2012 Pollution Prevention Evaluation Report

Discussing Minnesota's progress in preventing pollution

Minnesota Pollution Control Agency

February 2012

Legislative Charge

Minn. Statutes § 115D.10 Toxic Pollution Prevention Evaluation Report

The commissioner, in cooperation with the commission, shall report to the Environment and Natural Resources Committees of the senate and house of representatives, the Finance Division of the senate Committee on Environment and Natural Resources, and the house of representatives Committee on Environment and Natural Resources Finance on progress being made in achieving the objectives of sections 115D.01 to 115D.12. The report must be submitted by February 1 of each even-numbered year.

HIST: 1990 c 560 art 1 s 10; 1993 c 172 s 73; 1995 c 247 art 1 s 35; 1996 c 470 s 27; 1Sp2005 c 1 art 2 s 161

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Contents

Executive Summary

Pollution prevention (P2) means eliminating or reducing pollution at the source and includes; the use, generation or release of toxic chemicals, hazardous substances and hazardous waste. There are significant economic and environmental benefits when waste is reduced at its source as compared to controlling and managing it after its creation.

Every two years, the pollution prevention program reports to the Legislature on progress being made toward achieving the objectives of the Minnesota Toxic Pollution Prevention Act (Minn. Stat. § 115D.10). This report outlines the broad scope of partnerships and collaborative efforts that meld industry efforts with technical and financial assistance.

Program accomplishments

This report highlights some of the tools used to achieve the state's pollution prevention goals, including examples of how grants, recognition programs, technical assistance, research studies, and training programs have helped to make progress in preventing waste and pollution in Minnesota.

Green chemistry manufacturing and curriculum development

U.S. EPA grant funds have been devoted to support the implementation of green chemistry and design by Minnesota manufacturers and curriculum development in Minnesota post-secondary institutions through MPCA programs and projects. "Green chemistry" and "green engineering" are sets of principles for product designers to consider when making choices of materials, constituents, configurations within larger systems, or other product design and manufacturing process decisions.

Technical assistance partnerships

MPCA supports two pollution prevention technical assistance providers (the Minnesota Technical Assistance Program, in partnership with the University of Minnesota and the Minnesota Retiree Environmental Technical Assistance Program). These partnerships have reduced waste production by over 4 million pounds and saved Minnesota businesses and institutions nearly an estimated $3 million in 2010-2011.

Agency pollution prevention efforts

MPCA provides direct pollution prevention technical assistance through the Small Business Environmental Assistance Program (SBEAP) and through pollution prevention integration efforts with Minnesota businesses that have saved them over $6 million in 2010-2011.

Extending pollution prevention to other programs

Pollution prevention concepts can also be applied to achieve desired environmental outcomes. One area of recent innovation, avoiding contamination of stormwater runoff, is featured in this report.

Statewide trends for TRI reporting industries

The state evaluates data supplied by reporting facilities to the Minnesota Emergency Planning and Community Right-to-Know Act (EPCRA) program and the U.S. EPA to determine trends in quantities of chemicals generated and released. The 2010 data from Minnesota's 410 reporting facilities suggest that little overall progress in pollution prevention among manufacturers has occurred. Manufacturers continue to make progress in reducing toxic chemical releases, which declined nearly 17 percent between 2006 and 2010. However, the same improvement is not being seen in reducing overall TRI chemical generation, a more complete indicator of pollution prevention, which has changed very little from 2006 to 2010.Waste generation by manufacturers increased slightly, about two percent, recyclers increased significantly (44 percent), although they make up a tiny fraction of overall waste generation. Non-manufacturers (primarily electric utilities) stayed about the same. However, waste generation from treatment facilities declined by nearly 30 percent.

Consolidation of reports

The MPCA is proposing a report focused on pollution prevention, toxics in products and green chemistry to replace the Toxic Pollution Prevention Evaluation Report. This report would be done on a four year cycle starting in 2013.

Introduction

Under the Minnesota Toxic Pollution Prevention Act (TPPA), the policy of the state is to eliminate or reduce at the source the use, generation, or release of toxic pollutants and hazardous wastes.

Pollution prevention is a front-end rather than end-of-pipe solution to waste. When pollution prevention rather than pollution control is used as a means to reduce the use, generation and release of toxic chemicals, significant economic and environmental advantages often result. Pollution prevention approaches work most effectively when products are designed using green chemistry and design (http://www.pca.state.mn.us/aj0r71a) principles and production processes that minimize waste and pollution. Many non-toxic alternatives have already been developed and are available for manufacturers to adopt. Additionally, existing processes can also often be made more resource and energy-efficient, producing significant savings for manufacturers as well. Furthermore, pollution prevention concepts are not limited to just manufacturers. For example, reuse of products and materials can provide significant environmental and economic benefits for not only manufacturers, but also consumers and service professions as well.

Environmental and public health benefits

Reducing the quantity and toxicity of waste, air emissions, and water discharges that are created through manufacturing products decreases the potential for harm in the event of an accidental or intentional release. Using fewer toxic chemicals in product manufacturing reduces employee exposure risks as well as exposure to hazards these chemicals can pose in products.

Economic benefits

As this report shows, Minnesota businesses that have implemented pollution prevention measures that use less toxic materials or more efficient processes have benefited by saving millions of dollars. Businesses benefit through eliminating costs for end-of-process pollution control equipment and hazardous waste management; conserving resources; improving worker safety and community relations; improving recyclability of manufacturing materials and products, and; decreasing liability and costs of managing products in the general waste stream at the end of its useful life. Once practices are in place, savings from pollution prevention continue year after year.

