of the fabric of institutions around the world."

This report aims to provide a sampling of the types of successful organizations and programs that the act helped establish. We hope that sharing a variety of success stories will show the variety of impacts that pollution prevention programs have had, and can still have – whether by improving a firm's bottom line, by preventing toxic waste or exposures, or by educating young professionals. These programs have the power to change cultures.

Technical Assistance Program

Toxics Use Reduction Institute - University of Massachusetts Lowell

by Felice Kincannon

The Program

Columbia Manufacturing Inc., in Westfield, MA, started out as a bicycle manufacturing company, but has transitioned into the second-largest manufacturer of school furniture in the nation. The school furniture manufactured at Columbia is made from tubular steel that is bent and welded into various configurations, cleaned, plated, and then completed with the attachment of the seat or desktop.

Working with the Office of Technical Assistance and Technology (OTA), an agency of the Toxics Use Reduction Act (TURA) program, Columbia used a facility-wide approach to modernize and expand its nickel-chrome plating line.

How It Worked

The company sought systems that could expand production capacity while reducing water use, chemical and labor costs, and the generation of hazardous waste and wastewater. The company decided on a special racking system, which has gone through several modifications, combined with a Napco automated nickel-chrome plating line and a CASTion zero-discharge resource recovery system. This new line tripled the company's plating capacity and minimized waste generation.

Reductions: Columbia eliminated the use of 147,000 gallons per day of process water and no longer generates 130,000 gallons per day of wastewater from the new plating processes. All wastewater is recovered as de-ionized water and used in the rinse baths. As for the plating chemistry, approximately 98% of the nickel and chromic acid plating chemistry is recovered from the rinse water and reused. Since installation in 2001, Columbia has saved $3,000,000 in water and sewer fees, $3,850,000 in nickel purchase and usage, and $800,000 in chrome purchase and usage.

Photo courtesy TURI and Columbia Manufacturing Inc.

Economics: Columbia spent nearly $4 million for the new closed-loop waste treatment system – including installation, infrastructure upgrade, and other environmental upgrades. Additional gas-fired boilers and evaporative cooling towers were required, yet the overall return on investment on the CASTion system was less than two years. Since 2008, Columbia reduced its thermal energy cost by nearly $500,000 annually with other energy saving initiatives.

Why It Worked

Columbia had technical assistance from OTA and, importantly, the desire to create dramatic change and support both from management and shop floor employees who collaborated in this effort throughout the planning and implementation stages.

For more information, contact Rich Bizzozero at OTA, rich.bizzozero@state.ma.us, or Liz Harriman at TURI, harriman@turi.org.

Technical Assistance & Development Program

New York State Pollution Prevention Institute

by Kathleen Kosciolek & Jennifer Brake

The Program

Founded in 2008, the New York State Pollution Prevention Institute (NYSP2I) is a statewide technology development, transfer, and assistance center whose mission is to make the state more environmentally sustainable for businesses, workers, and the public through more efficient use of raw materials, energy and water, and reductions in toxic chemical use, emissions and waste generation. NYSP2I offers seven programs ranging from direct technical assistance to industry to community grants. Looking back, two initiatives stand out as particularly impactful: the Community Grants Program (CGP) and the Finger Lakes Food Processing Cluster Initiative.

How They Worked

The CGP provides financial and technical assistance to community organizations and local government agencies for projects that raise awareness and implement P2 practices at the local level. To date, the CGP has supported 64 projects, with grants totaling more than $850,000. These grants have resulted in over 500,000 people trained in P2 strategies statewide. One of the organizations funded through the program – Pratt Center for Community Development in Brooklyn, NY – received funding for an outreach initiative to educate community-based organizations and businesses to engage homeowners to undertake pollution-reducing, energy-efficiency retrofits and explain the technical aspects of an energy audit in layman's terms. This effort was part of the broader Retrofit NYC, an ambitious program to dramatically increase the number of residential energy efficiency retrofits in low and moderate-income communities to: reduce pollution and carbon emissions; lower energy bills; and promote sustainable behavior. The CGP-funded training contributed to Pratt's ability to perform hundreds of home audits and served more than 500 homeowners directly, while distributing thousands of informational packets.

