



# Wisconsin Plastics Recycling Study

The Wisconsin Department of  
Natural Resources (DNR) Bureau of  
Waste and Materials Management

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## Executive Summary

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Imagine if Wisconsin's citizens regularly threw away dollar bills in their garbage, and those dollar bills were taken to landfills and permanently buried in mountains of waste. We would surely react by saying "Please, separate out those dollar bills from your garbage and spend them at Wisconsin businesses." Those businesses would be only too glad to put those recovered dollars to immediate and productive use in the economy. This would create jobs and help the economy grow.

This scenario is a very close analogy to what is actually happening in Wisconsin with respect to used plastics. Used plastics have real monetary value to processors and manufacturers within Wisconsin. Yet despite a comprehensive statewide recycling program and a strong recycling ethic, hundreds of tons of valuable plastics are sent to Wisconsin landfills every day. The market value of used plastics sent to the landfill in 2009 alone was about \$64 million.

This study identifies actions that can be taken now to keep valuable plastics out of Wisconsin landfills and put them to productive use, thereby creating jobs and boosting economic development in Wisconsin. In addition to the benefits to businesses and employment, increasing plastics recycling would provide environmental benefits by prolonging the life of landfills and reducing pollutant emissions. Specifically, this study enumerates actions Wisconsin can take to:

- ◆ Double the tonnages of polyethylene terephthalate (PET) and high-density polyethylene (HDPE) bottles, the most recyclable and valuable of all the plastic materials currently being landfilled, that are available to processors and manufacturers.
- ◆ Increase by a factor of 10 or more the tonnage of film plastics, including plastic bags, which are recovered for recycling.
- ◆ Substantially increase recycling of non-bottle rigid plastic containers and other rigid plastics, particularly those with higher market value such as PET, HDPE and polypropylene (PP).
- ◆ Extract value from truly non-recyclable plastics by salvaging them for energy recovery.

The study identifies specific strategies that could increase the tonnage of plastics recovered by 100,000 tons annually and stimulate job growth by several hundred new jobs. The strategies could be adopted individually or as a coordinated approach. The degree of success in attaining this rate of additional plastics recovery will depend on the aggressiveness of policy decisions and actions adopted.



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## Background

The Wisconsin Department of Natural Resources (DNR) Bureau of Waste and Materials Management conducted a waste characterization study in 2009 to identify opportunities to better manage the state's waste and material resources and substantially reduce the impact of waste disposal. The study revealed that fully 14 percent (by weight) of the waste stream was used plastics. The market value of these plastics, including PET and HDPE bottles and jars and polyethylene (PE) film, was estimated at about \$64 million. The DNR contracted with Foth Infrastructure & Environment, LLC, together with Moore Recycling Associates to assess the potential to grow Wisconsin's economy through increased recycling of plastics.

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*Enforcement of laws and bans that are currently in place would significantly improve the amount of plastics recycled. Residents, businesses, restaurants, special events and public places (arenas, athletic facilities) were noted as having significant amounts of banned recyclables that are landfilled.*

~ Cory Tomczyk, IROW

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## Current Situation

Despite the high percentage of the US population that has access to PET and HDPE bottle recycling services, national studies indicate that the recycling rates are still relatively low for these and other high value, high volume recyclable plastics. Recycling rates for specific types of plastics in Wisconsin are not available, but are believed to be similar to national rates which range from a high of almost 30 percent for high value plastics to a low of 2 percent for lesser value plastics.

Wisconsin's comprehensive recycling law is widely supported by Wisconsin citizens and by the legislature through annual appropriations for recycling grants to local government recycling programs. The cornerstone of the law is a series of disposal and incineration bans on a variety of materials including plastic containers. The disposal ban on plastic containers went into effect in 1995. DNR granted a waiver for all containers except PET and HDPE bottles, due to inadequate markets infrastructure at the time. The waiver remains in effect today despite advances in the plastics recycling industry that support recycling of a much wider variety of plastic types.



Polyethylene Terephthalate



High Density Polyethylene



Polyvinyl Chloride



Low Density Polyethylene



Polyethylene



Polystyrene



Other Resins

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Eighty-five registered materials recovery facilities (MRFs) throughout Wisconsin sorted and prepared for market about 34,000 tons of plastic containers in 2010. This MRF infrastructure is continuously increasing in capacity, and is steadily being upgraded with state of the art automatic sorting equipment to increase efficiency and bale quality and range of plastic types recycled. There is also a separate but growing infrastructure for voluntary recycling of clean plastic film, wraps and bags through public drop-off programs at retail stores.