Report on toxic chemical releases

Although the amount of toxic chemicals generated as waste has not declined significantly based on Toxic Release Inventory data, pollution prevention efforts have helped to keep toxic chemical waste generation from increasing. In the case of toxic chemical releases, these efforts have helped to steadily reduce the amount released to Minnesota's air, water, and land. Documented results in this report show that millions of dollars have been saved, and millions of pounds of pollution have been eliminated through these partnerships and collaborations.

Program accomplishments

There are a variety of tools used to achieve the state's pollution prevention goals. The following section highlights some examples of how the MPCA has utilized grants, recognition programs, technical assistance, research studies, training programs and more to make progress in preventing waste and pollution in Minnesota.

Environmental assistance grants

Reuse, while high on the waste hierarchy and an excellent waste prevention strategy that helps to avoid the pollution associated with manufacturing new products, has not been fully developed in Minnesota. One of MPCA's Environmental Assistance grants created a replicable house wares reuse project that can be implemented in high-turnover neighborhoods such as near college campuses. The Southeast Como

neighborhood of Minneapolis borders the University of Minnesota and includes many student-occupied rental properties. In 2009, MPCA granted the Southeast Como Improvement Association (SECIA) $25,769 to help them develop reuse opportunities for the tremendous amount of furniture and household goods that piled up for disposal during the spring and fall move in/move out cycles. The goal of the grant project, nicknamed 'MIMO' (Move In/Move Out) was to establish a centralized reuse point during student Move-in/Move-out cycles to reduce the amount of usable items entering the garbage waste stream from the Como neighborhood.

Through direct education and outreach to neighborhood residents, and by developing a close partnership with the University of Minnesota's Reuse Center, the grant project, with some additionally leveraged resources, resulted in three MIMO events.

The three MIMO events (Spring 2010, Fall 2010, and Spring 2011) diverted nearly 10 tons of household goods for reuse (19,364 lbs) and had more than 2,224 participants. More materials were collected at the Fall event, but as awareness increased, the materials collected in the Spring event increased as well. The second Spring event diverted 6,146 lbs of material–a 50% increase over the first Spring event. The increase resulted from the increased awareness of the opportunity in the neighborhood and fine tuning the event management. Each event ran for 7-10 days over 3-4 weekends. The MIMO project demonstrated a successful model for waste diversion that has widespread interest and participation in an area surrounding a college campus.

Following the grant period, a Fall 2011 event was held and SECIA hopes to develop some further partnerships that will build the program into a permanent part of the integrated waste management system of the area.

Small businesses save money and help the environment through compliance assistance

A metro area printing facility was inspected by MPCA air quality compliance staff in response to a complaint and was referred to the agency's Small Business Environmental Assistance Program (SBEAP) for follow-up compliance assistance. The facility needed assistance calculating Potential To Emit (PTE) for air pollutants for various processes. An SBEAP staff member identified high amounts of Hazardous Air Pollutants (HAPs) and Volatile Organic Compounds (VOCs) coming from ink and solvent used to wash screen presses. Based on SBEAP recommendations, the facility located alternate products with lower pollutant levels that would reduce emissions, allowing the facility to lower emissions below the permitting thresholds (meaning they would not need an air permit). Using the alternate products resulted in VOC reductions of 168 pounds per year, and HAP reductions of 83 percent from 71 pounds per year to only 12 pounds per year, assuming similar product quantity usage.

A metro electronics recycling firm reports that, as a result of SBEAP's services, they reduced energy use and solid waste, as well as increased environmentally-preferable purchasing. They reported saving nearly $10,000 and reductions of up to 500 lbs of measurable solid waste.

A metal fabricator in Lake Crystal was spurred to action recently as a result of a letter from the MPCA, notifying them that they exceeded their Air Permit threshold. SBEAP staff helped the business determine that if they reduced Hazardous Air Pollutant (HAP) emissions, they would qualify for a streamlined form of air permit instead of a more rigorous and expensive state individual air permit. The company worked with its paint supplier and substituted a non-HAP VOC for xylene, cutting HAP emissions by 5,100 pounds per year. After making the switch, the company applied for and received a streamlined air permit, thus avoiding additional regulatory obligations. By reducing its HAP emissions the company saved $17,100 in avoided permitting fees.

Governor's awards for pollution prevention

The Governor's Awards for Pollution Prevention recognize Minnesota's businesses, nonprofits, private institutions, and governmental institutions that demonstrate a superior commitment to waste and pollution prevention, source reduction and resource conservation. Accomplishments must go beyond traditional waste

management practices, focusing instead on preventing, reducing and reusing through innovative and creative strategies.

Spotlight project: Public Pools Green Initiative (2010)
The city of Saint Paul's Public Pools Green Initiative (http://www.pca.state.mn.us/nwqh6fa) is a great example of using innovative new technology that reduces the use of toxic chemicals (chlorine, cyanuric acid, bicarbonate, acid and clarifier) for swimming pool maintenance.

The city partnered with Creative Water Solutions and USAquatics to use sphagnum moss as a water conditioning and treatment agent in several of the city's public swimming pools. It was the first use of moss as a water conditioning and treatment agent in a public pool anywhere in the world. The moss treatment system proved very effective for managing biofilm that forms in swimming pools.

Before switching to the moss filtration system, the play equipment in the kid's pool was faded and a few were almost white. Lifeguards were cleaning pool water lines and the play equipment weekly. After the moss system was installed, equipment colors were restored. Lifeguards stopped cleaning the water line because it was no longer needed. When the pool was drained, it no longer required scrubbing; in fact, it appeared as though it had been power washed.

The city was able to reduce spending on labor and chemicals. Chlorine use dropped in half by mid-summer and even further by the end of the season. Cyanuric acid use was discontinued. Bicarbonate and acid use also fell to half the levels of 2008, saving $36,000 in chemical costs, and $40,000 in reduced labor costs due to fewer overtime hours needed to respond to problems. Staff also observed an increase in customer traffic. Overall, the city realized a $100,000 increase in revenues from the pool in 2009.

