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Improving Recycling Performance in Michigan:

Best Practices, Options and Potential Costs

Prepared for

Associated Food & Petroleum Dealers

West Bloomfield, Michigan

Contents

Executive Summary

Over the last decade or more, Michigan has fallen behind other states in its recycling and waste diversion performance and, with a recycling rate of just over 14 percent, is now among the lowest performing recycling states in the Great Lakes and broader United States.

Discussions of Michigan's poor recycling performance and potential program and policy changes to improve the state's efforts have been ongoing for more than a decade. Analyses conducted in 2001, 2003, 2006, 2009, 2011, and in this report have demonstrated that Michigan is not achieving recycling and waste diversion results comparable to those in neighboring states or other bottle bill states, despite the high recycling rate of bottle bill materials. As noted in previous studies, recycling and better utilization of waste offer significant opportunities to increase jobs in the recycling sector, increase sales and income of the state's manufacturing sector, and expand Michigan's tax base (PSC 2006, PSC 2009, MRC 2011). Improved recycling also reduces greenhouse gas emission and provides broad environmental benefits by reducing resource use and litter (PSC 2009).

In its review of best practices from other states, PSC found that there is no single silver bullet for high recycling performance. States with high-performing recycling and other waste diversion programs know:

- Where they are by tracking performance and reporting on progress
- Where they want to be by setting and enforcing strong targets or goals for waste diversion
- How to get there by
  - Dedicating statewide funding to recycling efforts
  - Investing in state staff to provide leadership, technical assistance, and education
  - Providing financial support to local communities to develop recycling infrastructure and programs
  - Investing in outreach and education to teach people about the benefits and opportunities for recycling and to change their recycling behavior
  - Developing and implementing strong, enforceable recycling and waste diversion policies

Michigan could apply many of the best practices from high-performing states to expand statewide leadership and local recycling efforts in order to achieve its goal of 50 percent waste utilization. In particular, the state should:

- Implement a recycling data tracking and reporting system
- Incorporate its waste utilization goal into law
- Identify and implement dedicated funding to support statewide recycling efforts
- Add 8 to 10 state staff to provide overarching leadership, technical assistance, outreach, enforcement, and management of the state's recycling efforts
- Provide financial support to local recyclers to help build infrastructure and program capacity for expanded collection and processing of recycled materials
- Implement an education and outreach campaign that will help change people's hearts, minds, and behaviors on recycling
- Implement and enforce strong policies such as local recycling program requirements, waste bans, and commercial recycling requirements

The potential benefits of greater recycling performance to Michigan's economy and natural resources—to its Pure Michigan brand—are simply too great to ignore.

A more comprehensive and effective recycling program could be achieved under Michigan's current system of both bottle bill and community recycling

programs ("dual recycling system") or an approach that replaces the bottle bill with strong and widely available local curbside and drop-off recycling opportunities ("community-based, non-bottle bill system"). While either a dual recycling or community-based, non-bottle bill system is feasible, investment at the state and local level will be required either way. Estimated costs for statewide leadership efforts are fairly comparable under both systems—between $14.8 million (dual recycling system) and $16.5 million (community-based, non-bottle bill system). Predicted costs for the local collection and processing of materials, however, are significantly higher under a dual recycling system compared to a community-based, non-bottle bill system and potential revenues are slightly lower. The total extrapolated costs and revenues for a statewide recycling system are summarized below.

DUAL RECYCLING SYSTEM

- Predicted costs: between ($346) and ($713) million
- Potential revenue: $555 million
- Net system (cost)/gain: between ($158) and $208 million

COMMUNITY-BASED, NON-BOTTLE BILL SYSTEM

- Predicted costs: between ($131) and ($375) million
- Potential revenue: $668 million
- Net system (cost)/gain: between $292 and $537 million

Background

Waste reduction, recycling, reuse, and other activities help divert municipal solid waste (MSW) from disposal in landfills or waste-to-energy facilities and provide significant environmental and economic benefits to Michigan, including additional jobs, new and expanded business opportunities, and greater private and public revenues.[1] Despite being an early leader in recycling and continuing to operate one of the most aggressive bottle bill programs in the country, Michigan's collection and diversion of non-bottle bill materials have remained low, and the state's overall recycling performance is poor.

There have been numerous studies over the last 10 to 15 years evaluating Michigan's recycling performance, quantifying the potential economic and environmental benefits of increased recycling, evaluating whether to modify, expand, or eliminate the bottle bill, and identifying other opportunities to expand recycling. Some of the key studies include:

- **Michigan Bottle Bill: A Final Report to the Michigan Great Lakes Protection Fund** (Stutz and Gilbert 2000). This study evaluated the costs and benefits of seven different bottle bill alternatives in Michigan; compared costs per ton for bottle bill, modified bottle bill, and no bottle bill alternatives; and identified some of the trade-offs between cost and recycling levels.
- **Michigan Recycling Measurement Project** (Michigan Recycling Coalition 2001). The Michigan Recycling Coalition conducted a comprehensive analysis of Michigan's waste stream and recycling efforts, and evaluated how many communities and residents are served by recycling opportunities in the state. The study found that Michigan is under-performing and that its population is under-served by recycling alternatives.
- **The Michigan Beverage and Container Task Force Final Report** (Michigan Beverage Container and Recycling Task Force 2003). The task force, commissioned by then Senate Majority Leader Ken Sikkema, reviewed and evaluated Michigan's bottle bill and overall recycling program efforts, and made over 35 recommendations for policy, funding, and program changes to improve Michigan's recycling performance.
- **Expanding Recycling in Michigan** (Public Sector Consultants [for the Michigan Recycling Partnership] 2006). PSC evaluated the economic benefits of recycling in Michigan, public support for recycling, and Michigan's recycling performance compared to neighboring Great Lakes states. The study found that Michigan performs well below other states, that there are substantial economic benefits for the state from recycling, and that there is widespread public support for a comprehensive recycling system.
- **Expanding Recycling in Michigan: An Update** (Public Sector Consultants [for the Michigan Recycling Partnership] 2009). PSC updated the 2006 study, including a statewide survey that evaluated recycling access, participation trends, and people's willingness to pay for more comprehensive recycling programs. The study also documented the potential reduction of between 1.4 and 1.9 metric tons of carbon dioxide by increasing Michigan's recycling rate to 31 percent.
- **2011 State of Recycling in Michigan: A Way Forward** (Michigan Recycling Coalition 2011). This position paper outlined the economic benefits of Michigan meeting its 50 percent waste utilization goal, and identified six key elements of a comprehensive recycling program in Michigan and their costs.

In short, Michigan's poor recycling performance and the opportunities for expanding Michigan's waste diversion efforts (which include recycling,

1 In its 2009 report, *Expanding Recycling in Michigan: An Update*, PSC found that if Michigan increased its recycling rates to make them comparable to surrounding Great Lakes states, the state could recognize somewhere between 6,800 and almost 13,000 new jobs, $155 million to $298 million in increased revenue, and a corresponding increase of between $12 million and $22 million in state taxes (PSC 2009).

source reduction, and reuse of materials) have been documented and recognized for over a decade. While some modest policy and program changes have been adopted in response to these studies, there has been no significant change in direction, increase of effort, or improvement of performance.

There is a growing consensus among all stakeholders that Michigan must take action now to increase its recycling and overall waste diversion efforts in order to recognize the significant environmental and economic opportunities this would provide. Building on the previous work to date, the purpose of this analysis is to:

- Provide a more recent update on Michigan's waste diversion performance compared to other states
- Look at the policies, programs, and investments of the highest performing states (including both bottle bill and non-bottle bill states) to focus on the most common and critical program elements of success
- Describe what a better performing, comprehensive recycling program in Michigan could look like, and what it might cost, under both a bottle bill and non-bottle scenario

STUDY APPROACH AND CONSTRAINTS

This study should be read with the understanding that recycling data in Michigan and other states is inconsistently reported and collected and, in some cases, not collected at all. The best-known MSW data available nationally from the annual BioCycle *State of Garbage in America* reports was used for previous studies of Michigan's recycling performance, and provided a baseline of data for this analysis. The BioCycle reports contain survey response data from the 50 states on MSW tonnage and a percentage breakdown of tons recycled, composted, combusted, and landfilled. However, comparison of recycling rates across jurisdictions (state and even local) is made difficult by the fact that there are no standardized practices for collecting, measuring, and reporting recycling and solid waste data. Even comparing data within a single jurisdiction over time can be skewed because measurement and reporting practices can change due to policy shifts, funding sources with different reporting requirements, or technological advancements. The BioCycle survey requests data on municipal solid waste (that is, only the residential and commercial/institutional streams); however, most states had only aggregate tons for solid waste, which may include construction and demolition debris or industrial waste. This reporting inconsistency also affects recycling percentages in some states.

BioCycle's most recent report from 2010 used collection methods different from those in previous versions, and as a result some state recycling coordinators felt the data was not accurate for their programs and under-reported their actual recycling rates. Michigan's recycling rate in the 2010 *State of Garbage in America* report was 6 percent, but the Michigan Department of Environmental Quality (DEQ) noted several data gaps and assumptions in the 2010 BioCycle data for Michigan (Flechter 2012). The DEQ, working with BioCycle's research team, adjusted the rate to 14.5 percent based on missing data sources in the initial report, although this estimate has not yet been published by BioCycle because a more recent report than 2010 is not yet available (Flechter 2012).

Given the constraints with the *State of Garbage in America* report, PSC used the BioCycle data only as a baseline to help identify some of the high-performing states, and then researched individual, self-reported state recycling rates for the top 20 states, as well as other Great Lakes and bottle bill states, by reviewing publicly available state MSW and recycling reports. Where recycling performance data is presented in this report, it represents these state-reported rates, not the BioCycle data.

In order to better understand what factors or program elements have helped drive successful recycling performance in other states, PSC conducted a more in-depth evaluation of eight high-performing states. The states were chosen to garner a set that provided some geographic diversity (three Midwest, two West Coast, and three East Coast), size variation (population and area), and a mix of bottle bill and non-bottle bill states. While this report includes studies and examples from many of the top 20 states, the analysis of key program success factors is largely focused on the following eight states:

- California
- Iowa
- Maine
- Maryland
- Massachusetts
- Minnesota
- Oregon
- Pennsylvania

Overview of Recycling in Michigan

MICHIGAN'S RECYCLING SYSTEM

Recycling and waste diversion in Michigan is governed by both state policy and locally initiated ordinances or programs. At the state level, Michigan has three primary policies that affect its recycling performance:

- **The Michigan Solid Waste Policy of 2007**. The policy establishes a goal of utilizing 50 percent of Michigan's municipal solid waste (MSW) by 2015, including residential and commercial recycling and any other waste utilization methods (recycling, reuse, source reduction, and waste to energy). The policy calls for convenient (curbside or drop-off) residential recycling programs by 2012. It also stresses the need to increase participation in waste utilization programs and incentive systems such as "residential 'Pay As You Throw' (PAYT) variable rate disposal pricing, Recycle Bank™-type recycling reward systems, investment tax credits/deductions, technical assistance grants, market development matching grants, program development matching grants, and business recognition systems" (DEQ 2007).
- **The Michigan Beverage Container Initiated Law of 1976 (commonly known as the bottle bill).** Michigan's Beverage Container Initiated Law (commonly known as the bottle bill) was passed by voter referendum in 1976 to help clean up the environment and conserve energy and natural resources associated with waste creation and disposal. The law requires a deposit of $0.10/container, including any beer, soft drinks, carbonated and mineral water, wine coolers, and canned cocktails in airtight metal, glass, paper, or plastic container, or a combination, under one gallon, and bans these materials from waste disposal. Consumers pay the deposits, which are collected by retailers that in turn provide the deposit funds to the distributors or bottlers. When used beverage containers (UBCs) are returned to the retailers, the process repeats in reverse.

  The bottle bill designated the state as the owner of unclaimed deposits, called escheat funds. Escheat revenues are deposited into the unclaimed Bottle Deposit Fund. Each year, the Michigan Department of Treasury distributes 25 percent of the money in this fund to retailers (about $4.5 million in 2012) to help defray some of their collection and sorting costs and 75 percent is transferred into the Cleanup and Redevelopment Trust Fund to support remediation and other environmental programs (about $12 million in 2012). Currently, none of the escheat funds are used to support recycling efforts in Michigan (Michigan Initiated Law 1, 1976).
- **The Michigan Natural Resources and Environmental Protection Act (NREPA) Part 115.** Since 1995, Michigan's NREPA has banned the disposal of yard clippings in state landfills unless the yard clippings are diseased, infested, or are invasive species.[2] In lieu of landfill disposal, the Act allows for yard waste management options such as composting on properties where the yard clippings are generated, at a specifically designated composting facility, on a farm, or as part of the normal operations of a municipal solid waste landfill (Michigan NREPA 1994).