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*We could save an average of around \$0.08 per pound on cost of transportation if we could source more of our material from Wisconsin and nearby states.*

*~Daniel Mohs, Placon Corp.*

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Despite the maturing recycling infrastructure, a statewide system of comprehensive community recycling programs and a strong recycling ethic among Wisconsin citizens, the majority of plastics continue to make their way to the landfills each year at a very substantial economic loss to the state.

## Barriers to Plastics Recycling

Growth in Wisconsin's secondary plastics industry is constrained largely by a lack of supply assurance, an essential ingredient for new or growing companies and financing for capital investment. Increasing the amount and quality of recyclable plastics diverted from the waste stream through government and private efforts would effectively address this barrier. This study lists 27 market facilities located in Wisconsin including companies defined as reclaimers that sort, wash, grind, pelletize or compound the recyclable plastic and end-use manufacturers that produce a final recycled plastic product or package. Results from interviews and other sources indicate there is more than adequate market capacity to absorb additional clean, sorted PET, HDPE and PP containers and clean PE film. Domestic markets for polyvinyl chloride (PVC) and polystyrene (PS) are more limited.



Barriers to increasing plastics recycling arise from the inherent complexity of plastics recycling due to the wide variety of plastic resin types and need for an uncontaminated product by end-use markets. Financial and technical barriers limit the ability of smaller MRFs to accept a wider range

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*Our markets for PET and HDPE plastics are very strong. We have not yet found a domestic end market for the mixed plastic. We are concerned with what may happen to this grade if China stops accepting these mixed plastic bales. ~David Pellitteri*

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*Waste Management, Inc. is concerned for the future of the State of Wisconsin support for local RUs and their municipal recycling programs. This support is critical for recycling companies, large and small, to have some level of certainty that recycling initiatives are here to stay. Even more important is having stable end-use markets that can reliably purchase the large volumes of recyclables that we produce. ~Waste Management, Inc. staff*

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of the emerging plastic types or convert to a more consumer-friendly single stream collection system. This leads to variations in recycling programs, leaving consumers confused over what can and can't be recycled and how to recycle. Continuing gaps in "away from home" recycling services create an additional barrier, both in terms of reduced recovery of materials and in undermining the recycling ethic.

## Job Growth Potential and Economic Development Resources

Plastics recycling is an established growth sector that is poised for a calculated investment in accelerated market development. Key factors arguing for immediate investment include: strong industry demand for recycled plastics that currently exceeds supply, well-developed technologies to increase recycling rates, and advances in processing technology opening the door for cost-effective recycling of multiple types of plastics. A number of Wisconsin manufacturers have the capacity for further growth but are constrained by the lack of secure and steady supplies of clean, sorted recyclable plastics. Foreign export markets for recyclable plastics are expected to decrease in relative importance, creating the opportunity to grow Wisconsin's markets and processing capacity.

Plastics recycling can be a significant contributor to economic and job development potential. One study found that about 25 jobs are created for every plastics reclaimer, with average annual receipts of about \$2 million per year. Wisconsin's plastics industries (including manufacturers that use virgin resins only) employ about 39,800 people and maintain a direct payroll of \$1.6 billion. Plastics-dependent industries add another \$12.9 billion to the state's payroll. Within the U.S., Wisconsin is ranked 8th among all states in plastics industry employment.





In addition to recycling, alternative recovery technologies (e.g., waste to energy; plastics to oil) have the potential to utilize large quantities of non-recyclable waste plastics that are either too contaminated to be used as manufacturing feedstock or do not have sufficient end-use recycling markets. Recovering these non-recyclable materials and putting them to productive use would provide additional opportunities for economic development and entrepreneurship.

This study found that Wisconsin offers an impressive array of resources to facilitate efforts to grow Wisconsin's plastics reclamation and manufacturing sector. The principal relevant economic development organizations begin with DNR's own Green Tier program and encompass local municipal agencies, the Wisconsin Economic Development Corporation (WEDC), the Wisconsin Manufacturing Extension Partnership (WMEP), and the Northwest Wisconsin Manufacturing Outreach Center (NWMORC). The report identifies a wide variety of specific programs that may be available to public or private entities to support economic development investments. In addition, the report describes the available directories and materials exchanges that plastics industry participants can use to identify market opportunities.