For the Finger Lakes Food Processing Cluster Initiative, NYSP2I collaborated with the Center for Integrated Manufacturing Studies at RIT to win one of the first federal Jobs Accelerator grants awarded nationwide. The EDA-funded component helped food processing and agricultural businesses identify and implement technical improvements and sustainable manufacturing processes to reduce operating costs, minimize environmental impacts, open market opportunities, start new businesses, and retain and grow jobs. A total of 28 projects were completed providing companies with process assessments, green technology accelerator and sustainable supply chain assistance. Organic waste research conducted by graduate students resulted in two new organic waste tools. Through the DOL-funded component, 322 NYS workers have so far received training for career advancement in the industry. Plans for a broader and deeper Sustainable Food Systems Initiative are now underway.

Why They Worked

NYSP2I's mission is broad and our reach is wide, covering a state with a population of nearly 20 million people and over 47,000 square miles. Thus, partnership and collaboration have played big roles in our success. NYSP2I is led by Rochester Institute of Technology (RIT) and is a partnership between RIT, Clarkson University, Rensselaer Polytechnic Institute, University at Buffalo and the 10 NYS designated NIST Manufacturing Extension Partnerships (MEPs). NYSP2I also collaborates with a multitude of trade organizations, municipalities, public institutions, community groups and others. Not only do partnerships create exponential reach, localized partners have an innate understanding of the needs, challenges and strengths of their particular area. Therefore, assistance can be targeted to have a greater impact. Partnerships also enable us to draw upon a diverse pool of experts to identify and develop solutions for industry and often leverage complementary programs to achieve results.

The NYS Pollution Prevention Institute is primarily funded by the NYS Department of Environmental Conservation. For more information, go to **www.rit.edu/affiliate/nysp2i**

Partners in Pollution Prevention Program University of Nebraska-Lincoln

by Dr. Bruce Dvorak

The Program

The Partners in Pollution Prevention (P3) program of the University of Nebraska-Lincoln (UNL) has impacted Nebraska businesses since 1997. Administered by the University of Nebraska Extension and College of Engineering, the program provides P2 assistance to Nebraska businesses and valuable experience for student interns who conduct process evaluations, make waste reduction recommendations, and facilitate improvements.

How It Works

From 1997-2014, approximately 650 clients based in 89 Nebraska communities participated in the program—averting 303 million pounds of solid waste from landfills, reducing more than 263 million therms in energy use and more than 1,810 million gallons in water use. The initiatives resulted in a cumulative potential savings of $21.8 million.

Photo courtesy Iowa DNR

A crucial component of the program is the analysis of motivations and barriers to waste reduction. Based on interviews and surveys conducted with 93 past clients, the program reported that nearly 50 percent of all recommendations made by students were implemented. The information revealed that the motivation for implementing sustainability initiatives was a combination of financial, social, and environmental benefits, with corporate commitment to waste/resource reduction being important. Barriers to implementation were primarily financial, particularly other priorities for capital investment.

The greatest impact of the P3 program is the potential contribution student interns will make as they join the workforce. A comparison of the results of a survey published in 2011 in an ASCE Education Journal showed statistically significant differences exist between past P3 interns and a control group in terms of implementation of source reduction on the job (73 vs. 51 percent), even when the data was controlled for the individual's environmental ethic. It was also found that past P3 interns were 20 to 30 percent more likely to report large quantities of solid and/or hazardous waste to their employer.

Why It Works

Interns are competent; they get to the heart of the changes that need to be made, and they provide employee capacity to chase down the details of P2 improvements.

The P3 program has made a measurable difference to the bottom line for many Nebraska businesses. Today, the program continues to help businesses reduce waste as it prepares young people to provide leadership in implementing source reduction and sustainability in their future professional careers.