At the state level, the DEQ manages solid waste and recycling programs, and the Department of Treasury is the lead agency for administering the revenue and expenditures associated with the bottle bill. The DEQ has limited staff and funding dedicated to recycling efforts. While the 2007 Solid Waste

2 In 2012 the Michigan House passed HBs 4265 and 4266, which would exempt landfills that recover methane for energy production from the yard waste ban. The bills were transmitted to the Senate in March 2012 and were referred to the Committee on Energy and Technology. There has been no movement of the bills in the Senate since then.

Policy calls for the state to facilitate recycling programs, track data, provide technical assistance and education to locals, and serve as an information clearinghouse, these efforts are not currently adequately funded or staffed.

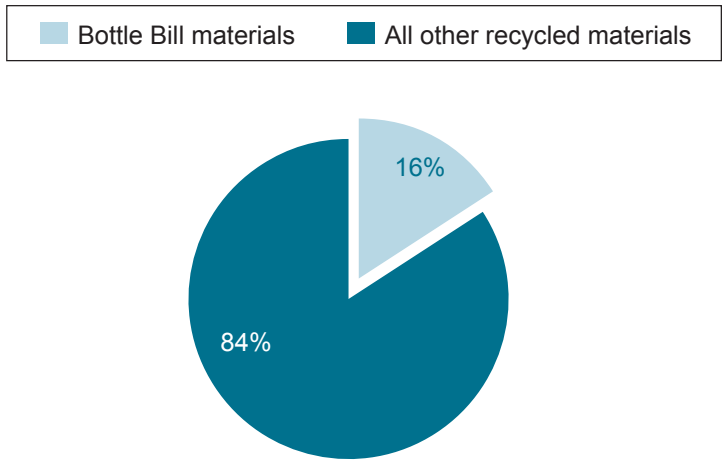
At the local level, collection and processing of recycled material is done by beverage distributors and retailers (for bottle bill materials) and by communities through municipally operated or contracted programs that provide curbside and/or drop-off recycling access for non–bottle bill materials. There are also regional waste authorities such as the Resource Recovery and Recycling Authority of Southwest Oakland County (RRRASOC), the Southern Oakland County Resource Recovery Authority (SOCRRA), or the Mid-Michigan Waste Authority, which provide comprehensive recycling for member communities in their regions and operate recovery and transfer facilities.

Local curbside and drop-off programs are generally funded through local taxes, waste assessments, millages, PAYT variable rate disposal pricing, or individual households that receive recycling service through subscription contracts with private waste and recycling haulers. Costs for the collection and processing of bottle bill containers are largely borne by distributors and retailers.

HOW DOES MICHIGAN PERFORM IN ITS RECYCLING EFFORTS?

Since Michigan does not routinely track recycling data from either local communities or haulers/processors, the state does not have specific information about where it stands in terms of current recycling performance or availability of recycling infrastructure for its residents and businesses. The most recent, detailed characterization of the waste stream and recycling was completed by the Michigan Recycling Coalition (MRC) in its 2001 *Michigan Recycling Measurement Project.* That study found that Michigan's recycling rate was 20 percent, and at the time that figure was below those of neighboring Great Lakes states (MRC 2001).

EXHIBIT 1. Bottle Bill Containers as a Share of Overall Recycled Materials in Michigan (2008)



SOURCE: Calculation by PSC based on recycling data provided by DEQ and Michigan Department of Treasury. See Appendix 1 for calculation details.

Since then no comprehensive measurement of recycled materials has been conducted for Michigan. The state's most current and best estimate of recycling in Michigan is 14.5 percent based on 2008 data (see Study Approach and Constraints section for more information on how DEQ calculated the state's performance rate).

Although the current recycling rate for bottle bill materials is 97 percent (among the highest in the nation), these containers do not account for a large share of overall recyclable materials. In 2008, the most recent year of data on estimated recycling rates, Michigan collected 278,988 tons of plastic, glass, and aluminum bottle bill containers through the bottle bill return system, which—as Exhibit 1 shows—amounted to approximately 16 percent of the state's total estimated recycled material that year.[3]

3 Calculated using the 2008 estimated 1,747,000 tons of total recycled materials, which is the most recent estimate for Michigan (Flechter 2012). See Appendix 1 for breakdown of how bottle bill material tonnage was calculated.

Recycling performance across many states has consistently been shown to improve when residents and businesses have convenient access to recycling infrastructure (curbside or drop-off). Access to convenient recycling varies throughout Michigan, but is not yet widespread. According to the Michigan performance dashboard, only 24 counties report that their residents have convenient access to recycling (State of Michigan N.d.).[4] In total, these counties make up only 12 percent of Michigan's total population.

Exhibit 2 summarizes Michigan's current recycling performance based on MSW generation, recycling rates, and access to convenient recycling.

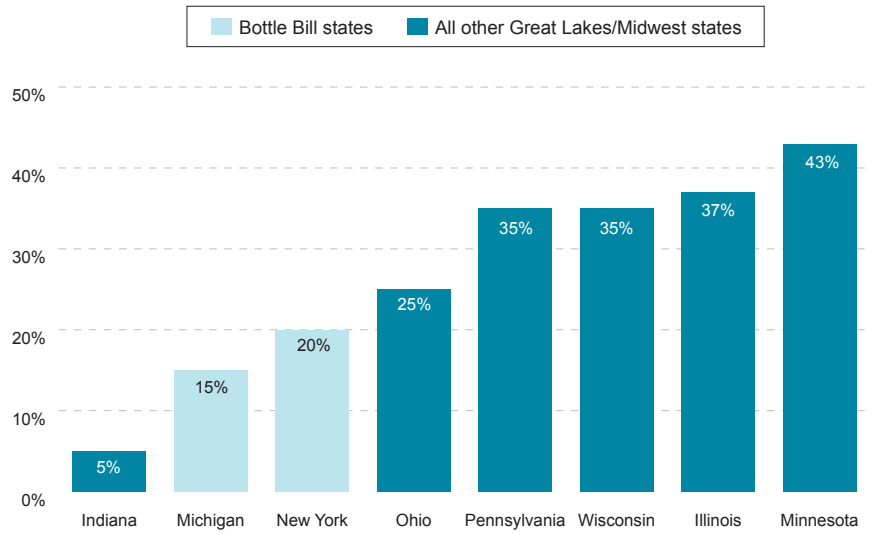
EXHIBIT 2. Summary of Michigan's MSW Generation and Recycling Performance

Population (2010)	9,883,640
Estimated MSW Generated (tons/year) (2008)	12,521,769
MSW Recycled (tons/year)* (2008)	1,747,000
Recycled material as a % of MSW (2008)	14.50%
Per capita annual recycling rate (tons/person) (2008)	0.22
Number of counties with access to convenient recycling (2012)	24 (of 83)

SOURCES: U.S. Census State and County Quick Facts 2012; Flechter 2012; State of Michigan N.d.
*Includes composted material and bottle bill returned containers.

How do these recycling levels compare with other states? PSC first compared Michigan's recycling rate to other Great Lakes states as part of its 2006 report, *Expanding Recycling in Michigan*; updated comparison rates are shown in Exhibit 3. As the exhibit shows, only Indiana has a rate comparable to or worse than Michigan's; however, Indiana is the only state included in the exhibit that reports data from BioCycle's *State of Garbage in America 2010* report because there is no other published self-reported rate for that state. Given the constraints with the BioCycle data, Indiana's actual recycling rate may be higher than the 5 percent reported below.

EXHIBIT 3. Recycling Rates for Great Lakes/Midwest States

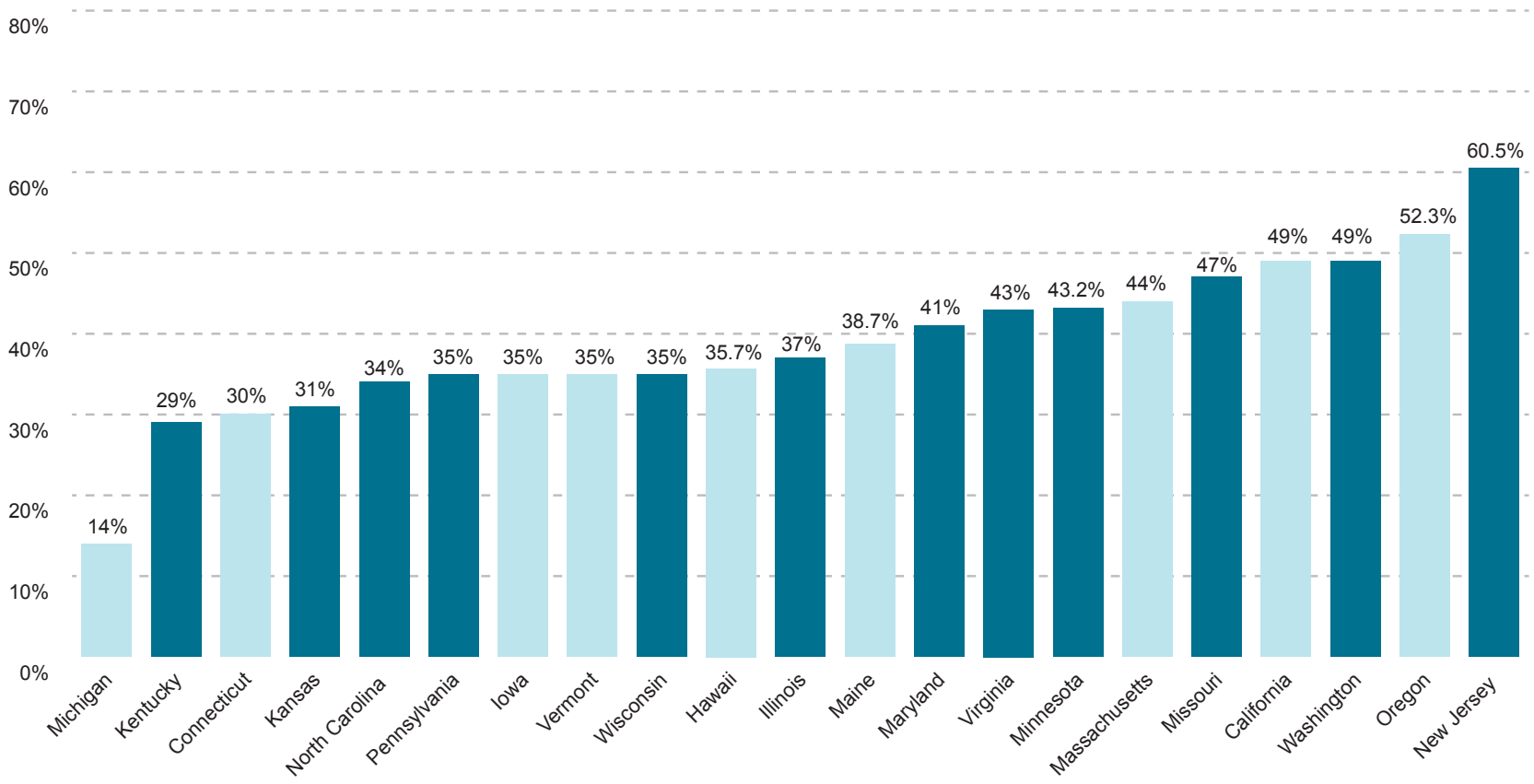


SOURCES: *BioCycle State of Garbage in America 2010* (using 2008 data); Flechter 2012; Fullerton and Miller 2010 (Illinois); Minnesota Pollution Control Agency 2011; New York Department of Environmental Protection 2010; Ohio EPA 2011; Pennsylvania Department of Environmental Protection N.d.; Recycling Connections Corporation et al. 2010.
NOTE: Lighter columns are bottle bill states.

PSC also compared Michigan's recycling rate to 20 states among those with the highest recycling rates (based on overall recycling rates), including 8 other bottle bill states and 12 non-bottle bill states (see Exhibit 4). The high-performing states used for comparison were initially selected based on their ranking in the BioCycle 2010 State of Garbage in America report. Given the BioCycle data limitations (discussed in the Study Approach and Constraints section), actual recycling rates for these states were obtained through research and/or interviews with state staff.

4 The criteria for "convenient" recycling requires that a county must provide a collection program to each resident through ordinance, public/private partnerships, private-hauler contracting, or a publicly managed program; that each community with 10,000 or more people must provide each resident access to curbside recycling; and in a community without curbside recycling, there must be at least one drop-off location per 10,000 people (DEQ N.d.).

EXHIBIT 4. Recycling Rates for High-Performing and Bottle Bill States



SOURCES: *BioCycle State of Garbage in America 2010* (using 2008 data); Flechter 2012; Kentucky Division of Waste Management 2010; DSM Environmental 2012 (Connecticut); Fullerton and Miller 2010 (Illinois); Kansas Department of Health and Environment 2011; North Carolina Department of Environment and Natural Resources N.d.; Pennsylvania Department of Environmental Protection N.d.; Johnson 2012 (Iowa); Vermont Department of Environmental Conservation 2010; Recycling Connections Corporation et al. 2010 (Wisconsin); Hawaii Department of Health 2009; Maine State Planning Office 2010; Maryland Department of Environment 2011; Virginia Department of Environmental Quality 2012; Minnesota Pollution Control Agency 2011; Massachusetts Department of Environmental Protection 2011; Missouri Department of Natural Resources 2007; CalRecycle 2012; Washington State Department of Ecology N.d.; Oregon Department of Environmental Quality 2012; New Jersey Department of Environmental Protection 2010.
NOTE: Lighter columns are bottle bill states.