## Potential Action Steps

This report identifies 40 actions for improving plastics recycling in Wisconsin. Among these are certain key actions for the next stage of implementation planning, such as:

- ◆ Establish ambitious plastic diversion planning targets (e.g., an additional 100,000 tons per year) by the year 2020 together with interim goals.
- ◆ Continue investing in the local responsible unit (RU) recycling programs as the primary building block for increasing collection of plastics. Develop clear recommendations for the largest RUs on how each can improve their plastics recycling program.
- ◆ Form a Wisconsin Plastics Recycling Council, with strong industry participation, to help implement these and other new initiatives.
- ◆ Hire a temporary market development specialist to focus and coordinate efforts to increase plastics recycling in Wisconsin.
- ◆ Disseminate this study and use it as a platform to develop, with industry input, a more detailed plastics recycling implementation plan and to improve coordination between government and the plastics industry.
- ◆ Conduct two detailed feasibility studies on the development of plastics recycling facilities to determine the scale, scope and economic potential of new operations to sort and reclaim two types of plastics:
  - ▶ Mixed rigid plastic containers (beyond PET and HDPE bottles); and
  - ▶ Plastic film/bags.

The remaining action options are classified into three broad planning scenarios, each with varying levels of government intervention. These scenarios are defined in this study for purposes of planning and comparison. Several of the options have elements within each scenario. The scenarios are not mutually exclusive; elements of each scenario could be implemented.



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**The Status Quo Scenario:** Rely on prevailing industry trends to support growth in plastics recycling in Wisconsin. Some trends are favorable to gradual growth: the continued adoption of single-stream collection, the gradual upgrading of equipment at MRFs such as automatic sorting machines, development of more effective labeling standards for plastic packaging, and a broadening over time of accepted plastic materials in collection programs driven by consumer demand.

**The Partnership-Orientated Scenario:** Implement a series of government initiatives and foster voluntary private sector actions, including a diverse and comprehensive mix of measures that generally avoid legislation or other mandates. This scenario anticipates that both private and public investments will be made to increase recycling, including enhanced public education as a basis for other capital and operating improvements.

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*Plastic film and bag recycling at retail establishments can be a “win-win-win” solution. The corporate entity can receive revenue from the sale of scrap plastic film, can save on avoided cost of disposal of this material, can provide a convenient drop-off recycling service for customers, and can tout their new recycling as a “green” initiative.*  
~Dave Heglas, Trex

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Examples of new program initiatives include:

- ◆ Promotion of a phased increase in municipal curbside and drop-off recycling programs, e.g.:
  - Phase One: All plastic bottles by the end of 2014.
  - Phase Two: All rigid plastic containers by the end of 2016.
- ◆ An enhanced plastic film and bag recycling program that could include further research to characterize current recyclable supplies and disposal systems and/or enhanced film/bag recycling system development such as the Flexible Film Recycling Group pilot programs.
- ◆ Enhanced supply assurance mechanisms developed by both business-to-business and government initiatives.
- ◆ Public-private partnerships that would enhance “away from home” recycling collection systems.
- ◆ Enhanced government procurement policies and actual purchase of recycled plastic products.
- ◆ Voluntary investigation by the private sector into the feasibility of development of a plastics-to-oil (PTO) facility in Wisconsin to recover residual and other waste plastics that are not recyclable.

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**The Policy-Oriented Scenario:** Institute policy-oriented options; including container deposits, phased removal of the disposal waiver for all bottles and all rigid containers, additional landfill surcharges and material “take back” requirements. The diversion planning targets under the partnership-oriented scenario are conceived as triggers for consideration of some combination of these policy options; if adequate progress is not successful under the partnership-oriented scenario, then policy options could be forwarded for legislative consideration.

While controversial, container deposits warrant further and serious consideration. Container deposits universally achieve high recycling rates, in some cases as high as 85 to 90 percent. If Wisconsin were to require container deposits on all beverage containers, and take no other action, it could recycle almost 16,000 tons of additional high-demand plastics. Deposits and municipal curbside / drop-off systems can be compatible when the proposed deposit legislation is designed to maximize recycling and minimize negative economic impacts on municipal programs. In addition to substantially increasing the tonnages of recyclable plastics available to Wisconsin processors and manufacturers, a Wisconsin container deposit program could generate about \$60 million in unredeemed deposits that could be re-invested back into the recycling infrastructure.

## Conclusion

Wisconsin is well-poised to substantially improve plastics recycling rates. The right combination of actions identified in this study could offer a platform for significant progress on the challenge of supporting jobs and economic growth through enhanced recovery of plastics. Public-private partnerships will play a significant near-term role in the enhancement of plastics recovery.







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