Learn more about the Partners in Pollution Prevention (P3) program at **www.engineering.unl.edu**

Pollution Prevention Institute Kansas State University

by Nancy Larson, David Carter, & Jean Waters

The Program

Kansas State University's Pollution Prevention Institute (K-State PPI) has its roots in Hazardous Waste Minimization programs from the late 1980s but has evolved to focus on source reduction. Nancy Larson, director of K-State PPI says, "We've come a long way, Baby, but we still have work to do. We learn new things every day as we continue to identify process, technology, and material efficiencies for our clients."

The K-State PPI undergraduate student internship program has been an effective tool for spreading the source reduction message to businesses through direct technical assistance.

How It Works

As of 2014, there have been more than 67 intern projects at 39 companies. More than 66 million kWh of electricity, 530,000 therms of natural gas, 270 million gallons of water, 16 thousand tons of waste, and $10.6 million have been saved. Ten companies have used interns over multiple years.

As evidence of the program's success, Larson points to long-term changes throughout the years which are achieved by companies such as Precision Pattern and Cobalt Boats. Both companies have worked with K-State PPI off and on since 1995. Their P2 projects have not only saved money on material purchases and waste disposal costs, but also on maintenance and energy, all while reducing emissions of volatile organic chemicals (VOCs), hazardous air pollutants (HAPs), and hazardous wastes.

Why It Works

Relationships between K-State PPI and the companies are vital to the program's success. David Carter, coordinator of the P2 Intern program, said, "The training and on-going support we provide to the interns, plus working with the companies to be sure we have a good P2 project identified are also keys to success."

Photo courtesy K-State PPI

Carter also suggests that success depends on continuing the P2 momentum that the program starts. "P2 is like an Environmental Management System," Carter said. "There's no one solution. It's a continuous improvement process. The P2 message needs to still get out even though we've been talking about it for 25 years, because there's always work to do."

For more information about Kansas State's Intern Program, as well as other pollution prevention initiatives, visit ***www.sbeap.org****.*

Performance Tracking & Recognition Program

Virginia Environmental Excellence Program

by Keith Boisvert

The Program

For the past 15 years The Virginia Department of Environmental Quality (DEQ) Office of Pollution Prevention (OPP) has administered the Virginia Environmental Excellence Program (VEEP). VEEP is a multi-tiered voluntary environmental program that recognizes and rewards facilities and projects that are actively going beyond regulatory compliance and reducing their environmental footprint.

The program was developed in collaboration with the regulated community and aims to drive improved environmental performance through the application of Environmental Management Systems (EMS) and pollution prevention. Ultimately the goal is to move facilities and projects toward environmental sustainability.

How It Works

Participating facilities report annually on environmental commitments and share explanations of their pollution prevention successes. This allows the OPP to stay abreast of current pollution prevention methods and disseminate the information to other facilities. OPP staff conducts pollution prevention site assessments at participating facilities and projects in the program.

Staff uses information from annual reporting and other site visits to help facilities identify pollution prevention opportunities. The multi-tier design of the program helps to drive improvement and the benefits of the program, such as: public recognition, permit fee discounts, help with recruitment, and the opportunity for regulatory flexibility.

In 2014 the 400-plus facilities participating in the program submitted annual reports that showed the following environmental improvement totals:

- Recycled Water Use: Increased by 97,741, 468 gallons
- Water Use: Reduced by 566,083, 852 gallons
- Total Energy Use: Reduced by 1,291,647 MMBTUs
- Hazardous Waste Disposed: Reduced by 187,216 tons
- Non- hazardous Waste Disposed: Reduced by 1,461,505.6 tons

Participating facilities also reported savings of over $41 million through pollution prevention, recycling and energy efficiency efforts in 2014.

Photo courtesy VEEP

Why It Works

The program's success can be attributed to its collaborative nature. Participants are not only members but stakeholders. Both the DEQ and the regulated community have a commitment to a common goal of environmental improvement by voluntarily going beyond compliance through the application of pollution prevention.