In addition, the following organizations also received Governor's Awards in 2010 (http://www.pca.state.mn.us/nwqh6fa):

- Commercial Asphalt Company, Dem-Con Companies, Minnesota Asphalt Pavement Association, Solid Waste Management Coordinating Board: From Roofs to Roads

- Fairview Health Services, Merrick, Inc., Minnesota Waste Wise, Partnership Resources, Inc., PPL Industries: Waste Reduction and Recycling Initiatives

Road salt use reduction

After Dakota County employees attended winter maintenance (road salt) training (http://www.pca.state.mn.us/sbiz41), reductions in the use of road salt used were documented. For the 2008/2009 season, the county used 14,175 tons of salt for thirty-five snow events, averaging 405 tons per event. For the 2009/2010 season the county used 9,585 tons of salt for twenty-seven events, averaging 355 tons per event. Most road salt eventually enters streams, lakes and ground water through stormwater runoff or infiltration. The reduced salt use correlates to about 40 million gallons of Minnesota waters protected, through reduced concentrations of chloride per snow event.[1] County staff attributed the decrease in salt from 405 to 355 tons to the use of computerized spreaders, using magnesium chloride[2], and to the winter maintenance training provided by Fortin Consulting (in partnership with the MPCA).

[1] 1 tsp of road salt permanently pollutes 5 gallons of freshwater; 10 tons pollutes about 8 million gallons; 50 tons pollutes about 40 million gallons (amount they reduced per snow event - for reference 40 million gallons fills about 60 Olympic sized pools); 50 tons x 27 events = 1,080,000,000 gallons of freshwater that Dakota County protected in the year we conducted the second round of the KAP (Knowledge, Attitude, Practices) study that evaluates training effectiveness.

[2] The amount of magnesium chloride needed is less per snow event, because it is more effective in melting salt and it adheres to the road surfaces melting snow over a number of days thus reducing follow-up applications.

Green chemistry manufacturing and curriculum development

Background

"Green chemistry" and "green engineering" are sets of principles for product designers to consider when making choices of materials, constituents, configurations within larger systems, or other product design and manufacturing process decisions. These principles were established recognizing that such design choices dictate the product's environmental, human health and energy impacts during and after its intended use.

Chemical formulations are a key part of most products, including cosmetics, soaps, and other personal care, health and beauty products, but also consumer products which incorporate solvents, paints, adhesives, lubricants, plasticizers, and a host of other formulations to provide the performance attributes that customers desire. Green chemistry and engineering may involve the use of biological materials (biomaterials) and feedstocks. However, the great majority of green chemistry now being implemented involves improving the environmental and health performance of fossil fuel-based chemicals or formulations.

Clean technology tools like green chemistry and engineering help sustain businesses into the future by diversifying products, reducing risk and cost, and broadening access to world markets which may be aggressively regulating chemicals or growing consumer awareness and demand for clean products. According to a recent study (http://www.pikeresearch.com/research/green-chemistry) by Pike Research, green chemistry provides a market opportunity which will grow from about $2.8 billion in 2011 to $98.5 billion in 2020, nationally.

Because product improvement through green chemistry and design is a key part of pollution prevention, this section provides a brief update on state green chemistry and design activity since the submittal in December 2010 of the Options to Reduce and Phase-out Priority Chemicals in Children's Products and Promote Green Chemistry (http://www.pca.state.mn.us/index.php/view-document.html?gid=15319) - Report to the Legislature.

In that report, MPCA recommended the following based on stakeholder outreach and related research:

1. The Legislature should consider establishing formal green chemistry policies;
2. The MPCA should continue to track and report on green chemistry's development;
3. The MPCA should establish a policy to promote green chemistry and product design as part of its pollution prevention programs;
4. MPCA should direct a minimum of one FTE of existing staff in fiscal 2012 and 2013 to explore and promote green chemistry and design in business and in government.

MPCA's pollution prevention program is currently working to implement the third recommendation and MPCA's recent green chemistry activity has centered on the fourth recommendation. A summary of related activities and learning follows in the next subsection.

MPCA green chemistry efforts have identified the following needs/concerns over the past year:

- Minnesota businesses lack familiarity with green chemistry, resulting in a continuing need to engage business and stakeholders on what green chemistry is and how it can beneficially applied;

- Insufficient data exists on chemicals in products for Minnesotans to be able to determine where Minnesota's Priority Chemicals (http://www.health.state.mn.us/divs/eh/hazardous/topics/toxfreekids/index.html), as designated under the Toxic Free Kids Act (Minn. Stat. 116.9403) are manufactured, incorporated or sold in Minnesota;

- Visible business leadership is needed in setting and supporting improved lifecycle performance standards, particularly through supply chain relationships, and to facilitate green chemistry public policy development;
- Non-focused use and promotion of tools and programs for improving environmental and human health performance can be confusing to businesses and consumers. This suggests a need for a more unified approach to Minnesota efforts, for example, identifying clean technology including green chemistry and biomaterials as a "brand" or attribute of Minnesota-made products.

Green Chemistry Activity

MPCA's Resource Management and Assistance Division has dedicated approximately 1.4 FTE to green chemistry and design in fiscal 2012, and will continue the effort in fiscal 2013. Following is a summary of efforts since December 2010.

Partnerships and networking

The Minnesota Green Chemistry Forum (http://www.greenchemistrymn.org/), a forum of businesses, government, non-governmental organizations (NGOs) and academia to advance green chemistry practice and policy in Minnesota and nationally, led, with several partners and sponsors, the development of the first Minnesota Green Chemistry Conference: Adding Value Through Green Chemistry. Held on January 7, 2011 on the University of Minnesota West Bank campus, this event featured presentations by business, government and NGO leaders, and attracted 179 attendees, including government, NGOs, educators, students and 45 businesses/consultants. Due to this strong response, the Forum and partners developed "Minnesota Green Chemistry Conference 2012: Strategies for Growth" (January 26, 2012) and plan to continue annual conferences as long as demand exists.