Across Great Lakes and high-performing states (bottle bill and non-bottle bill), Michigan is the lowest performing state in terms of its recycling rate except for Indiana. This may be attributable to the fact that Michigan does not track recycling data and that calculated estimates are just low. However, given that Michigan has consistently ranked lower than other states since 2001, it is likely an accurate indication of relative performance.

What Makes a Successful State Recycling Program?

If other states have consistently outperformed Michigan in overall recycling efforts, what are the key factors that have made them successful? The data in the previous chapter shows that overall recycling performance does not seem to be tied to whether or not a state has a bottle bill/bottle deposit system. Four of the ten top performing states have bottle bills, and two of the top five are bottle bill states.

In its in-depth review of eight high-performing recycling states, PSC evaluated specific waste diversion or recycling program elements in those states to determine whether there are any policies or programs that are strongly related to high recycling performance. While the analysis did not find any single element that seemed to drive high recycling participation and system efficiency, there were numerous common elements across successful programs, and interviews with state and local recycling coordinators further reinforced the importance of some program elements in particular. Overall, the research clearly shows that states with successful recycling programs know where they are on recycling and waste diversion, know where they want to go, and are making the investments and policy changes that will help them reach their goals, as illustrated in Exhibit 5.

EXHIBIT 5. Model of a Successful State Recycling Program

SOURCE: Developed by PSC based on its analysis of high-performing states, 2013.

KNOW WHERE YOU ARE: Tracking and Measuring Progress

Every high-performing recycling state deploys some type of regular data tracking and reporting on the amount of MSW that is generated, diverted, and/or recycled. Regular data collection and reporting has allowed states to track their progress in meeting goals, adjust and refine their recycling programs to improve performance, and target funding at both the state and local levels. Most of the states interviewed for this study also agreed that an important part of their recycling program enforcement comes from the transparency provided through consistent and detailed data tracking and reporting. When communities track and report the amount of MSW generated, recycled or diverted, and disposed, it helps maintain program momentum and progress.

Methods of data collection varied across top performing states. Depending on whether programs are provided by municipalities or private haulers, these states collect information from municipalities (counties, cities, or other

planning areas), haulers, and processing facilities. California, Maine, Maryland, Massachusetts, Minnesota, Oregon, and Pennsylvania collect extensive and detailed annual information from each of their municipalities, including progress in meeting recycling targets and tons recycled by material types. Iowa uses a more modest data collection system that only requires planning entities to report their progress in meeting the state diversion rate goals when they submit their Comprehensive Plan update every five years (although they can request an annual calculation and approval of their goal rate from the state).

California and Pennsylvania have set up an online reporting survey that municipalities or other reporting entities can access to confidentially enter their data. Pennsylvania uses the national ReTRAC recycling reporting system to measure its progress. In addition to states that use this system, many individual institutions and municipalities use the ReTRAC program, including several Michigan counties such as Clinton, Genesee, and Wayne (Ronson 2013).

In other states, such as Iowa and Maryland, the state provides a template spreadsheet to each municipality or planning entity, which they fill out and send back to the state. Oregon largely uses a system of franchise agreements to provide recycling services at the local level, and requires that any public or privately operated recycling facility submit an annual Material Recovery Survey Form. This includes landfills, haulers, depots, material recovery facilities, and any local government that handles recycled materials.

In interviews with state recycling coordinators, most did not know the breakdown of their costs for tracking and reporting (it is generally part of their staff's overall recycling program administration). Maryland estimates its data tracking and reporting costs are equivalent to about one full-time equivalent (FTE) (Mrgich 2013). Pennsylvania estimates that it spends about $75,000/year on the ReTRAC system and staff time, including reporting (Holley 2012). In its *2011 State of Recycling in Michigan: A Way Forward* document, the MRC estimated a $95,800 annual amortized cost for a data collection and reporting system.

Michigan's 2007 Solid Waste Policy, as well as the previous studies by PSC, MRC, and the Michigan Beverage Container and Recycling Task Force, have all called for ongoing data collection and reporting, but the state has never invested in regular waste diversion data collection.

KNOW WHERE YOU WANT TO BE: Setting and Pursuing Aggressive Goals

Every one of the eight high-performing states evaluated had a specific target or goal for waste diversion and/or recycling at a statewide level. In every state but Michigan and Massachusetts the target or goal is included in statute as well as policy. In Michigan and Massachusetts the goal is statewide and is included in state administrative policy. The targets across the high-performing states range from a low of 35 percent to a high of 75 percent. Some of the high-performing states set waste diversion targets (which includes source reduction, recycling, and reuse) and other just use recycling targets (see Exhibit 6).

EXHIBIT 6. State Recycling or Waste Diversion Targets

	CA	IA	ME	MA	MD [1]	MN [2]	OR [3]	PA	MI
Recycling (R) or waste diversion (D) target/goal	D= 75%	D= 50%	R= 50%	D= 70% R= 56%	R=40%	R=60%	R=50%	R=35%	D=50%
Is target/goal included in statute or state administrative policy	Statute	Statute	Statute	Policy	Statute	Statute	Statute	Statute	Policy

SOURCES: Pennsylvania Department of Environmental Protection N.d.; State of Iowa 2013; Minnesota Statute 16A.531; State of Maine 2012; Maryland Department of Environment N.d.; Massachusetts Department of Environmental Protection 2011; CalRecycle 2012; Oregon Department of Environmental Quality N.d.; Michigan DEQ 2007.

[1] Maryland also has specific targets for cities based on population size. Cities with a population of 150,000 or above must meet a target of 20% recycling and cities with a population of less than 150,000 must meet a target of 15%. At no point can the rate achieved be less than 10%.

[2] Minnesota statute requires specific targets for municipalities as well: 35% outside metro areas and 50% inside metro areas.

[3] Oregon has additional goals of no increase in per capita MSW and no increase in total MSW.

Michigan's Solid Waste Policy of 2007 includes a goal of utilizing 50 percent of Michigan's MSW by 2015, including residential and commercial recycling and any other waste utilization methods.[5] This goal is comparable to those in other states, but it has not been tracked, enforced, or actively pursued through state leadership since it was established. In contrast, other states have supported and enforced pursuit of their recycling targets through state leadership and financial investment (to be discussed in the next section), enforcement mechanisms, and simply maintaining momentum and pressure through data tracking and reporting.

Several states have moved away from calculating recycling rates and are now just tracking tons of recycled materials or simply tracking waste diversion (which includes source reduction, material reuse, and recycling). Pennsylvania, for example, determined that addressing differences in calculation or data collection methods was too challenging and now just tracks the total tons recycled each year, driving toward continued increases in tons recycled (Holley 2012). California, Iowa, and Massachusetts measure waste diversion or reduction and have set their targets based on total waste diverted (although Massachusetts has targets for both recycling and waste diversion) (Johnson 2012; Fischer 2012).

5 Waste utilization includes waste diversion methods previously described in this paper such as source reduction and recycling or reuse of materials, as well as utilizing waste-to-energy methods.

KNOW HOW TO GET THERE: Making Investments and Implementing Strong Policies

Across the board, top performing states—with or without a bottle bill—have invested state resources in comprehensive recycling programs and developed and implemented strong policies and programs to get them where they want to be in terms of waste reduction and recycling.

The three program elements most commonly **funded** by high-performing states are:

- Staff at the state level (central and/or regional) to be a leader on recycling, help educate the public about the benefits and opportunities for recycling and waste diversion, administer the state's recycling program, provide technical assistance to locals, and enforce policies
- Financial support for local recycling programs
- Education and outreach campaigns

Some states have also invested significantly in market development programs, but there was not widespread agreement among top performing states interviewed for this study regarding the priority of those investments.

The most common or seemingly effective **policy** tools used by high-performing states include:

- Requirements for local governments to provide recycling or meet waste diversion targets
- Waste bans
- Commercial recycling requirements

Dedicating Sufficient Funding to Support Comprehensive Recycling

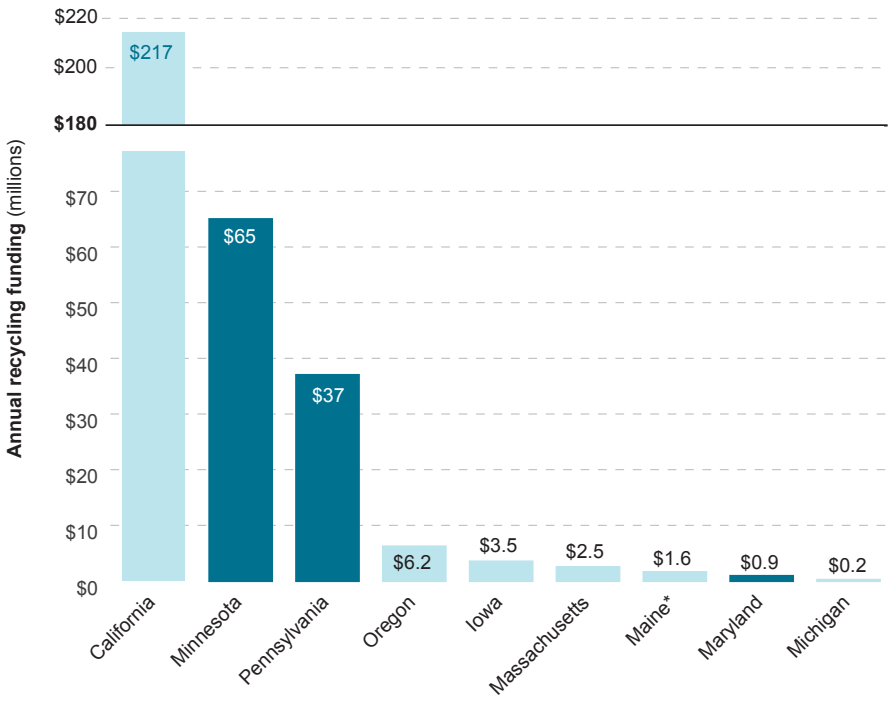
Every high-performing state PSC evaluated uses a dedicated source of funding for its comprehensive recycling efforts. Even in other bottle bill states, which, like Michigan, operate largely independent bottle bill and community recycling programs (dual recycling systems), funding was generated and directed to help advance comprehensive recycling efforts beyond beverage containers. Some of the types of funding used by high-performing states are summarized below:

- Maine and Maryland use fees on tire sales (as well as batteries and other materials in Maine) (Macdonald 2012, Mrgich 2012).
- California and Maine (in addition to tire fees) use unclaimed bottle deposit funds to support their state recycling programs, although California is currently facing a structural deficit in its program due to several budget factors and is in the process of making changes to the funding structure.
- Minnesota levies a solid waste tax to fund its Select Committee on Recycling and the Environment (SCORE) program. Haulers collect the tax from waste generators (residents, businesses) and pay that tax to the state. The tax is paid only on MSW. Seventy percent or $33.76 million, whichever is greater, of the amount remitted must be credited to the state's environmental fund (Minnesota Statute 16A.531).
- Iowa, Oregon, and Pennsylvania use landfill tipping fees to fund waste reduction and recycling program costs. In these three states, the tipping fees range from $1.24 to $4.75. The benefit of using tipping fees is that this simultaneously funds recycling programs and discourages waste disposal at landfills, which further accelerates the goals of the programs. The drawback, however, is that the more successful the program is in increasing recycling and reducing waste, the less revenue it produces.
- Massachusetts uses a totally unique source among the eight states—dedicating a portion of the sale of its renewable energy credits (RECs) from waste to energy facilities to help support recycling efforts.
- Some states, including California and Minnesota, are looking at options for expanding Extended Producer Responsibility (EPR) fees to packaging and paper as a means of supporting waste reduction efforts. EPR allocates the costs of recycling a material across brand owners of that product and brand owners internalize that cost and incorporate it into their product prices.

Michigan provides a small amount of funding (about $200,000) to support its state recycling efforts. In addition, the state collects almost $17 million in unclaimed deposit funds through its bottle bill system, but these funds are used for payments to participating retailers and other environmental programs, and do not currently support the state's recycling efforts.