For more info about VEEP go to ***www.deq.virginia.gov***

Intern Program

PennTAP
Pennsylvania State University Engineering

by Roger Lee Price

The Program

Established in 1965 as one of the nation's first technical assistance programs, PennTAP is a resource organization within Penn State University that provides technical assistance to Pennsylvania's manufacturers, business and industry. Penn State University engineering students work alongside PennTAP senior engineers performing pollution prevention and energy efficiency assessments for industrial manufacturing facilities.

How It Works

This program exposes students to field testing and data analysis through work on real-world engineering projects. Students identify waste reduction and energy conservation opportunities while learning to embrace a proactive and economically responsible conservation ethic. The program emphasizes the importance of interpersonal oral and written communication skills in engineering.

Since 2009, more than 40 engineering students have been engaged with PennTAP for a total of more than 14,300 student hours to conduct 144 industrial pollution prevention and energy efficiency assessments. Industry sectors assessed include manufacturers of chemical, food, glass, medical, metal, plastic, powdered metal, wood and ceramic products, electronics, hospitals, industrial machine manufacturing, transportation equipment, and printing.

Verified results of these assessments include the following:

- Saving almost $1,650,000/year in energy & waste management costs.
- Reducing water consumption by more than 27,000,000 gallons/year.
- Saving more than 26,000,000 kWh/year in electricity consumption (equivalent to the annual energy use of 2,900 households).
- Reducing their greenhouse gas emissions by almost 50,000 metric tons of carbon equivalent (MTCE) per year (equivalent to removing 9,000 cars from the highway).

Photo courtesy PennTAP

Why It Works

Let the students explain. One student says: "Working with PennTAP allowed me to see in person the challenges and responsibilities that engineers face in the work place ... I had a blast. I learned a ton!"

Another says: "The one-on-one consulting experiences with clients and hands-on field work made a lasting impression that will follow me throughout my career."

For more information about PennTAP, go to ***penntap.psu.edu***

Technical Assistance Program

Kentucky Pollution Prevention Center

by Ken O'Hara

The Program

The Kentucky Pollution Prevention Center (KPPC), a state-mandated technical assistance resource center, was established in 1994 and is part of the J.B. Speed School of Engineering at the University of Louisville. From the beginning, the Center has been active in the evolution of P2. Cam Metcalf, a P2 pioneer and Executive Director of KPPC from 1994 to 2013, led the Center as it developed a comprehensive approach to client engagement. That approach incorporates elements of EPA's Seven Steps process to move clients from "reactive" activities to "proactive" strategies.

One of KPPC's most engaged and successful clients is Denyo Manufacturing in Danville, Kentucky. Denyo is a medium-sized company that manufactures diesel engine-driven generators. The company has put in place well-developed pollution prevention and energy efficiency programs that include a high level of employee involvement.

Image courtesy KPPC

How It Works

In consultation with KPPC, the company's award-winning efforts resulted in reduced water and natural gas consumption, improved wastewater treatment operations, better management of process chemicals, lowered air emissions and significant cost savings. Denyo saw its production rise from 1,450 units in 2009 to 5,662 units in 2012 – a 390 percent increase, while lowering its waste and improving the overall environmental performance of the facility.

Why It Works

Through working with a variety of clients, KPPC realized that P2 initiatives work best when they become an integral part of an organization's culture and its business strategy. Successful programs require support from top level management and commitment from everyone within an organization.

As Plant Manager Joey Harris stated, "Working with KPPC helped us 'catch the fever' about the benefits of environmental sustainability. Prior to working with KPPC, we had no baseline to identify waste or measure the cost to manage that waste. You catch the fever when you see real, measurable improvements."

Denyo is one of more than 800 Kentucky organizations that KPPC has helped over the past 20 years by reducing waste at its source, improving Kentucky's environment, and saving its clients more than $30 million.