MPCA is a member of the Minnesota Green Chemistry Forum.

Grants to support implementation

MPCA's Resource Management and Assistance Division secured 2010 P2 grant funds from U.S.EPA to offer Green Chemistry Demonstration grants to Minnesota companies to support product chemistry improvement projects. By the spring of 2011, MPCA staff had executed three grant agreements totaling $85,891 with Cortec Corporation, Salo Manufacturing and Ecolab Inc.

The initial Demonstration grant offering drew 10 applicants. Five companies met the grant minimum qualifications and 3 were funded. This suggests demand exists for future grant rounds of similar amounts. Brief progress reports on specific grants follow (see also http://www.pca.state.mn.us/aj0r71a).

Salo Manufacturing, Menagha

The objective of this project was for Salo to determine whether they could economically manufacture fiberglass bathtub and shower units with low styrene soy-based or non-styrene resins and gel coats, and at the same time maintain the structural and cosmetic characteristics of the units manufactured with their previous raw materials. Salo also tested alternative clean-up solvents and mold release agents.

Salo Manufacturing wrapped up the grant in late 2011. A resin was tested that would reduce volatile organic compound (VOC) and hazardous air pollutant (HAP) emissions by 10,800 pounds annually, but it was too costly and didn't perform well. The effort has indicated opportunities for technology development to improve performance. Salo was successful in reducing acetone use for clean-up and adopting VOC-free release agents, saving annually 3,670 pounds of VOC emissions, 4 tons of acetone use, 600 pounds of related hazardous waste, and around $1,700 in reduced material costs as well as $500 in hazardous waste fees.

Cortec Corporation, White Bear Lake
The objective of this project is to develop a commercially viable, water-borne, corrosion resistant metal primer, with a VOC level of less than 25 grams/liter compared to the current standard of 250 grams/liter. If successful, this will provide performance (and renewable content) similar to a traditional alkyd coating, with the convenience and environmental benefits of a latex paint. This project was still under way and to date, the best-performing alternative formulation tested to that point had a VOC content of approximately 50 grams/liter. The project is scheduled to be completed in 2012 and further updates will be posted to the Demonstration grant web page noted above.

Ecolab Inc., Eagan
Using life cycle approaches, Ecolab is pursuing new designs for several of their key hard surface cleaning products for optimum efficacy and enhanced human health and environmental safety. The project scope is the core set of Ecolab products used in general hard surface cleaning: glass cleaner, all purpose cleaner, and neutral, alkaline, and acid bathroom cleaners. These products are used in multiple Ecolab market segments including hospitality, building service contractors, long term care, and government/education.

In late 2011, Ecolab's current progress was:

- Glass Cleaner - in local field tests with feedback positive on the performance of the formula.
- All Purpose Cleaner - in development in the lab.
- Neutral Bath Cleaner - in development in the lab and submitted for regulatory consultation.
- Acid Bathroom Cleaner - in local field tests.
- Sustainable Packaging - in testing of alternative packaging materials.

The project is scheduled to be completed in 2012 and further updates will be posted to the Demonstration grant web page noted above.

Technology transfer and diffusion
In addition to the Demonstration grants, MPCA's Resource Management and Assistance Division offered about $35,000 of its U.S.EPA funds to field test low VOC, styrene-free fiberglass reinforced plastic resin using metering equipment to regulate resin use per part and promote this strategy to Minnesota composite manufacturers, e.g. bath enclosure, vehicle body or boat makers. The Minnesota Technical Assistance Program (MnTAP) won the competitive bidding process to provide technical assistance and diffusion services. The project began in late 2011 and will end in 2012.

Assistance
MnTAP is working with MPCA to develop green chemistry student intern partnerships with companies and research mentors to focus on improving product chemistry and engineering.

Also in the assistance arena, MPCA and MnTAP staff are monitoring policy development in other states for assessing safer alternatives and participating in a multi-state team advising the State of Washington on the development of "scalable" alternatives assessment tools. The purpose of this activity is to develop self- and assisted-assessments which are more useful for small and medium-sized businesses than most current models. MnTAP and MPCA staff will be adding knowledge and skills in life cycle analysis which will also support assistance to business.

Curriculum and education
MPCA awarded small grants to four Minnesota post-secondary institutions to develop and incorporate aspects of green chemistry and engineering into chemistry and engineering curriculum (courses, labs, experiments) at the University of Minnesota-Duluth, St. Catherine University, Winona State University and the University of Minnesota-Twin Cities (see also http://www.pca.state.mn.us/aj0r71a).

Integration of green chemistry and engineering into college curriculum directly benefits Minnesota companies who will hopefully hire today's students in the future, MPCA and MnTAP staff are exploring funding partnerships with companies and foundations for future grant rounds.

Policy development

The MPCA has co-sponsored and participated in both Phase 1 and Phase 2 of the Environmental Initiative's Minnesota Chemical Regulation and Policy Project (http://www.environmental-initiative.org/projects/minnesota-chemical-regulation-a-policy), a stakeholder process involving public and private sector leaders convened to recommend improvements to Minnesota's approach to chemical regulation, management and policy. Phase 2 recommendations are anticipated in Spring 2012.

MPCA staff have been promoting both an intra-agency and an inter-agency/governor's office initiative. This effort is in response to the Environmental Initiative project's anticipated recommendations for private sector leadership and public sector support of a coordinated green chemistry effort in the state of Minnesota.