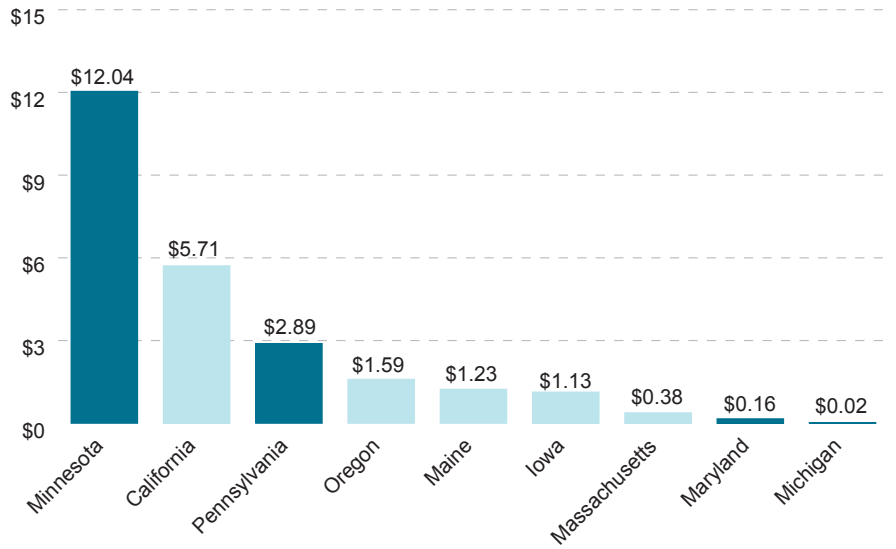
PSC did not find any consistent trends in the level of funding provided by high-performing states, but across the board, Michigan is providing the least amount of funding to its recycling efforts. The level of state recycling program funding in high-performing states ranges from just under $1 million (Maryland) to $217 million (California), with per capita funding between $0.16 (Maryland) and more than $12 (Minnesota). Exhibit 7 summarizes the total state recycling expenditures for the high-performing states and Exhibit 8 summarizes per capita expenditures. Overall the State of Michigan spends less than $200,000/year on all recycling/composting activities, or $0.02 per person, less than all the other states. That number is much lower if you break it down into municipal solid waste recycling activities only (Flechter 2012).

EXHIBIT 7. Total Annual Recycling Funding in High-Performing States and Michigan (in millions)



SOURCES: Fischer 2012; Flechter 2012; Holley 2012; MacDonald 2012; Mrgich 2012; Spendelow 2012; Johnson 2012; CalRecycle 2012; Vee 2012.
NOTE: Lighter columns are bottle bill states.
* Maine did not have current total budget amounts due to recent program and agency changes. Budget numbers in the chart are based on estimated unclaimed bottle deposit collection in 2006 which are used to fund recycling programs.

EXHIBIT 8. Per Capita Annual Recycling Funding in High-Performing States and Michigan



SOURCE: PSC calculation based on funding amounts provided by states in interviews and 2010 census data.
NOTE: Lighter columns are bottle bill states.

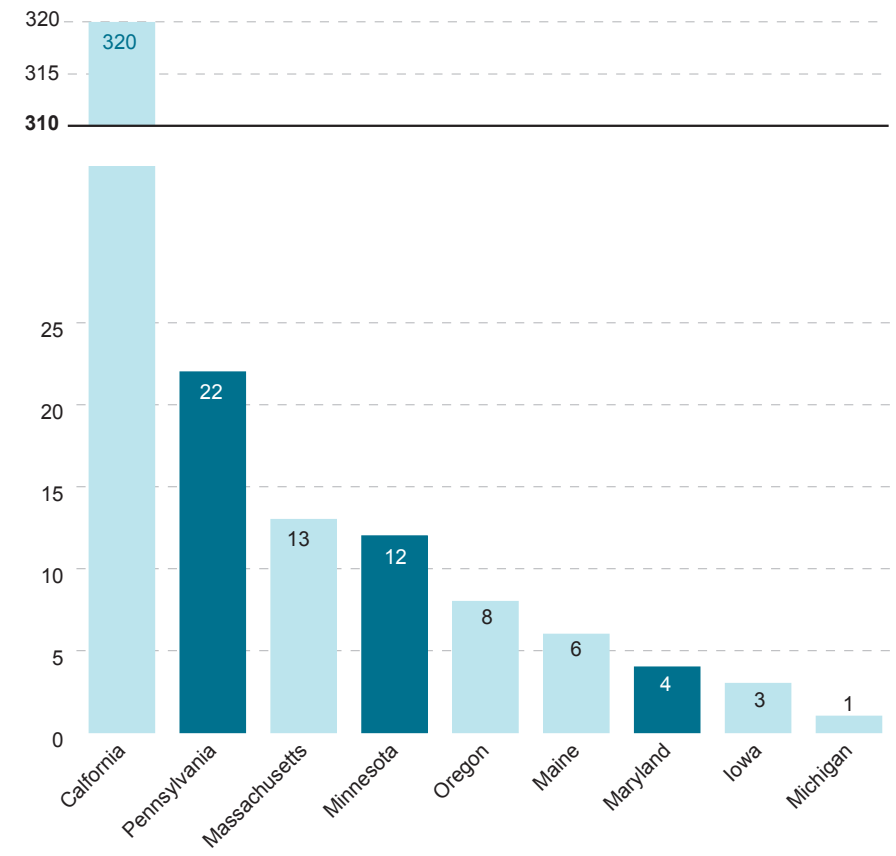
The large range in program funding is related to numerous factors, including states' overall level of political support for recycling and waste diversion efforts. The size of a state likely plays some role as well. California's overall funding for recycling is over three times as much as the next closest state (Minnesota), but it is also a significantly larger state than Michigan and the other seven states evaluated in this study in terms of population and land area. Its per capita spending is within the same range as the other seven states. In addition to Michigan, the two other states on the low end of the per capita spending are Massachusetts and Maryland, both of which are significantly smaller states than Michigan (and the other high-performing states). Total land area in both states is under 10,000 square miles, with 14 and 24 counties, respectively (compared to an average of 60 counties and over

75,000 square miles in the other high-performing states). One could assume that less funding is needed in Massachusetts and Maryland because of the smaller area and lower number of local government units the state must coordinate with on recycling efforts. The lower level of funding may also be related to the fact that these states had strong funding levels for a long time in early program years and a recycling culture has taken root at the local level so state funding is less critical at this juncture.

Staff

All of the high-performing states have more staff than Michigan, at either the headquarters or regional level, dedicated to advancing and implementing their programs. Most of the states interviewed for this evaluation were not able to break down staffing levels for specific program elements given a high amount of overlapping responsibilities and year-to-year variations in program priorities. However, Exhibit 9 summarizes the total number of FTE staff in each state working on recycling and waste diversion efforts, which gives a general picture of the magnitude of state investment in recycling and waste reduction. The average number of state recycling staff in top performing bottle bill states is 7.5 FTEs (excluding California, which has more than 40 times the other states' average). In non-bottle bill states, the average number of FTEs is 9.7. Again, Michigan has the lowest number of dedicated recycling program staff of any of these states.

EXHIBIT 9. Total Recycling Program FTEs in High-Performing States and Michigan



SOURCES: Interviews with state recycling coordinators, 2012.
NOTE: Lighter columns are bottle bill states.

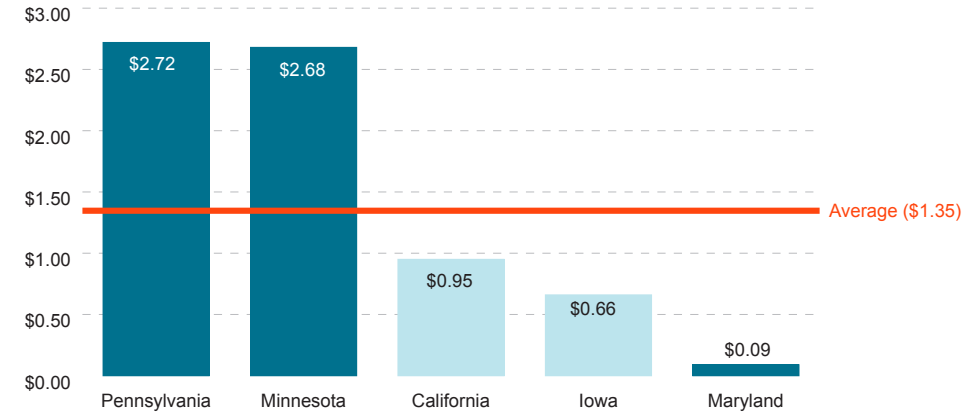
The types of staff program activities are fairly consistent across high-performing states, and largely mirror those called for in Michigan's 2007 Solid Waste Policy and more recently proposed by the Michigan Recycling Coalition in its *A Way Forward* position paper. While each high-performing state emphasizes certain program elements more than others, the most common staff activities include:

- Providing outreach and education (such as maintaining recycling websites, developing school curricula, creating and distributing outreach materials, presenting at conferences).
- Providing technical assistance to local communities and businesses. Some states (such as Iowa, Massachusetts, and Minnesota) also have a process for locals to submit special requests or grant applications for state technical assistance for bigger projects. Some states have heavily emphasized the technical assistance element, and have dedicated a significant amount of their staffing to this effort. Massachusetts, for example, has six regional recycling coordinators (almost half of its state recycling staff) located in different regions who are assigned to provide direct assistance to the state's 351 cities and towns; Oregon has eight regional coordinators who also provide services to the state's towns, cities, and counties.
- Administering and enforcing recycling programs and policies, tracking recycling performance, and reporting. Every state had at least one full-time equivalent overseeing general program administration, tracking of information from local communities, and reporting progress. Enforcement staff was generally involved in broader MSW enforcement efforts, and none of the states interviewed were able to estimate how many FTEs are focused on enforcement efforts specifically.

Financial Support for Local Recycling Programs

Five of the eight high-performing states evaluated currently provide funding to communities to help support local recycling programs. The three states that do not currently provide local grants (Maine, Massachusetts, and Oregon) provided funding for the first decade or more of their state recycling programs, and have only suspended the funding in recent years due to budget constraints and the understanding that local recycling infrastructure is largely developed and operating effectively now. The amount allocated varies a great deal, ranging from just $500,000 a year to over $35 million a year. Exhibit 10 shows the per capita amount of state funding provided to local recycling programs. On a per capita basis, there does seem to be somewhat of a divide in spending for local programs between bottle bill and non-bottle bill states. This is a small sample of states however, and Maryland, which is not a bottle bill state, has the lowest spending of the five states that provide local support.

EXHIBIT 10. Per Capita State Expenditures on Local Recycling Program Support



SOURCE: PSC calculation based on funding amounts provided by states in interviews and 2010 census data.
NOTE: Lighter columns are bottle bill states.

States have provided support through both competitive and formula grants (based on population or tons recycled), and funds are used to support outreach/education, planning, demonstration

In Minnesota, state grants make up an average of 25 percent of local recycling and waste reduction program budgets.

projects, and operation of recycling programs at the local level. Michigan does not currently provide any grant funding to locals specifically for recycling programs, although in the late 1980s the state provided over $150 million in grants over eight years for recycling-related projects through the Clean Michigan Fund and Solid Waste Alternatives Program (Michigan Beverage Container and Recycling Task Force 2003).

None of the states evaluated or interviewed for this analysis sought to have centralized state funding of local recycling programs. State grants have simply been used to help offset some of the costs, develop programs and create awareness, and ensure consistent and accurate reporting of recycling information. Local governments in high-performing states (as well as in Michigan) use additional local funding mechanisms for their recycling programs, including PAYT fee structures, tipping fees, MSW fees or taxes, millages, and general funds

Education and Outreach Campaigns

Currently, most state outreach and education efforts are undertaken through state staff or are included as part of grants to local communities. California is the only state that reported current non-staff education funding, and it spends about $5 million on recycling-related education and outreach throughout the state.

While dedicated outreach and education funding is not presently a focus for most top performing states, several indicated it played a bigger role in early years of the program to help residents and businesses understand the benefits of and opportunities for recycling. In some cases, states had significant education and outreach budgets which they used to develop education materials, buy advertising (radio, TV, and billboard), create marketing campaigns, and support local outreach efforts. Pennsylvania, for example, was spending almost $4 million a year on outreach in the first decade or so of its program for print, television, and radio media, and Maine used to provide about $500,000 in grants to locals or nonprofits for recycling outreach. As the programs have matured and the culture of recycling has taken hold among state residents, funding of advertising campaigns seems to have become much less of a focus.

The Curbside Value Partnership (CVP) has provided outreach and education assistance to states and communities through its online programs and technical staff, including billboard and poster templates, example public service announcements, and development of marketing materials and logos. Minnesota has used this program in the past, as well as Georgia and numerous local communities throughout the United States (Curbside Value Partnership N.d.). Many of the materials and resources are available at no cost and CVP staff can provide individual, tailored education assistance for a fee.

Michigan does not currently expend any external funding on outreach and education efforts, although it does maintain a modest recycling information page on the DEQ's website.