For more information about KPPC, Kentucky's Resource Center for Environmental Sustainability, visit ***kppc.org.***

Volunteer & Recognition Program

Kentucky EXCEL Program

by John Eisminger

The Program

KY EXCEL is Kentucky's environmental leadership program in which members perform environmentally beneficial projects each year. Heaven Hill Brands, an independent family-owned distillery in Bardstown, KY, joined KY EXCEL as a Partner member in May of 2010. During the first year of membership, Heaven Hill staff worked with KY EXCEL staff to develop an environmental management plan (EMP).

How It Worked

The EMP highlighted areas in which the distillery could improve and reduce its environmental impact. The distillery decided to focus efforts on recycling measures identified in the EMP.

When Heaven Hill began its recycling project, approximately 12 tons of recyclables were collected per year. Recycling is now a significant part of the culture at Heaven Hill Brands. The facility recycled over 700 tons in 2014!

Photo courtesy KY EXCEL

With the success of its recycling program, Heaven Hill Brands has increased efforts to reduce its environmental impact. On Sept. 13, 2013, Heaven Hill upgraded its KY EXCEL membership level to Leader, a designation that requires the facility to perform three environmentally beneficial projects annually. Since becoming a KY EXCEL Leader member, Heaven Hill Brands installed an outdoor recycling center for employees to bring their recyclables from home because there is no curbside recycling in Nelson County.

Why It Worked

Initially, there was resistance to the recycling program, but with continued support from upper management and rewards for increased recycling, the program has dramatically expanded, and employees are on the lookout for new things to recycle.

The recycling program has provided some income for Heaven Hill Brands. With this money, employees are rewarded for their recycling efforts, and other environmentally beneficial projects at the distillery have been made possible.

Heaven Hill Brands has agreed to mentor others in setting up recycling programs, including locating vendors to take recyclables. In 2014, Heaven Hill Brands was awarded the Department for Environmental Protection's Environmental Pacesetter Award for its efforts.

For more information about the KY EXCEL Program, please visit ***dca.ky.gov/kyexcel***

Intern Program

Iowa Department of Natural Resources

by Jeff Fiagle & Jean Waters

The Program

The Iowa Department of Natural Resources (IDNR) has offered Pollution Prevention Services ever since the P2 Act became law in 1990. IDNR began by providing technical resources and information specific to the unique processes of each industry and assistance from staff engineers. By 2001, when it became apparent that companies needed implementation support as well as information, the IDNR developed the P2 Intern program.

How It Works

The intern, a knowledgeable engineering student mentored by P2 engineers, provides the company with the extra hands needed to research and implement source reduction projects. At the end of the summer program, the intern delivers a report which can serve as a roadmap for implementing more projects. IDNR has found that about 50-60 percent of all interns' recommendations are implemented within three years.

Photo courtesy Iowa DNR

The results in terms of money saved and reduction in environmental impact were highly successful and participating businesses have been enthusiastic. "We could not be more pleased with the outcome of the project," Tonya Burgess, of Sivyer Steel Corporation, said of one intern. "She far exceeded the objectives by her diligent efforts. This is a great program and I'm thrilled we were able to participate."

As of 2014, the IDNR P2 intern program documented more than $75.2 million in savings for Iowa companies— through water conservation (1.44 billion gallons of water saved), reduction in solid waste (138 tons), and hazardous waste (1.53 million gallons and 1,130 tons). More than 363 million kWh and 9.20 million therms have been saved.

Why It Works

Interns bring resources and expertise unavailable at the companies, plus they provide the manpower for implementation. Although the IDNR is a regulatory agency, the P2 services are confidential, allowing for a mutually trusting and beneficial relationship. Because of such trust, companies achieve a reduction in the environmental footprint beyond that which would be required by regulation. Companies can also benefit from a very useful matrix of case summaries IDNR has garnered from years of field work and organized by company name and project type.