Technical assistance partnerships

The MPCA engages in a multi-faceted approach to pollution prevention, including providing financial assistance for businesses and institutions seeking ways to reduce waste as well as offering technical assistance directly through technical assistance partnerships.

Pollution prevention technical assistance is a demonstrated means to achieve results. The state sponsors two technical assistance providers in Minnesota and a summary of their results is presented in Table 2.

Table 2: Summary of Pollution Prevention Assistance Results for 2010 - 2011

	Waste reduced (pounds)	Waste reused (pounds)	Water conserved (gallons)	Energy conserved	Cost savings
MnTAP	4,263,829	431,279	18,911,650	8,266,905 kWh 754,800 therms	$2,768,878
RETAP*			760,103	643,525 kWh 15,368 therms	$149,467
Total	4,263,829	431,279	19,671,753	8,910,430 kWh 770,168 therms	$2,918,345

*RETAP totals are 2009-2011

Minnesota Technical Assistance Program (MnTAP)

The Minnesota Technical Assistance Program (MnTAP) is an environmental assistance provider of non-regulatory pollution prevention services to Minnesota manufacturers and industry. MnTAP helps businesses become more efficient by providing industry tailored pollution prevention, energy efficiency and waste reduction assistance; conducting applied research; and offering training and education opportunities. To enhance the reach and quality of its programs, MnTAP partners with trade and industry associations, educational institutions, and state and local agencies.

Located at the University of Minnesota, MnTAP is primarily funded through a state grant from the MPCA which totaled $1,585,000 in the period from January 2010 through September 2011. Partnerships with the U.S. Department of Energy, U.S. EPA Region 5, Xcel Energy and the Minnesota Department of Employment and Economic Development have leveraged an additional $475,000 for targeted technical assistance work conducted in 2010 and 2011. As seen in Table 3, facilities receiving MnTAP assistance have saved over $2,768,878, prevented nearly 4.7 million pounds of waste through reduction or reuse, and conserved 18.9 million gallons of water.

Table 3: 2010-2011 MnTAP Environmental and Economic Impact Results (January 2010 through September 2011)

Service Provided	Waste Reduced (Pounds)	Water Conserved (Gallons)	Energy Conserved	Waste Reused (Pounds)	Cost Savings
Site Visits	4,170,175	12,563,400	4,416,842kWh 423,156 therms		$1,752,101
Student Interns	93,604	6,348,250	3,850,063 kWh 331,644 therms		$922,671
Materials Exchange				431,279	$94,106
Total	4,263,829	18,911,650	8,266,905 kWh 754,800 therms	431,279	$2,768,878

Site visits are a primary tool for providing pollution prevention technical assistance. A total of 505 staff site visits were conducted between January 2010 and September 2011, within many of the major industrial sectors in Minnesota including the food processing, fabricated metals, primary metal manufacturing, and hospitality industries. A retargeting exercise conducted in 2010 identified these priority industry sectors for outreach: metal finishing, metal fabrication, drycleaning, printing, hospitals and clinics and biobased products.

For more details on MnTAP's work, please see their 2010 Environmental Benefits Report (http://www.mntap.umn.edu/resources/reports/EnvBenefits/EnvBenefits_10.pdf).

Retiree Environmental Technical Assistance Program (RETAP)

Minnesota's Retiree Environmental Technical Assistance Program (RETAP), administered by MPCA, provides waste and energy use reduction assistance to non-manufacturing commercial and service facilities, and to government and non-profit institutions, at no charge to the clients. RETAP fills a need in Minnesota to provide energy and waste assessment services to smaller companies and non-profits that are not otherwise likely to pay for such assistance and which aren't appropriate clients for the more manufacturing-focused MnTAP.

The program is a creative and efficient use of taxpayer dollars since assistance is provided by retired engineers and environmental professionals, each with many years of experience, for a cost well below their market value.

As Table 4 shows, for the 2009-2011 reporting period, 96 assessments were completed. Half of these were local government facilities, 16 were commercial buildings, 13 were facilities for faith community, 11 were schools and the remainders were 7 manufacturing facilities and one medical facility.

Table 4: RETAP Environmental and Economic Impact Results (2009-2011)

Calendar Year	Number of Assessments	Number of Clients on which results are based**	Water Conserved (Gallons)	Energy Conserved	Cost Savings	CO2 from Energy savings (tons co2e)
2009	47	33	660,103 gallons	395,858 kWh 5,134 therms	$81,338	585 tons co2e
2010	26	17	100,000 gallons	220,822 kWh 1,860 therms	$50,466	266 tons co2e
2011*	23	5***	0	26,845 kWh 8,374 therms	$17,663	69 tons co2e
Total	96	55	760,103	643,525 kWh 15,368 therms	$149,467	920 tons co2e

*Through September 2011
**This is the number of clients who responded to RETAP's follow-up survey and/or phone calls.
***follow up for most 2011 clients will be conducted in 2012

In 2010, the program received honorable mention in the States Stepping Forward awards for excellence in energy efficiency program design and delivery from the American Council for an Energy-Efficient Economy.

Agency Pollution Prevention Efforts

MPCA also provides direct pollution prevention technical assistance through the Small Business Environmental Assistance Program (SBEAP) and through pollution prevention integration efforts. These activities help businesses to better understand the opportunities available to them for going "beyond compliance" in managing their wastes and the financial benefits that pollution prevention can offer.

Small Business Environmental Assistance Program (SBEAP)

SBEAP provides free, confidential, multi-media environmental assistance to small businesses. This includes maintaining compliance with new and existing environmental requirements while helping reduce regulatory burdens (by reducing the amounts of emissions and wastes generated).

As shown in Table 5, a significant accomplishment for the program was the assistance provided to facilities to attain a "No Exposure" exclusion from storm water permit requirements, meaning the facilities took steps to protect industrial materials and activities from exposure to rain, snow, snowmelt, and runoff; thereby ensuring that stormwater leaving the site is not contaminated and not contributing to degradation of receiving waters. There were 1000 facilities that attained this exclusion, each of which avoided $6,000 in permit fees in 2011, for a total savings of $6 million.