Photo courtesy of Curbside Value Partnership

Market Development

Three of the eight high-performing states, California, Massachusetts, and Pennsylvania, as well as other states such as North Carolina, have also invested significantly in market development efforts in order to attract businesses that use recycled materials, which means that higher amounts of recycled materials stay in the state for economic benefit. Pennsylvania, for example, provides $700,000 a year to the nonprofit Market Center to help stimulate private sector recycling. Massachusetts offers a recycling loan fund through BDC Capital that provides loans ranging from $50,000 to $500,000 for machinery, equipment, or real estate to private sector companies engaged in the recycling industry. The state capitalized the loan fund in 2006 at $3.1 million (Fischer 2012). Finally, California's Recycling Materials Development Zones program provides loans, technical assistance,

PENNSYLVANIA RECYCLING MARKET CENTER

Pennsylvania has invested in the Market Center to complement the state's "supply-side" recycling efforts by developing a strong base of businesses that buy and use secondary materials. The center provides materials-specific and cross material technical assistance, outreach, training and relationship building to encourage greater feedstock conversion, development and commercialization of new technologies, and deployment of best practices in the state. In addition to state funds, the Center generates its own revenue through technology innovation developments (RW Beck 2003).

and free product marketing to businesses located in the zones that use recycled materials to manufacture their products (CalRecycle N.d.). The state is also providing up to $20 million for plastics market development grants, funded through a projected drop in PET plastic processing fee payments, to create new and expand existing plastics market business activities (Verespej 2011).

While California, Massachusetts, and Pennsylvania have invested significantly in market development, the other five high-performing states have not made it a funding priority. Oregon for example, has considered the issue and determined that market development is not an important recycling program element for the state (Spendelow 2012), particularly with its strong access to export markets on the West Coast.

Michigan's only current market development efforts consist of some limited time allotted by DEQ staff to maintaining a materials market directory and participation in regional market development meetings.

Implementing and Enforcing Strong Recycling Policies

High-performing states have developed, implemented, and enforced strong waste diversion and recycling policies to drive increased performance. The most common or seemingly effective policies were requirements for local programs or local targets, banning certain materials from waste disposal, and mandating commercial recycling.

Requirement for Local Recycling Programs

As demonstrated in Exhibit 11, all but one of the top performing recycling states (Massachusetts) require local communities to offer recycling programs or to meet local targets. Locals are generally given flexibility in how to offer those services, whether municipally provided, contracted, or franchised, but state law or policy prescribes which types of services must be provided based on population size or density and/or what percentage of recycling or waste diversion communities must achieve.

EXHIBIT 11. Local Recycling Program Requirements in High-Performing States

	CA	IA	ME	MA	MD	MN	OR	PA	MI
Required Recycling/ Waste Diversion Target	75%	25–50%		None	10–20%	25–50%			None
Required local program			✓	None		✓	✓	✓	None

SOURCES: State of Pennsylvania 2010; State of Iowa 2013; Minnesota Statute 16A.531; State of Maine 2012; Maryland Department of Environment N.d.; Massachusetts Department of Environmental Protection 2011; CalRecycle 2012; Oregon Department of Environmental Quality N.d.; Michigan DEQ 2007.

- In Minnesota, counties must provide at least one recycling center and sites for collecting recyclable materials that are located in convenient areas, provide for recycling of problem materials and major appliances, and ensure that materials collected are taken to market for sale or taken to processing centers. Counties can license for collection of recyclable materials. Cities with 5,000 or more residents must have curbside, centralized drop-off, or a local recycling center for at least four broad types of materials, and offer at least monthly pick-up of at least four broad types of materials.
- In Oregon, the state has designated "wastesheds" (usually counties) that are required to have recycling depots available to residents and businesses, and cities with a population of 4,000 or more must offer monthly curbside recycling to garbage service customers.
- In California, Act 939 of 1989 required cities, counties, and regional agencies (if applicable) to develop a source reduction and recycling element in their integrated waste management plan that results in a diversion of 50 percent of all solid waste from landfill disposal. An update to this legislation, AB 341, increased the state and local diversion target to 75 percent (CalRecycle N.d.).
- Pennsylvania's Act 101 requires larger municipalities (10,000 or more residents, or a population of more than 5,000 with a density of more than 300 people per square mile) to pass an ordinance or other regulation that requires the separation and collection of at least three materials through a municipal recycling program that provides curbside pick-up at least once per month. The ordinance applies to residential and commercial customers (unless a commercial customer can demonstrate it contracts separately for recycling). The Act set an initial local recycling goal of 25 percent, which was later raised to 35 percent (State of Pennsylvania 2010).
- Maine also requires curbside recycling in communities with 10,000 or more people, and requires local programs to provide commercial recycling as well. The state estimates that 98 percent of its residents are served by local recycling programs, either drop-off or curbside (State of Maine 2012).

Michigan currently has no requirements for local communities to provide recycling programs.

Waste Bans

Waste bans serve as another mechanism for essentially requiring recycling among residents and businesses. Many states ban hazardous or problematic materials (including electronic waste), and many, including Michigan, ban yard waste from landfill disposal.

Massachusetts has an aggressive waste ban (as opposed to a local recycling requirement) that prohibits disposal of traditionally recycled materials including paper, cardboard and paperboard, glass and metal containers, food waste, and single resin narrow-necked plastics. The comprehensive waste ban has resulted in the need (and market response) for local recycling programs, and the state estimates that about 90 percent of its population is served by curbside or drop-off recycling opportunities (Fischer 2012).

Connecticut, North Carolina, and Wisconsin are other states with waste bans that prohibit disposal of certain materials. All three states have broad bans on the disposal of aluminum containers, corrugated paper, plastics #1–#7, foam packaging, glass containers, magazines, newspaper, office paper, steel

WISCONSIN WASTE BAN

Beginning in 1995, Wisconsin has banned certain materials from disposal in state landfills. Currently banned items include plastic, metal, and glass containers, paper, cardboard, yard materials, vehicle components, appliances and electronics. After the first five years of banning common recyclable items, the state found that recovery of steel, aluminum, and glass containers was over 50 percent, cardboard over 70 percent, and newsprint over 65 percent. This accounted for over 850,000 tons of waste diverted from the state's landfills (Wisconsin DNR N.d.).

containers, bi-metal containers, waste tires, oil filters, and oil absorbent materials in landfills (North Carolina Department of Environment and Natural Resources N.d.; Wisconsin DNR N.d.; Connecticut Department of Environmental Protection N.d.).

In addition to statewide bans, many communities have passed ordinances that ban certain materials from landfill disposal. A 2007 study of waste management programs in 19 communities in North America found that 15 of the communities had waste bans in place, and that enforcement of the bans is done at both the landfill and the curbside through fines, tagging garbage that has banned material with "no pickup" stickers and leaving it for the following week (Skumatz et al. 2007).

Michigan currently bans disposal of bottle bill materials and yard waste, but not other potentially recyclable materials.

Commercial Recycling

While there has been significant focus on providing curbside recycling to residents, many states and communities have ignored or struggled to accommodate the commercial sector in their recycling efforts. The commercial sector generates a large share of the solid waste in the United States. According to the U.S. Environmental Protection Agency, annual commercial and institutional (such as schools or hospitals) waste generation is approximately 35 to 45 percent of the waste stream (U.S. EPA 2011). Individual states have estimated their commercial waste at an even higher share of the overall waste disposal. A waste characterization study conducted in California, for example, found that nearly three-fourths of the solid waste in California comes from the commercial sector (Cascadia 2009).

Of the eight high-performing states evaluated, four require commercial recycling at the local level (California, Maine, Massachusetts, and Pennsylvania).

- California's updated recycling act requires any business that generates four or more cubic yards of commercial solid waste per week or a multifamily residence of five or more units to arrange for recycling services (State of California General Assembly 2011).
- In Maine, local recycling programs also serve commercial businesses, and two-thirds of the recycled materials in the state come from commercial/business efforts (Macdonald 2012).
- Massachusetts' waste ban applies to both residential and commercial waste generators, so commercial entities are required to self-haul or contract for recycling, or in some cases are served by municipal programs (Fischer 2012).
- Pennsylvania requires any community with mandated recycling (populations over 10,000 or population density greater than 300 persons per square mile) ensure that commercial entities recycle aluminum cans, corrugated cardboard, office paper, and leaf waste, at a minimum (Pennsylvania Department of Environmental Protection N.d.).

Other states, such as North Carolina and Rhode Island (as well as the District of Columbia) have also implemented commercial recycling requirements, and numerous cities throughout the United States have local commercial recycling requirements and programs (District of Columbia N.d.; North Carolina Department of Environment and Natural Resources N.d.).

Other than beverage containers recycled through the bottle bill return system, there is no specific commercial recycling program in Michigan. Anecdotally, it appears that few municipal recycling programs are serving the commercial sector, although there are some examples of existing and growing programs. Ann Arbor, Grand Rapids, Lansing, and Emmet County are among the communities that offer commercial recycling (on-site collection) through the municipality or a municipal contracted service. Given the significant share of the waste stream the commercial sector generates, increasing commercial recycling and reducing waste are likely to be important factors in Michigan's effort to increase overall

The City of Lansing began a pilot program in 2012 to provide 96-gallon recycling carts for about 75 of its local businesses to participate in the city's municipal recycling program. Businesses are charged $47 each quarter for weekly recycling pick up, and the city hopes to expand the program to more businesses in coming years.

recycling and achieve the state's Solid Waste Policy of 50 percent waste utilization.

Enforcement of Recycling and Waste Diversion Policies

All of the high-performing states have the ability to legally enforce provisions of their recycling statutes and require compliance on the part of local communities, waste generators, or disposal facilities. While enforcement is not a major focus of most states' comprehensive recycling programs, Iowa, Maryland, and Massachusetts all have fairly strong enforcement mechanisms for their programs.

- In Massachusetts, the state enforces its waste ban by inspecting disposal facilities and issuing notices of noncompliance and then financial penalties if necessary. It is the responsibility of the facilities to work with haulers and waste generators to ensure that banned materials are not brought to the facility for disposal.
- Iowa requires solid waste planning areas that are not meeting the state's interim 25 percent waste diversion goal to draft and implement local PAYT recycling ordinances, notify the public of its failure to meet the goal, and provide a comprehensive recycling education program for its residents and businesses, including a one-day commercial sector seminar (State of Iowa 2013).
- Maryland's Recycling Act stipulates that if a jurisdiction is not meeting recycling targets, the state can prohibit the local government from issuing building permits for all new construction, although this enforcement mechanism has never been used (Mrgich 2013).

In some states the best compliance mechanism has turned out to be incentives. In Oregon, for example, wastesheds are eligible for a 6 percent credit toward their required 50 percent MSW recovery goal by meeting their recycling target (Spendelow 2012). Iowa utilizes variable state landfill tipping fees depending on a planning area's level of compliance with the state's waste diversion goals. If a community is not meeting the interim 25 percent diversion goal in Iowa, it pays a tonnage fee of $3.30 per ton to the Iowa DNR. If a community meets the interim 25 percent target but does not meet the 50 percent goal, it pays $2.10 per ton to the DNR. In planning areas that are meeting or exceeding the 50 percent goal, the landfill tonnage fee drops to $1.95 per ton (State of Iowa 2013).

Making Michigan a Top Performer for Waste Diversion

RECOMMENDED ELEMENTS OF A COMPREHENSIVE RECYCLING PROGRAM

If other states are successfully setting and meeting recycling goals and realizing the significant environmental and economic benefits that accompany greater recycling, how can their best practices be applied in Michigan to help the state become a top performer and reap similar benefits? The previous chapter evaluated common successful elements of high-performing states' waste diversion and recycling programs. The analysis reinforced the findings of more than a decade's worth of studies on Michigan's recycling performance and options for improving its recycling program.

The question now is where Michigan should invest its limited resources to attain the best and most cost-effective waste diversion and recycling operation. Based on best practices in high-performing and bottle bill states, Michigan's 2007 Solid Waste Policy, and program options identified in previous papers (such as the MRC's *A Way Forward*), an improved system of comprehensive recycling in Michigan would include:

- Statewide waste diversion leadership and program administration
- Local (public and private) collection and processing of recycled materials

Specific statewide and local program elements and potential costs are identified and discussed below and shown in Exhibit 12. In making recommendations, PSC assumed that the state desires and plans to pursue its 2007 Solid Waste Policy goals of 50 percent waste utilization and will implement policy and investment measures that expand local curbside and drop-off recycling access regardless of whether a bottle bill or non-bottle bill approach for collecting recyclable materials is used. For the purposes of this analysis, PSC has assumed a Michigan recycling rate of 35 percent, with the remaining 15 percent of waste utilization made up of source reduction and reuse. A 35 percent recycling rate would be comparable to the median rate of the 20 high-performing states shown in Exhibit 4.

Statewide Leadership and Program Administration

Achieving greater recycling and overall waste diversion performance will require investment at the state level for leadership and administration efforts. The state's role in creating a strong cultural ethic for recycling, helping to address market failures that make waste disposal cheaper than recycling, encouraging greater participation, and tracking and articulating the economic and environmental benefits to Michigan is critical. While the state is largely the focus of the efforts described here, there are significant opportunities for some of the statewide leadership elements to be provided by other public, private, or nonprofit partners as well.