To learn more about the IDNR P2 intern program go to ***www.iowap2interns.com***

Technical Assistance Program

Pacific Northwest Pollution Prevention Resource Center & Oregon Manufacturing Extension Partnership

by Michelle Gaither & Ken Grimm

The Program

In 2007, the Pacific Northwest Pollution Prevention Resource Center (PPRC) and Oregon Manufacturing Extension Partnership (OMEP) partnered in a lean and environment pilot project with Woodfold Mfg., Inc. in Forest Grove, Oregon. Woodfold manufactures a custom line of wood products, including specialty doors and shutters. The primary objectives of this collaboration were to:

- Evaluate the benefits and synergies of integrating environmental considerations into lean practices, and,
- Improve product quality, production efficiency, and environmental performance at Woodfold.

How It Worked

Woodfold is well-versed in lean manufacturing. Numerous lean and environmental procedures were already in place prior to this effort. However, Woodfold had not previously combined lean and environmental considerations into one project. The primary focus for this evaluation was the shutter painting line, which involves spray priming, sanding, and spray painting. OMEP provided lean guidance for value stream mapping (VSM) of this process line, while Woodfold staff and PPRC provided environmental input to the VSM.

Collaborators expanded the scope of the value stream map beyond conventional lean process mapping to incorporate material, energy, and water inputs and outputs. Collectively, participants identified numerous potential lean and environmental improvements. Among other improvements, Woodfold:

- Increased paint transfer efficiency for lacquer from 15.9% to 19.7% and for primer from 39.6% to 42.4%. Improved transfer efficiency reduced the company's annual output of volatile organic compounds by 968 pounds.
- Found a local recycler for flexible PVC scrap, diverting about 1,000 pounds per month of solid PVC waste from the landfill.
- New flush and purge water methods saved the company 2,600 gallons of water per year.
- Improved water use reduced the use of evaporators and saved 120,000 kwh per year.
- Gained yearly cost savings of an estimated $44,832.

Why It Worked

In addition to Woodfold's willingness to implement change, this project worked because of the collaboration of experts involved. Examining environmental wastes in conjunction with lean activities helped the team identify opportunities that may not have been considered in a traditional lean project.

Kevin Emerick, Environmental Health & Safety Manager with Woodfold, emphasized the value of onsite trainings. "This pilot project would never have produced this level of savings had we not been able to have PPRC's expert staff onsite for this hands on event," Emerick said. "I see more and more agencies relying heavily on the internet as a resource and the go to tool for reaching their customers. While the internet is a great resource to share information there has to be hands on outreach to help kick start the learning."

Looking Back to Look Ahead

As pollution prevention has been integrated into business practices, its ideas have been swallowed by larger concepts, namely sustainability. According to Google's nGrams tool, use of the term *pollution prevention* appears to have peaked in the mid-1990s and has been declining ever since. The term *sustainability,* meanwhile, has been on a torrid increase – with no end in sight. While overshadowed by more marketable and positive terms, however, pollution prevention remains a crucial aspect of any forward-thinking business's sustainability strategy and goals.

Mike Kelley, who has worked with the Ohio Environmental Protection Agency Office of Compliance and Pollution Prevention since 1988, sees further adoption as the main hurdle for future pollution prevention success. "The challenge for us is to try to bridge the gap between the CEO and the janitor," Kelley said. "How does a preventative philosophy become totally engrained, where it makes sense day in and day out, and where that way of doing things doesn't fall apart when one person leaves a business?" In other words, how can government and businesses work together to motivate a culture of innovation and continuous improvement?"

In this way, new pollution prevention challenges are the same as the old ones. But as businesses enact low-hanging solutions, improvement becomes more difficult. Improvement requires deeper cultural shifts, cooperation, innovation, and, crucially, good information.

Jean Waters, with the Pollution Prevention Regional Information Center (P2RIC), notes that, "For businesses the problem has shifted from finding information about technical solutions to finding information about technical solutions, behavior change, implementation, communication and measurement. Changes need to be accomplished with further resources. It's just another reason to save the most money by using the strategy – P2 – Right from the Start."

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