Table 5: SBEAP Environmental and Economic Impact Results (2010-2011)

Pollution reduced			Cost savings	
Air emissions	5,555 lbs		Regulatory fees	$22,720
Solid waste	1,000 lbs		Solid waste generation	$10,000
Hazardous waste	800 lbs		Stormwater runoff fees	$6,012,000
Unclassified*	5,640 lbs		Unclassified*	$43,648
Total	12,999 lbs		Total	$6,088,368

*Results self-reported by clients who did not specify the nature of the waste/pollution reduced

SBEAP provides assistance through a variety of approaches, including site visits, workshop presentations and exhibits, telephone and email contacts, in-person meetings and online through the program web page (http://www.pca.state.mn.us/aj0r7d7).

Pollution Prevention Integration

An important aspect of pollution prevention is integrating waste and pollution prevention concepts with internal MPCA media-driven programs that have traditionally relied on regulatory tools such as permitting and inspections to manage waste and pollution. By introducing pollution prevention through the regulatory process, regulated facilities' compliance costs and requirements can be lessened or eliminated.

Non-Hospital Health Care Outreach

Integrating pollution prevention practices into the hazardous waste regulatory framework can create incentives for non-hospital healthcare facilities to implement cost-cutting pollution prevention practices.

Approximately 9,000 non-hospital healthcare facilities, i.e. dentist offices, long term care facilities, medical clinics, pharmacies, and veterinarians operate in Minnesota. As this outreach effort began, the MPCA believed most of these facilities were out of compliance with hazardous waste regulations, especially with respect to pharmaceutical waste management. To bring these facilities into compliance and encourage adoption of prevention practices, the MPCA and MnTAP jointly developed tools to educate facilities and assist them.

Tools included a web site (MnTAP's 5th most visited site), presentations, on-line self assessments, and direct P2 technical assistance in the form of site visits provided by MnTAP. The web site drew 50,814 page views and training events drew 1,815 attendees either in person or online via webcast during the grant period and remains active. As part of an EPA P2 grant, it built on, and furthered, previous pollution prevention integration into the hazardous waste regulatory framework.

Non-hospital health care practitioners successfully completing the self assessments evaluated their practices, corrected any deficiencies, and then answered questions about their behavior going forward in light of knowledge of the rules. The online self assessment was designed so that facilities would have to certify compliance with the hazardous waste rules. Certifying facilities were screened for MPCA's Green Star Award (http://www.pca.state.mn.us/0agx5e7). There were 282 online facility self-assessments completed, with 263 Green Star Awards conferred and the remainder pending.

The results of the on-line assessments clearly show the biggest outcome of this initiative to be a change in waste management method. Pharmaceutical waste management is moving away from disposal in the sewer and septic system to disposal through licensed disposal companies.

Extending Pollution Prevention to other programs

Along with the primary focus on preventing pollution in manufacturing processes, pollution prevention concepts can also be applied to achieve desired environmental outcomes in areas such as preventing contamination of stormwater runoff and reducing the environmental impacts of remediating contaminated sites. Here are examples of how pollution prevention techniques can be used to address impaired waters.

Green Stormwater infrastructure

Project Recharge, led by the Crow Wing Soil and Water Conservation District (SWCD), received state grants through the Board of Water and Soil Resources (BWSR) to identify water quality trends and to assist homeowners and communities with strategies for being proactive on water quality protection, which is less costly and more efficient than being reactive to water quality problems.

Activities that contribute pollutants and excess runoff to the lakes include the addition of impervious surfaces, such as parking lots and roofs, as well as conversion of the forested landscape for agricultural, industrial, residential and commercial purposes. Project Recharge received a competitive grant through BWSR in 2010 to address those pollution sources by completing many conservation projects, including shoreland restorations, rain gardens, and stormwater management practices that filter and treat polluted stormwater around the Brainerd Lakes Area. The grant was funded by the Clean Water Land and Legacy Amendment.

Collectively, over two tons of sediment, 16 pounds of phosphorus, and six million gallons of annual runoff is prevented from entering Pelican, Serpent, Crosslake, Rush, East and West Fox lakes. Suspended sediment in lakes causes turbidity (cloudiness or murkiness), which blocks the sunlight aquatic plants need to survive. Also, one pound of phosphorus can feed the growth of 300-500 pounds of algae in a water body, so the benefits are very significant.

The Sauk River has been on the impaired waters list for some time. In an effort to improve water quality, the Sauk River Watershed District (SRWD) initiated several landowner best management practice (BMP) programs to reduce the amount of sediment and nutrients entering area lakes, streams and the Sauk River. One program introduced in the lower region of the watershed was the Cold Spring Rain Garden Initiative (http://www.bwsr.state.mn.us/projects/cold-spring.pdf), aimed at reducing storm water runoff to Brewery Creek and the Sauk River. This program focused on a 5-square-mile area within the City of Cold Spring where storm water directly drains into the impaired Sauk River. By targeting information and outreach to landowners

in that area, 75 landowners responded by expressing a concern and interest in doing their part to help the Sauk River, and 33 rain gardens are being installed. Rain gardens will restore water quality by infiltrating potential pollutants before they enter waterways. This project is expected to significantly reduce the sediment load to the Sauk River and will be measured by the amount of debris removed from pretreatment chambers by landowners. Using the P8 (Program for Predicting Polluting Particle Passage thru Pits, Puddles, & Ponds) model, it is anticipated that 35 pounds of phosphorus and 1,800 pounds of sediment will be captured each year within this rain garden system thereby improving the water quality of the Sauk River.