KNOW WHERE YOU ARE: Tracking and Measuring Progress

In order to track recycling and waste diversion progress and make adaptive program changes over time, Michigan should implement a simple, low-cost recycling data tracking and reporting system. The ReTRAC model used by Pennsylvania would be easy to use for the state as well as local reporting partners in Michigan, and could be administered by either the state or a third party with relative ease. The potential cost of a data tracking system is about $30,000, plus some additional staff time, based on an estimate for Michigan provided by ReTRAC (Ronson 2013).

KNOW WHERE YOU WANT TO BE: Setting and Pursuing Aggressive Goals

Michigan has a strong waste utilization goal in its 2007 Solid Waste Policy, but the policy does not have teeth. As described in the previous chapter, there are benefits of having goals or targets incorporated into law, including greater ability to enforce recycling efforts. As with most of the high-performing states, Michigan's waste utilization and/or recycling target should be included in statute to better ensure compliance and progress.

KNOW HOW TO GET THERE: Making Investments and Implementing Strong Policies

In improving Michigan's waste diversion performance, the state could pursue a system that moves away from the bottle bill approach and focuses efforts to expand recycling at the community level (community-based, non-bottle bill system), or it could continue to maintain a system with both bottle bill and community recycling (dual recycling system). As this study shows, strong recycling performance can be achieved under both approaches as long as there is concurrent leadership and investment in broader recycling efforts at both the state and local levels. In some cases, the state-level program elements below and their costs are slightly different under a dual recycling versus a community-based, non-bottle bill approach.

- **Michigan should identify and implement a dedicated source of funding** that is sufficient to support the state's recycling leadership and administration role, and will help the state achieve its recycling and waste diversion targets. Several of the revenue sources used in high-performing states could be applied in Michigan. For example, fees charged on the sale of certain products (such as tire fees in Maine and Maryland) could generate revenue for the state's recycling efforts. Previous studies on Michigan's recycling programs have also considered opportunities for a one-cent sustainability transaction fee (sometimes called the "penny plan") on all transactions of goods that cost more than two dollars. Potential revenue generation from this source has been estimated to be about $42 million (MRC 2011). A 2009 public opinion survey conducted by PSC found that almost half (49 percent) of respondents strongly favored the idea of a penny fee to support statewide recycling (PSC 2009).

  Tipping fees are the most commonly used, and at least in small measure ($0.37 per ton), this funding source is already used in Michigan to help fund solid waste permitting and management programs. The 2003 Beverage Container and Recycling Task Force recommended that Michigan initiate a $3 per ton surcharge on municipal and commercial waste disposed in landfills and use the funds to create a Recycling Works! Fund that would support state and local recycling efforts (Michigan Beverage Container and Recycling Task Force 2003). The funding could be a special revenue stream or general funds, as long as it is sufficient and consistently dedicated for recycling activities.
- **Michigan should have 8–10 additional state staff dedicated to recycling and waste diversion program efforts.** Under a dual recycling system, the state would continue to need about ½ FTE at the Department of Treasury for bottle bill administration. The range of 8 to 10 additional staff at the DEQ is based on an average of 7.5 FTE in bottle bill states, and 9.7 staff in non-bottle bill states. The related, estimated costs for additional staff at these levels would be between $1.1 million and $1.4 million respectively.
- **Michigan should provide financial support (either performance-based or by population size) to local communities** to help build and maintain necessary recycling infrastructure and programs. However allocated, the funding should be predicated on local recyclers (public or possibly private) meeting minimum program requirements (such as curbside collection, recycling of a wide variety of materials). Based on an average expenditure of $1.35 per capita (see Exhibit 10), the potential cost for this program element would be about $13 million. Over time, local recycling programs could become more self-sustaining (depending on the market for recycled materials), but state investment in the next five to ten years, in particular, will be necessary to shift the momentum and help build local capacity.
- Enthusiasm for recycling, as well as pressure to recycle, needs to be bolstered among Michigan residents and businesses statewide. **In order to accelerate behavior change, Michigan should undertake a statewide recycling outreach and education effort** like those done in

Pennsylvania, Minnesota, Maine, California, or Georgia. Costs for outreach and education will be highest in the next three to five years, as renewed effort is put into changing recycling behavior. If the state chooses to replace the bottle bill with other comprehensive recycling legislation, these short-term costs will be significant because substantial advertising and marketing (such as radio, television, or billboard ads) will likely be required. The potential costs for short-term outreach and education efforts range from about $300,000 (based on Minnesota and Maine's expenditures in the early years of their recycling programs) to as much as $2 million (based on average per capita in Pennsylvania and California). In later program years, outreach and education could be built into state staff responsibilities or provided by local communities with support from the state (as is currently done in many of the high-performing states).

Outreach and education efforts could be undertaken by the state, or could be part of a partnership with other private or nonprofit partners.

- Michigan should implement strong recycling policies. **The state should seek legislation that either requires local recycling programs or institutes a broad waste ban, and that requires commercial recycling.** These types of policies would help expand access to recycling, as well as the volume and types of materials collected throughout the state. If local program requirements similar to those used in high-performing states were implemented in Michigan (curbside programs for populations of more than 10,000 people or population density greater than 300 people per square mile), approximately 75 percent of the state would be covered by such programs (Csapo 2013).

  However, Michigan is limited in its ability to require local recycling programs because of the Headlee Amendment, which outlaws unfunded mandates on local governments. In order for Michigan to put local recycling program requirements in place, the state would need to provide local communities with adequate funding for those programs. Thus, Michigan may need to rely more on local incentives or waste bans rather than requirements for local recycling programs (Michigan Beverage Container and Recycling Task Force 2003). These policies could be a replacement for the state's bottle bill or be implemented as additional recycling policies.

  If the state maintains its dual recycling system, PSC recommends maintaining the current model rather than expanding the bottle bill system to cover additional material types. While an expansion would likely significantly increase the collection of those materials, evidence from some studies suggests that this could further deplete recycled material volume and value from local recycling programs. Such a loss could substantially drive up recycling costs per ton and make it very expensive to offer local recycling programs for other materials. In addition, an expansion of the system would increase the volume of materials that retailers must collect and store, posing additional expenses for retailers that already pay a disproportionate share of bottle bill costs (Stutz and Gilbert 2000; Fullerton and Miller 2010).

The total estimated costs for the recommended statewide leadership and administration program elements described above would be between $14.8 million (under a dual recycling system) and $16.5 million (under a community-based, non-bottle bill system).[6]

Overall projected costs for state-level leadership investments are comparable between the two types of systems, but are slightly less under a dual recycling system.

PSC did not include a dedicated market development effort as one of the recommended program elements because there was not agreement among staff in high-performing states about the value and importance of these programs (although most states, including Michigan, have some staff time focused on market development work). Nevertheless, PSC believes the state should further evaluate whether such an effort is warranted as a future phase of Michigan's recycling program to help achieve the state's waste utilization goal. The MRC's *A Way Forward* document recommended that Michigan implement a market development effort, citing the potentially significant economic gains associated with expanded recycling markets, and estimated about $1.4 million for the cost. If Michigan pursues a statewide market development program, it would make the most sense to model the effort on Pennsylvania's Market Center, which has a fairly long track record of success.

6 Costs for the dual recycling system do not include the estimated $10 to $13 million in fraudulent redemption costs in Michigan each year (Durkin 2013).

Local Collection and Processing of Recyclable Materials

In order to achieve greater recycling and overall waste diversion performance, local municipalities and private sector waste management businesses also need to provide recycling leadership and make investments that expand recycling participation in their communities. Several communities in Michigan are successfully operating cost-effective and high-performing recycling systems including Ann Arbor, Grand Rapids, Rochester Hills, Traverse City, Emmet County, and SOCRRA and RRRASOC member communities.

KNOW WHERE YOU ARE: Tracking and Measuring Progress

Local governments (perhaps at the county level) should collect data on the volume of recycled materials or other waste utilization (by material type), expenditures, and revenues for their recycling programs and report that information annually to the state. Local governments could utilize the ReTRAC system described above for these efforts (which offers a free account option for individual community tracking), as several communities in Michigan are already doing.

KNOW WHERE YOU WANT TO BE: Setting and Pursuing Aggressive Goals

Michigan communities should consider local ordinances that reflect state recycling targets and requirements (or more aggressive targets if they choose). In high-performing states, many communities have tailored and codified their local programs to meet their specific needs, and Michigan communities should consider opportunities for this as well.

KNOW HOW TO GET THERE: Making Investments and Implementing Strong Policies

As with the statewide leadership and administration elements, there are some differences in "how to get there" under a dual recycling system versus a community-based, non-bottle bill system. At a minimum:

- **Michigan communities should implement local residential recycling programs** that ensure residents and businesses have access to convenient and affordable recycling opportunities (preferably curbside). These programs could be municipally run, but high-performing states and even many Michigan communities that seem to have the highest performance and financial success are generally using municipal contracts or franchise agreements to provide services. This approach reduces local government administration costs and takes advantages of economies of scale for private haulers/collectors.

  Under a dual recycling system, residents would continue to take their UBCs to local retailers for recycling and reimbursement of container deposits.

CASE STUDY:
Recycling in Rochester Hills, Michigan

The City of Rochester Hills contracts with a third party private company for the collection of its garbage and recycling. The city negotiated a rate for its residents ($50/quarter), and the hauler works directly with the residents—providing carts, billing and customer service. The city has only nominal costs for oversight of the contract, tracking disposal and recycling performance, and providing some outreach. The contract also allows the city to share in revenue from the materials sales when the hauler gets more than $30 per ton for the materials (White 2013).

- **Commercial entities should work with their municipalities or a private hauler to establish a recycling program for their commercial businesses**. Where smaller businesses have access to the curb, they should be welcomed to participate in community recycling programs, such as those offered in Lansing and Grand Rapids. Alternatively, commercial businesses could contract individually with their waste hauler to provide recycling services.

  If the state maintains its dual recycling system, commercial businesses would self-haul their bottle bill materials to collection centers as they currently do. A drawback to this approach is that it is an inefficient

collection system, because it requires two totally separate sets of infrastructure and processes to recycle what could be collected through one system.

Little data exists on the average costs of local residential and commercial recycling programs across the United States. For this analysis, PSC applied collection and processing costs and potential material values from two bottle bill states (Maine and Connecticut) and two non-bottle bill states (Minnesota and Wisconsin) to Michigan's population as well as total tons recycled at a 35 percent recycling rate to get a sense of the potential economic costs and/or gains under both a dual recycling and community-based, non-bottle bill system.[7] The predicted costs are estimated based on both per ton and per capita costs.

As evident in Exhibit 12, there is a wide cost differential between per capita and per ton estimates. On a per ton basis, predicted costs varied from $359 million (under a community-based, non-bottle bill system in Michigan) to $698 million (under a dual recycling system in Michigan).[8] On a per capita basis, costs varied from $115 million (under a community-based, non-bottle bill system in Michigan) to $331 million (under a dual recycling system in Michigan). Per capita estimates give a picture of the costs distributed throughout the population, but estimating costs based on population size may not yield the most accurate results because collection expenses such as trucks, carts, and operation time are not strongly related to the number of people in a community (except as a proxy for how much material might be generated).

The potential revenue from materials sales is approximately $537 million under a dual recycling system in Michigan and about $655 million under a community-based, non-bottle bill system in Michigan. In total, net costs or gains for local collection and processing efforts could be between ($161) million in net costs and $540 million in net gains.

Adding bottle bill containers to the local recycling stream would likely reduce the cost per ton to recycle for most Michigan communities because it adds high-value materials like aluminum and increases the overall volume, which drives down per ton costs when there is existing capacity in the system (PSC heard anecdotally during the course of this research that many communities currently have that excess capacity).

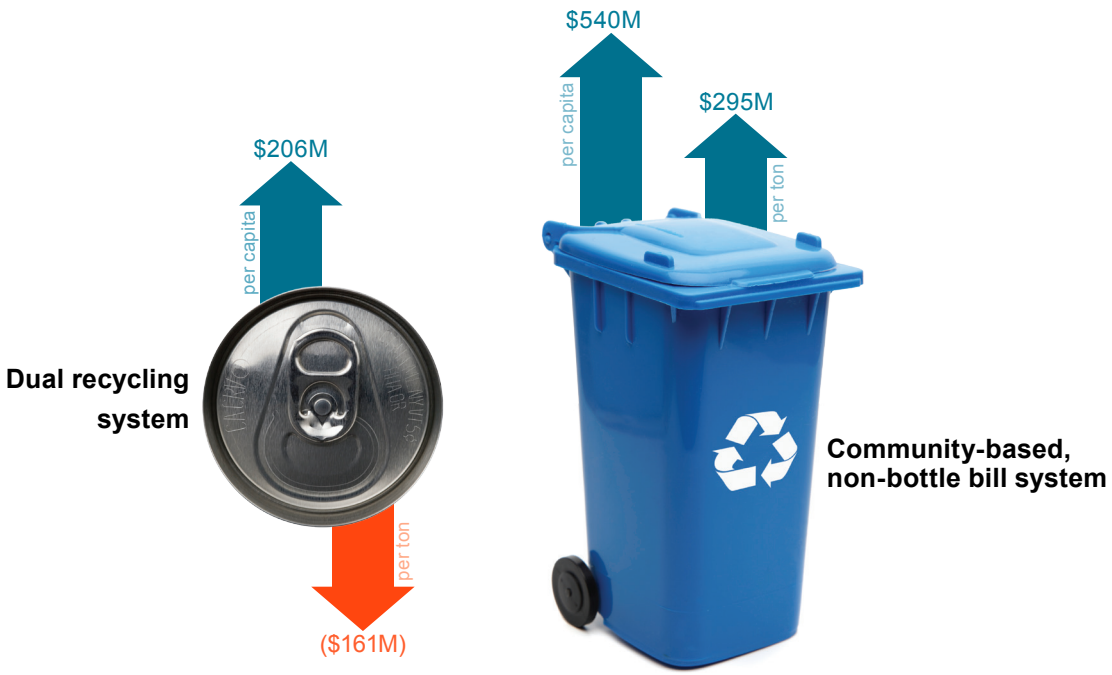
A community-based, non-bottle system has lower predicted collection and processing costs and higher potential revenues than a dual recycling system.