Statewide trends for TRI reporting industries

The state evaluates data supplied by reporting facilities to the Minnesota Emergency Planning and Community Right-to-Know Act (EPCRA) program and the U.S. EPA to determine trends in quantities of chemicals generated and released. The 2010 data from Minnesota's 410 reporting facilities suggest that progress in pollution prevention among manufacturers has remained constant since 2006 as TRI chemical waste generation has increased.

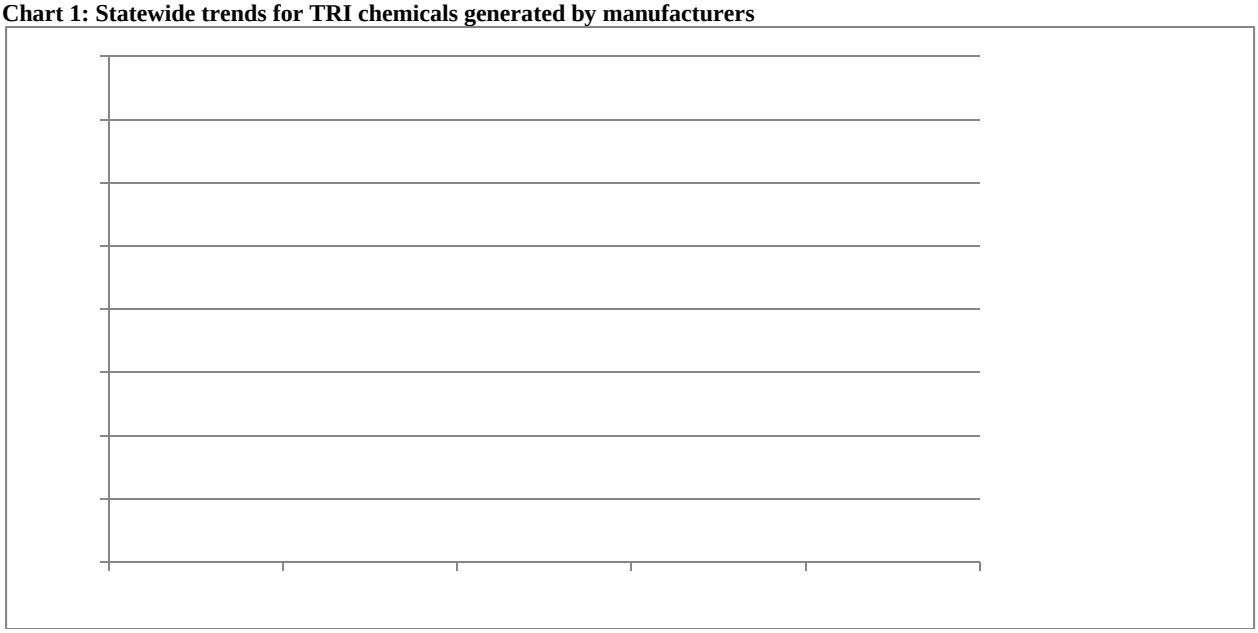
Generation of TRI chemicals in Minnesota – manufacturing sectors

For the purposes of the Toxic Release Inventory program, toxic chemical generation is defined as the sum or aggregate of the quantities for each waste management method employed, which includes releases (direct release to air, water, or land); on-and-offsite recycling; treatment; and burning for energy recovery. Minnesota's pollution prevention program uses actual reported quantities of TRI chemical wastes and releases not adjusted for production because an appropriate economic adjustment method to utilize in this analysis has yet to be identified.

In general, Minnesota's pollution prevention efforts focus on working with manufacturers to reduce waste through improving the efficiency of production processes or finding ways to use less or non-toxic chemicals in those processes. A look at how Minnesota manufacturers manage the TRI chemical waste they generate is shown in Chart 1.

As Chart 1 shows, 2009 saw a decline in waste generated by manufacturers, however, that bounced back in 2010 for an overall increase of five percent since the previous Pollution Prevention Evaluation Report.

Chart 1: Statewide trends for TRI chemicals generated by manufacturers



Management method of TRI chemicals generated (in millions of pounds)

Year	2006	2007	2008	2009	2010
Releases	13.1	12.8	12.8	9.6	10.9
Energy Recovery	3.4	3.6	2.9	2.6	1.9
Recycling	32.9	32.3	31.5	26.1	32.4
Treatment	93.7	92.6	92.3	90.1	101.3
Total Generation	143.1	141.3	139.5	129.3	146.6

Overall trends in TRI chemical generation – all sectors

TRI chemical generation declined in 2009, primarily due to the overall decline in manufacturing output, as evidenced by the decline in the Purchasing Manager's Index (PMI). The PMI is a composite index based on new orders, production, delivery lead time, inventories and employment and is used by economists and government officials to forecast the future state of the economy. It provides an early indication of where the economy is headed in the next three to six months. An index above 50.0% indicates expansion while an index below 50.0% indicates contraction. The PMI dropped below 50% in August 2008 and remained there until July 2009, reaching a low of 28.4% in February 2009. TRI chemical waste generation rebounded in 2010 and essentially returned to 2008 levels, similarly following the PMI trend, which has remained above 50% since August 2009, reaching a high of 67.9 in March 2011.

The manufacturing sectors that report generating the most Toxic Release Inventory wastes in Minnesota include petroleum refineries, pulp mills, small arms ammunition manufacturing, paper mills and laminated plastics manufacturing. The chemicals for which the most waste was reported to be generated are ammonia, methanol, n,n-dimethylformamide, copper compounds and barium compounds.