While the costs presented here are not modeled estimates of collection and processing costs, and there is a significant difference in potential costs between per capita and per ton measures, the data does tell us something clearly: ***predicted costs are substantially lower under a community-based, non-bottle bill system and predicted revenues are substantially higher regardless of which measure you use.*** This finding is in line with the intuitive assumption that operating two separate recycling systems is generally less efficient than operating a single comprehensive system.

7 Appendix 2 provides a detailed discussion of how statewide leadership and administration and local collection and processing costs and revenues were generated by PSC.

8 The collection and processing costs under the dual recycling system include both local community collection costs of $113 per ton for non-bottle bill materials, as well as costs to recycle the approximately 270,000 tons of bottle bill containers in Michigan. Estimated recycling costs for these bottle bill containers is $640 per ton (Stutz and Gilbert 2000), more than five and a half times greater than the average cost to recycle materials under a local community collection system. See Appendix 2 for more details on how potential costs and revenues were calculated.

EXHIBIT 12. Comparison of Net Costs (or Gains) of Recommended Local Recycling Elements Under Dual and Community-based, Non-Bottle Bill Recycling Systems



SOURCE: Calculated by PSC based on average cost and material revenues in Connecticut, Maine, Minnesota, and Wisconsin. See Appendix 2 for a detailed description of cost calculations.

BOTTLE BILL OR NO BOTTLE BILL?

The recommended comprehensive recycling system described above could be accomplished under either a dual recycling system or community-based, non-bottle bill system, and differences in program elements and costs between the approaches have been identified. There are benefits and drawbacks to maintaining Michigan's bottle bill system as well as replacing it with a more comprehensive community-based, non-bottle bill recycling system. Following are some of the key issues to consider in choosing between these approaches:

- **Efficiency and convenience of collection system.** Under a community-based, non-bottle bill approach, all recyclable materials in a community are collected through one system rather than having to operate and maintain separate collection and processing of bottle bill materials and other materials. At a system-wide level this is more efficient for both recycling providers (which collect all materials with the same set of trucks and/or drop-off facilities) and consumers (who don't have to separate bottle bill materials and don't experience the extra costs or the inconvenience of transporting beverage containers to retail centers). Consumers could take their recycling to a single location, generally as close as their curb. Studies have documented greater efficiencies of single community systems (Fullerton and Miller 2010; DSM May 2009).

  A community-based, non-bottle bill approach may also be more efficient because it directs limited state and local resources to the collection systems that already recycle the vast majority of materials in Michigan. In 2011, just over 4 billion bottle bill containers were sold in Michigan, which constitutes about 16 percent of Michigan's current recycling stream (see Exhibit 1). When Michigan is achieving 35 percent recycling, those same 4 billion containers could make up a maximum of only 6 percent of the total recycled stream. Maintaining an expensive bottle bill collection system for just those containers is inefficient, assuming an increase in overall recycling rates.

- **Health and safety concerns.** Passage of the bottle bill has resulted in decreased health and safety risks associated with sharp litter (glass or metals) and harm to farm animals. The 2000 *Michigan Bottle Bill* report

estimated over $27 million in injury reduction and farm damage prevention benefits from Michigan's bottle bill (Stutz and Gilbert 2000). However, these benefits are at the expense of other health and safety costs associated with UBC returns in retail outlets, including costs to control the introduction of pests and bacteria into businesses that sell food, and the health and safety of workers handling UBCs. A 2004 study showed that retail workers involved in processing used beverage containers had sufficient exposure to mold, fungus, and particulate matter from the containers to cause increased respiratory conditions and congestion (Kennedy et al. 2004).

- **Controlling litter.** The bottle bill was designed to help reduce litter in Michigan, and removing the financial incentive to recycle these materials would likely mean that individuals will not make a separate effort to collect these materials from roadsides, parks, or other public locations as they currently do under Michigan's bottle bill system. Therefore, maintaining a dual recycling system would continue to help control litter in the state and reduce the associated human and animal health risks (such as injury or illness from ingestion of garbage) from littering of those materials.

  However, many states have implemented successful litter reduction outreach and education campaigns that target all litter, not just bottle bill materials, and this type of effort could help address the potential for increased litter under a non–bottle bill system. A study by the Institute for Applied Research in 2003 found that Michigan's bottle bill was the most expensive of five potential litter control programs (such as advertising or paid litter pick-up), and only addressed a narrow portion of the state's litter (Michigan Beverage Container and Recycling Task Force 2003). In fact, non-covered materials such as plastic water and juice bottles, paper, cardboard, and cigarette butts are all significant contributors to litter problems. A 2011 study in Maryland documented that the percentage of beverage containers in overall litter ranges from 4 percent to 21 percent (University of Maryland Finance Center 2011).
- **Escheat funds for environmental program support.** The state currently reserves about $12 million in bottle bill escheat funds which are used to fund state remediation and wetland protection programs. Elimination or substantial modification of the bottle bill system will reduce an important source of funding for these environmental programs. Replacement costs for these programs will have to be considered and implemented if any significant changes to the bottle bill are pursued.
- **Changing hearts and recycling behaviors.** The bottle bill has been very popular in Michigan. Residents are already in the habit of recycling bottle bill materials and currently recycle almost all bottle bill containers (97 percent). Maintaining the current bottle collection system would likely continue to yield high return rates for these containers.

  However, under Michigan's current dual recycling system, recycling of non-bottle bill materials is very weak and there is a lack of a comprehensive recycling culture throughout the state. While this is certainly due in large part to lack of recycling access, it is likely that some people think because they return bottle bill materials they are doing all that they need to do in terms of recycling. After making efforts to recycle these materials, people may be less motivated to participate in other recycling efforts.

  Making any changes to a system that has been well liked and successful for some portion of recyclable materials would require a significant outreach and education effort, particularly in the early years. Presuming any potential changes to the bottle bill system, if implemented, would occur in conjunction with expanded local recycling programs (by, for example, phasing out the bottle bill system over time as local capacity increases), emphasis on increased convenience and accessibility of recycling at the local level and reduced costs for consumers purchasing those products will be a key tool in changing hearts and minds of Michigan residents.
- **Existing infrastructure for some of the system.** Bottle bill collection systems and infrastructure are already in place and would not need significant changes or funding, only ongoing maintenance and reinvestment. Some community infrastructure is already in place for some of the state's localities, including drop-off centers, curbside collection infrastructure (such as trucks and bins), and existing local outreach and

education systems. These programs and systems would need to be significantly expanded to achieve Michigan's 50 percent waste utilization goals.

- **Inequitable distribution of bottle bill material recycling costs.** Under the current bottle bill configuration, retailers and distributors pay almost all the costs to collect those materials and consumers who return their UBCs do not contribute to paying for bottle bill recycling expenses. Retailers pay the largest share of the bottle bill system costs (estimated by Stutz and Gilbert at just under $95 million a year), and receive only a very minor offset of those costs from the state's payment of a portion of the unclaimed deposit funds ($4.5 million distributed among almost 2,500 stores). Distributors also bear a significant share of the system costs, with estimates of 20 to 30 percent increased transportation fleet costs, but they own the value of the UBCs and the sale of those materials provides a significant offset for their costs depending on current material prices.
- **Value and volume of bottle bill materials for local recycling programs.** Bottle bill materials include PET plastic; brown, green, and clear glass; and aluminum cans. The value of these materials is mixed, but generally the net value of glass is lower than collection costs, and the value of aluminum and plastic is much higher. Including these materials in local community recycling collection systems rather than bottle bill collection systems could help offset a community's costs for recycling these as well as other materials. It must be mentioned, however, that studies on this impact have been inconclusive. A Massachusetts study showed that the state's bottle bill is a net positive in terms of cost for communities because of the overall reduction in volume (DSM May 2009). Studies in Illinois and Rhode Island, however, found that bottle bill programs are a net financial loss for community recycling programs. Schilling, for example, found that the removal of aluminum from local programs in Illinois would increase household curbside recycling costs by 20 percent (Schilling 2004; DSM May 2009).
- **Fraud in the system.** Under a dual recycling system, bottle bill fraud has been costly for Michigan taxpayers and contributes to the system's cost inefficiencies. One common form of fraud is the return of bottles and cans purchased in other states (where no deposit was paid) to Michigan return centers and collection of the $0.10 deposit for those containers. A recent study estimates that Michigan loses between $10 and $13 million a year on fraudulent redemption of UBCs (Durkin 2013), and there have been similar estimates of loss from fraud in other bottle bill states. Another type of reported fraud is the purchase of bottle deposit beverages with supplemental nutrition assistance program (SNAP) cards that are then dumped and returned for the cash deposit which can be used on non-SNAP eligible products (The Hagstrom Report 2011). Both of these issues are related to the availability of cash payments for returned UBCs, and cost Michigan taxpayers money.

The bottom line is that there are significant advantages and disadvantages to both a bottle bill and non-bottle approach to expanding recycling in Michigan. Many of the disadvantages identified for both approaches could likely be minimized through specific design of the state's recycling program, but there will always be issues to address and challenges to overcome.

Conclusions

Michigan, like most other states, has set broad recycling and waste diversion/utilization goals, but has not invested in what is required to achieve those goals. States with high-performing recycling and other waste diversion programs consistently track their progress so they know where they stand in meeting goals and provide state leadership to their communities by setting and enforcing strong recycling policies, dedicating funding to help support local programs and outreach efforts, and providing technical assistance to communities and private sector recycling entities. After years of falling behind other states in its recycling performance and forgoing the associated economic and environmental benefits associated with greater recycling, it is time for Michigan to make the investment and implement some of the fairly significant policy and program changes required to meet its goals.

The data has shown that there is no single secret to success, but all of the states evaluated in this paper had fairly consistent approaches to their comprehensive recycling programs. Both bottle bill and non-bottle bill states can have high-performing recycling programs, but either system requires support.

Because Michigan would need to make some significant policy, program, and investment changes to meet its recycling and waste utilization goals, it is appropriate to take a step back at this juncture and evaluate whether a bottle bill or non-bottle bill system makes the most sense and which would be the most efficient. Based on best practices and an evaluation of potential costs and revenues, it will likely be more efficient to meet Michigan's 50 percent waste utilization goal by instituting a community-based, non-bottle bill collection system because local programs must be expanded regardless of whether Michigan maintains a bottle system or not. While the state's costs for leadership and administration are slightly higher under a community-based, non-bottle bill system, the estimated local collection and processing costs (which are the major source of Michigan's recycling costs) are substantially lower for this type of system than a dual recycling system, and the revenue potential is higher.

There would be significant challenges accompanying such a change, including public understanding and the need for complementary efforts to reduce litter and ensure funding for other programs that currently depend on unclaimed bottle bill deposits. However, the increased efficiency and improved convenience of such a system would yield many benefits for the state's recycling performance and economy overall. There would also be many beneficiaries of this approach—both public and private—and there may be some significant opportunities for public-private collaboration to fund and support some of the necessary state and local recycling program elements.

"Based on best practices and an evaluation of potential costs and revenues, it will likely be more efficient to meet Michigan's 50 percent waste utilization goal by instituting a community-based, non-bottle bill collection system…"

Regardless of which approach the state pursues in strengthening its recycling programs and performance, the examples from other states discussed in this report offer proven and applicable models for Michigan to adopt.

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Appendix 1:
Calculation of Bottle Bill Material Tonnage

Year 2000—Baseline

	# of Containers Collected	% of Collected Materials	# of Containers/ ton	Total tons
Plastic	627,040,000	16.0%	16,216	38,668
Aluminum	2,625,730,000	67.0%	59,473	44,150
Glass	666,230,000	17.0%	3,593	185,424
Total	3,919,000,000			268,242

SOURCES: Stutz and Gilbert 2000 (number of containers per ton); Michigan Department of Treasury 2012 (number of bottle bill containers collected in 2000).

2011

	# of Containers collected	% of Collected materials	# of Containers/ ton	Total tons
Plastic	629,600,000	16.0%	16,216	38,826
Aluminum	2,636,450,000	67.0%	59,473	44,330
Glass	668,950,000	17.0%	3,593	186,181
Total	3,935,000,000			269,337

SOURCES: PSC calculation based on Stutz and Gilbert 2000 (number of containers per ton); Michigan Department of Treasury 2012 (number of bottle bill containers collected).

Appendix 2:
Description of Potential Costs for Improved Recycling in Michigan

Based on application of best practices from the high-performing states evaluated, as well as recent estimates made by the MRC in *A Way Forward*, PSC has estimated potential costs for expanded recycling in Michigan under both a dual recycling system and a community-based, non-bottle bill system, including common costs for statewide leadership and program administration efforts, as shown in exhibits 13 and 14. It was beyond the scope of this analysis to estimate the potential costs of augmenting or significantly modifying the bottle bill system (such as shifting to a depot versus retail UBC return model).

State Recycling Leadership and Program Administration Costs

Under either a community-based, non–bottle bill or dual recycling system, increased recycling performance in Michigan will depend on greater statewide leadership and investment as described in this report. At a minimum, achieving Michigan's 50 percent waste diversion/utilization goal will require additional staff and costs for data collection and tracking, outreach and education, and technical assistance.

In addition to staff expenses, an expanded recycling program in Michigan will likely require expenditures (contracts, grants, or purchases) for support to local recyclers, outreach and education efforts, and possibly data tracking and market development. Support grants for locals could be based on performance or community size, and help build local capacity

Costs for grants to support local recycling programs were based on an average (from five of the states evaluated that have provided local support funding) of $1.35 per person and applied to Michigan's population of 9,883,640 (U.S. Census Bureau 2012).

Material Collection and Processing Costs

In addition to statewide costs described above, dual recycling and community-based, non–bottle bill recycling systems will require expenditures for material collection and processing. In Michigan and other bottle bill states the bulk of the recycling costs for collection and processing of UBCs is borne by the private sector (bottling/distribution and retail sectors), with residents and local and state governments bearing the costs of recycling all other materials at the curbside or local drop-off centers (through individual fees, taxes, or other public funding).

Bottle Bill Collection and Processing Costs

A 2000 study by Stutz and Gilbert showed costs for retailers to collect and sort bottle bill materials of over $95 million a year. Extrapolating those costs based on current levels of beverage containers sold and returned, PSC estimates current gross costs of approximately $172 million for distributors and retailers combined.

A portion (25 percent) of the state's unclaimed deposits is provided to retailers to help defray their costs, but it is very small percentage of their overall costs. In 2011, for example, retailers' share of the unclaimed deposits was $4.5 million, paid to 2,556 stores (Heideman 2012). If these payments were averaged across stores, disbursements would have been just over $1,600 per store; about 4 percent of their projected costs.[1]

Distributors in Michigan's bottle bill system retain ownership of the UBCs and sell those materials to help defray their collection and processing costs.

1 See Appendix 1 for description of how projected bottle system costs were calculated.

The current market value of the approximately 3.9 billion UBCs returned in Michigan (2011 returns) would be about $67 million, which results in approximately $105 million in net costs for distributors and retailers combined.

Local Community Collection and Processing Costs

Costs for local recycling collection programs are widely variable and depend on many factors, including:

- Population density
- Market conditions/hauler demand
- Volume of materials generated

Most of the states evaluated for this report do not collect recycling program cost information from their local communities. Minnesota is the only top performing state that tracks revenue and expenditures by county, and the average cost per ton to recycle for its counties in 2011 was $73.28 (Vee 2012), with low-volume communities generally paying more per ton to recycle. Maine State Planning Office staff analyzed average costs per ton to recycle at the local level and estimated that the average cost per ton for local communities to offer recycling programs was about $113 per ton (MSPO N.d). Even within a region, costs can vary significantly. In Michigan's SOCRRA recycling system, for example, there is a high-performing community with a significant volume of material whose per-ton costs are about $60. A neighboring SOCRRA community that generates significantly less volume pays about $300 per ton (Csapo 2012).

For the purposes of this analysis, PSC used average per capita ($11.61) and per ton ($73) costs from Minnesota to estimate potential costs for a community-based, non-bottle bill system in Michigan because Minnesota had extensive data for all 87 of its counties and the state has a similar geographic and population density to Michigan. Potential material values were estimated based on a 2011 Wisconsin statewide average of $133 per ton (Wisconsin Department of Natural Resources 2012). These two states provide an example of what costs and materials revenues might be in a high-performing non-bottle bill state, and were used to predict the potential cost in Michigan at a similar recycling rate under a non-bottle system.

To estimate costs for a dual recycling system, PSC used a calculated per ton cost rate from Maine, the only bottle bill state with a readily available per ton cost estimate. Per capita costs under a dual recycling system were calculated based on per capita recycling costs ($16.06) in Connecticut because it was the only bottle bill state with detailed per capita cost data available (Connecticut Department of Environmental Protection 2009). Potential material values were estimated based on a 2011–2012 EcoMaine MRF value of $101 per ton.[2] As with non-bottle bill states, PSC used Maine and Connecticut as examples of potential costs and material revenues in bottle bill states and used them to estimate potential costs in Michigan at a similar recycling rate under a dual recycling system.

PSC recognizes that the four states used as models are a small set of the potential range of per ton and per capita costs across the United States. The purpose of this study was simply to provide a range of costs in other states and provide a sense of what costs might be in Michigan based on best practices in both bottle bill and non-bottle bill states; PSC did not attempt to comprehensively assess or model costs and benefits of recycling in Michigan.

The addition of UBCs to the local collection system would provide additional revenue, particularly from high-value materials such as aluminum. The increased volume could lower the overall cost per ton to recycle, especially for communities with excess current capacity, but could increase collection costs for other communities. Studies on the impacts of a bottle bill program on local net costs are inconclusive. For example, a study done in Massachusetts found that the bottle bill saved an average of $4 million to $5 million in local collection costs each year (Massachusetts Department of Environmental Protection N.d.). However, a study conducted for Rhode Island in 2009 found that implementing a bottle bill in that state would cost local governments over a million dollars in lost net revenue (DSM Environmental 2009), and an Illinois Recycling Association paper estimated that implementing a bottle bill program in that state would cost over three times as much as a curbside recycling program and increase costs to households for curbside recycling by 20 percent (Schilling 2004).

2 EcoMaine is the only MRF in the state of Maine and serves 45 communities in southern Maine (2 of the contracted communities are in New Hampshire communities) (EcoMaine N.d.)

EXHIBIT 13: Extrapolated Costs and Revenues of a Dual Recycling System Based on Comparable States

	Program element	(Cost)/Revenue	
State administration	State staff[1]	($1,120,000)	
	Financial support to local communities for recycling infrastructure and programming[2]	($13,387,917)	
	Outreach and education (materials, advertising)[3]	($300,000)	
	Technology costs for data tracking[4]	($30,000)	
	Subtotal state costs	**($14,837,917)**	
		Based on per ton costs	Based on per capita costs
Local collection (costs)/revenues	Estimated total tons recycled[5]	269,338 (bottle bill); 4,652,334 (all other)	269,338 (bottle bill); 4,652,334 (all other)
	Costs to distributors for bottle bill materials[6]	($73,265,804)	($73,265,804)
	Costs to retailers for bottle bill material[6]	($99,110,206)	($99,110,206)
	Costs to local providers (community or private)[7]	($525,713,742)	($158,731,258)
	Revenue from bottle bill material sales[8]	$66,989,164	$66,989,164
	Revenue from other recycled material sales[9]	$469,885,734	$469,885,734
	Revenue from escheat funds[10]	$4,500,000	$4,500,000
	Revenue from state support grants	$13,387,917	$13,387,917
	Subtotal net collection	**($143,326,937)**	**$223,655,547**
Extrapolated statewide system		**($158,164,853)**	**$208,817,629**

SOURCE: Calculated by PSC based on cost and revenue data from two bottle bill states.
1 Staff includes 0.5 FTE at Department of Treasury (Heideman 2012) and 7.5 FTE (average of bottle bill states evaluated in this study) at MDEQ at an average cost of $140,000 average FTE (PSC 2012).
2 Financial support amounts estimated based on average grant funding per capita of $1.35 per person for the five high-performing states that provide local support.
3 Cost estimated based on the average of Maine and Minnesota recycling education expenditures in previous years of their recycling programs. These two states had the most modest outreach funding costs of the four states who have provided dedicated outreach expenditures such as advertising campaigns. Maintaining a dual system will require some additional, dedicated education funding in order to expand awareness and participation in local recycling, but less outreach than would be required with a major program shift away from the current bottle bill system.
4 Based on estimate provided by ReTRAC for annual cost for online tracking through ReTrac Connect Leader program.
5 Total tons recycled based on 2011 landfilled amount (11,952,633 tons), estimated total 2011 waste generated using 14.5% recycling rate (14,061,921), and assuming an overall increase of recycling to 35% (4,921,672). Bottle bill materials make up 269,338 of the total 4.9 million tons.
6 Costs based on 2011 bottle bill tonnage returned (269,338) multiplied by $640/ton (unit cost published by Stutz and Gilbert 2000). Bottle bill collection costs are borne 43% by distributors and 57% by retailers (Stutz and Gilbert 2000).
7 Calculated based on Maine's average cost of $113 per ton and Connecticut's average cost of $16.06 per capita.
8 Bottle bill material revenues of $66,989,164 estimated based on recent material sales prices for aluminum, plastic, and glass provided by Csapo (2013) and Smith (2013). Total calculated price per ton is $243.
9 Based on average EcoMaine MRF values for 2011–2012 of $101/ton.
10 In 2011 the State of Michigan paid $4.5 million in eschaet funds to retailers to help offset their collection costs.

Newly developed local programs would be impacted more by the greater associated costs with a higher volume of curbside and drop-off materials, because many current programs have existing capacity and the increased volume of materials only helps to drive down their cost per ton to collect them. Exhibits 13 and 14 summarize potential costs and revenues of both a dual recycling and community-based, non-bottle bill system based on the sources and calculation methods described above and in the main report. The costs include state investments and local collection and processing costs. Revenues include the sale of materials and funding from the state (escheat and new grants or allocations).

EXHIBIT 14: Extrapolated Costs and Revenues of a Community-based, Non-Bottle Bill System Based on Comparable States

	Program element	(Cost)/Revenue	
State administration	State staff[1]	($1,358,000)	
	Financial support to local communities for recycling infrastructure and programming[2]	($13,387,917)	
	Outreach and education (materials, advertising)[3]	($1,670,000)	
	Technology costs for data tracking[4]	($30,000)	
	Subtotal state costs	**($16,445,917)**	
		Based on per ton cost	Based on per capita cost
Local collection (costs)/revenues	Estimated total tons recycled[5]	4,921,672	4,921,672
	Costs to local providers (community or private)[6]	($359,282,076)	($114,749,060)
	Revenue from material sales[7]	$654,582,413	$654,582,413
	Revenue from state financial support grants	$13,387,917	$13,387,917
	Subtotal revenues	**$667,970,329**	**$667,970,329**
	Subtotal net collection	**$308,688,253**	**$553,221,269**
Extrapolated statewide system		**$292,242,336**	**$536,775,353**

SOURCE: calculated by PSC based on cost and revenue data from two no-bottle bill states.
1 Staff includes 9.5 FTE at MDEQ at a cost of $140,000 average FTE (PSC 2012).
2 Dinancial support amounts estimated based on average grant funding per capita of $1.35 per person for the five high-performing states that provide local support.
3 An aggressive outreach campaign would be needed for first few years post-bottle bill system change to educate people about opportunities to recycle, recycling requirements, and litter abatement. Cost estimated based on what Maine and Minnesota invested in early years of their recycling programs.
4 Based on estimate provided by ReTRAC for annual cost for online tracking through ReTrac Connect Leader program.
5 Total tons recycled based on 2011 landfilled amount (11,952,633 tons) , estimated total 2011 waste generatedusing 14.5% recycling rate (14,061,921), and assuming an overall increase of recycling to 35% (4,921,672).
6 Calculated based on Minnesota's average cost of $73 per ton and $11.61 per capita for its 87 counties as reported in their 2011 SCORE report.
7 Based on average 2012 MRF valuesin Wisconsin for 2012 of $133/ton.

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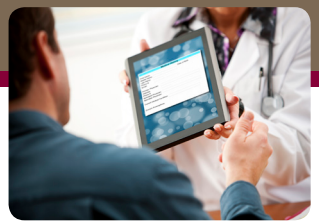

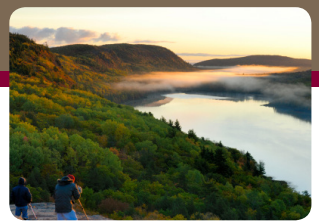

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