As Table 6 shows, waste generation from non-manufacturers (primarily electric utilities) continues to decline from 2008, in part due to projects such as the Xcel Energy-Riverside Generating Plant being converted from burning coal to natural gas in 2009, eliminating nearly 400,000 pounds of toxic metals in the coal ash. Additionally, upgrades at Minnesota Power's Boswell Plant reduced coal ash-related waste generation by 300,000 pounds. However, trends in chemical waste generation show that there is still quite a bit of opportunity for pollution prevention among Minnesota manufacturing and industry.

Table 6: Total amount of TRI chemicals generated (in millions of pounds)

Year	2006	2007	2008	2009	2010
non-manufacturers (electric utilities, chemical distributors)	14.7	16.6	15.7	15.0	14.3
recyclers (metals and solvents)	0.9	0.8	1.1	0.9	1.3
hazardous waste treatment	16.8	15.9	15.8	9.2	11.9
manufacturers	143.1	141.3	139.5	129.3	146.5
total TRI chemical generation	175.5	174.6	172.1	154.5	174.1

Overall trends in TRI chemical releases – all sectors

TRI chemical releases continue to decline, nearly 12 percent overall since 2008. As noted above, this is due in part to reductions made by electric utilities. Manufacturers also continue to make reductions in releases, despite the overall increase in TRI chemical waste generation. As shown in Table 7, one small positive for manufacturers is the continued reduction in releases, which declined nearly 15 percent from 2008 even with the partial recovery in manufacturing activity from 2009's steep decline. This was a sharper decrease than the decline of overall TRI chemical releases by almost 12 percent.

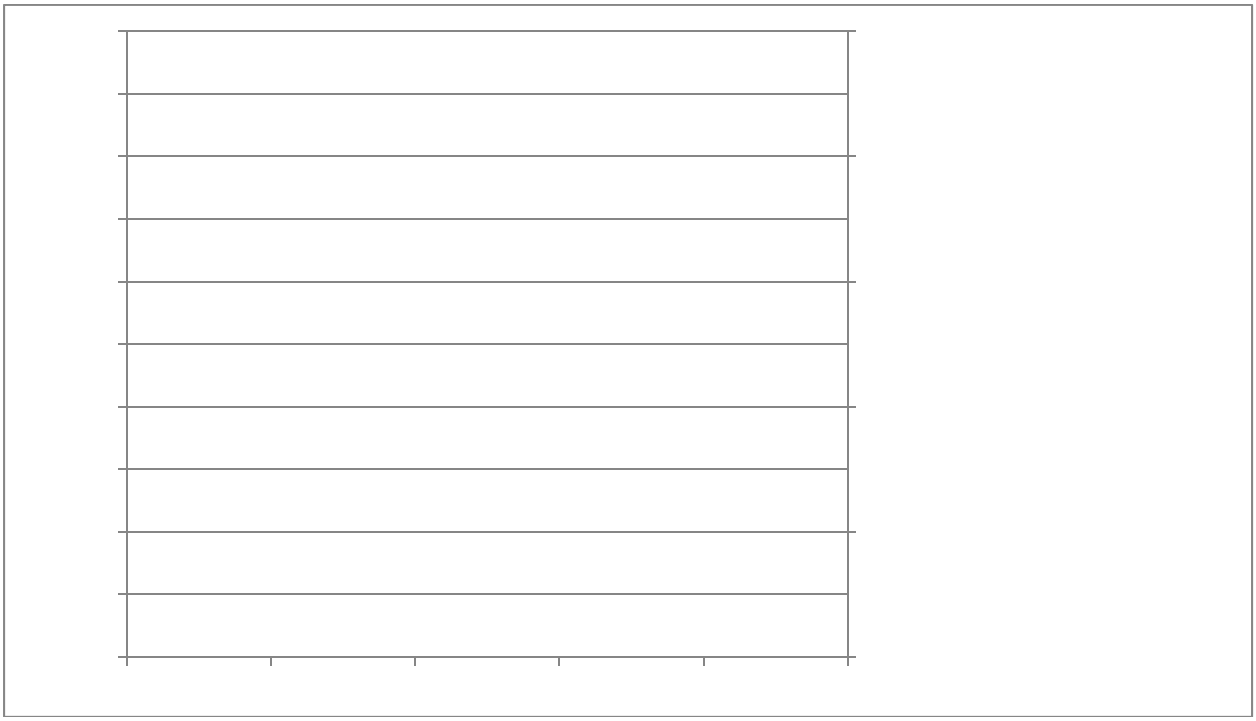
Table 7: Amount of TRI chemical wastes released (in millions of pounds)

Year	2006	2007	2008	2009	2010
non-manufacturers (electric utilities, chemical distributors)	12.7	13.8	12.6	12.0	11.7
recyclers (metals and solvents)	0.4	0.5	0.4	0.3	0.3
hazardous waste treatment	1.2	1.5	0.6	0.4	0.4
manufacturers	13.1	12.8	12.8	9.6	10.9
total TRI chemical releases	27.4	28.6	26.4	22.3	23.3

Nevertheless, the increase in TRI chemical waste generation among manufacturers, along with the nearly 10 percent increase in toxic chemical wastes being managed through treatment shown in Chart 1, suggests that manufacturers may be investing in pollution control, rather than pollution prevention.

As Chart 2 further illustrates, the fraction of chemical releases in comparison to overall generation continues to decline from 2008. While the reduction in releases is a good trend, the corresponding lack of reduction in generation further confirms the need for a stronger focus on pollution prevention activities.

Chart 2: Statewide trends for TRI chemical releases as a portion of chemicals generated



Consolidation of reports

The MPCA is proposing a report focused on toxic pollution, toxic products and green chemistry to replace the Pollution Prevention Evaluation Report to consolidate the reporting requirements of Minn. Stat. 115D, requirements for reporting on problem materials, product stewardship policy and activities in the Toxic Pollution Prevention Act (115D) and Waste Management Act (115A). It is proposed that this report would be done on a four year cycle starting in 2013.