

## **Envisioning Alternate Take-Back Models for Mattresses in Rhode Island**

### **Executive Summary**

*Mattresses are costly for taxpayers, municipal governments, and the state of Rhode Island. This paper examines the current costs associated with mattress collection, the benefits of applying a product stewardship model, an array of financial and legislative options for implementing such a program, and a set of goals for future take-back models. Based on an analysis of these goals, producers have been identified as among the most effective parties to ameliorate problems associated with mattress collection and recycling. Producers currently play no role in the end-of-life management of this waste stream. As a result, this paper concludes with a model for an optimal take-back program in which a producer-funded third party stores and transports mattresses to recycling facilities and also finances existing retail collection programs.*

### **Current Issues Associated with Mattress Disposal and Recycling**

#### *Expense to Municipalities*

Mattresses are one of the most difficult and expensive waste streams municipalities handle: They cannot be landfilled or blended with other solid waste because air pockets trapped within the mattresses cause them to rise through the fill layers, displacing other trash. Mattresses have therefore been targeted by municipalities as a high-priority issue. Of municipalities that contributed data to this study, mattress hauling and disposal constitutes an average of 3.7% of their solid waste budgets (Table 1). Many of these mattresses have been dumped on the curb, rather than collected by retailers or paid for by citizens who bring them to designated collection sites. Municipalities absorb nearly all costs associated with mattress hauling and disposal not covered by retailers operating their own take-back programs: They operate designated drop-off locations, pay the Rhode Island Resource Recovery Corporation (RIRRC) a \$10 tipping fee for every mattress delivered as part of a segregated load and \$50 per mattress delivered as an unsegregated load, and pick up mattresses left on the side of the road. Beginning on August 1, 2011, the City of Providence will charge residents \$20 per mattress for scheduled pick-ups and will fine property owners \$50 to \$500 for mattresses and box springs left on the curb without a scheduled pick-up.<sup>1</sup>

#### *Expense to the State*

Mattresses cost Rhode Island Resource Recovery Corporation (RIRRC) \$350,000 per year, a cost that RIRRC does not fully recover through tipping fees.<sup>2</sup> As a result of the

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<sup>1</sup> “Throwing out an old mattress set?” *Providence Department of Public Works*. Online. Available <http://cityof.providenceri.com/DPW/throwing-out-an-old-mattress-set>. 12 June 2011.

<sup>2</sup> Kite, Sarah. Director of Recycling Services, Rhode Island Resource Recovery Corporation. Personal Interview. 16 June 2011.

mattresses' bulk and buoyancy, landfills have strong incentives to refuse these items. According to a Brown University analysis, a landfill loses approximately \$50 in opportunity costs when it buries a mattress instead of other, more compactible trash.<sup>3</sup> Currently, mattresses in Rhode Island that are brought to the Central Landfill in Johnston, RI, are shipped by RIRRC to Conigliaro Industries, a recycling facility in Framingham, MA. Each resident or municipality that brings mattresses to the Landfill must pay a \$10 tipping fee per mattress in order to cover the costs associated with disposing of the mattress. However, this fee is not sufficient to cover the full costs of the mattress disposal: During FY2010, RIRRC spent \$350,000 to recycle nearly 35,000 mattresses with Conigliaro Industries, losing \$2-3 per mattress or box spring for labor and handling costs.<sup>4</sup> When the \$2-3 per mattress labor and handling costs are included, the total cost to RIRRC becomes closer to \$437,500. As a result of the discrepancy between the tipping fees it collects and the full costs of labor, hauling and recycling, RIRRC fails to break even in its attempts to properly handle and recycle mattresses.

### *Public Health Concerns*

Although studies have not been done to conclude the health risks associated with mattresses in Rhode Island, health concerns associated with this waste stream include the spread of mold and bed bugs. To date, Rhode Island residents have come into contact with bed bugs at hotels, homeless shelters, and hospitals, leading to concerns over their continued presence in the state.<sup>5</sup>

### **Municipal Costs Associated with Mattress Hauling and Disposal**

Municipalities take different approaches to the ways that they collect and dispose of mattresses. The majority contracts with RIRRC in some fashion, paying either the \$10 (as part of a segregated load) or \$50 (as part of an unsegregated load) tipping fee per mattress delivered. Municipalities can contract with multiple parties to coordinate pick-up and disposal: The City of Providence, for example, contracts with Waste Management for appointment pick-ups, but with RIRRC for segregated disposal for mattresses collected from vacant lots.<sup>6</sup> The hauling and disposal costs that the municipalities (through taxpayers) absorb can constitute significant portions of the municipalities' waste hauling budgets, as calculated below.

### *Central Falls*

In FY2009/2010, Central Falls spent 3.6% of its total solid waste budget on mattress disposal. The city disposed of 363 mattresses at a total cost of \$18,163.16 (\$9,075 for vehicle costs, \$3,564 for labor costs, and \$5,523 for disposal costs with RIRRC). It charges residents \$15.00 to dispose of a mattress or box spring. In the same year, Central Falls spent \$503,594 on

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<sup>3</sup> Ernst, Max, Ben Heller, Dan Rome, and Kiana Ward. *Extended Producer Responsibility: An Innovative Paradigm for Mattress Disposal*. Rep. Print. 7.

<sup>4</sup> Kite, Sarah.

<sup>5</sup> Salit, Richard. "Bedbugs on the rise in R.I." *The Providence Journal*. 30 September, 2010. Online. Available [http://www.projo.com/news/content/BEDBUGS\\_IN\\_RI\\_09-27-10\\_U2JUMP4\\_v58.1ed252c.html](http://www.projo.com/news/content/BEDBUGS_IN_RI_09-27-10_U2JUMP4_v58.1ed252c.html). 12 July 2011.

<sup>6</sup> Brickle, Lindsey. Policy Analyst, Executive Office, City of Providence. Personal Interview. 23 June 2011.

its total solid waste disposal program.<sup>7</sup> Thus, mattress disposal and hauling accounted for 3.6% of its total solid waste budget ( $18,163/503,594=0.036$ ).

### *Woonsocket*

During FY2010, Woonsocket spent 1.1% of its total municipal solid waste budget on mattress disposal. The city pays RIRRC \$250 per ton of segregated mattresses. It collected 40 tons of segregated mattresses within the last 12 months, paying a total of \$10,000 to RIRRC. It also pays Waste Management \$1,750 per month to pick up these mattresses. Thus, the cost of hauling (\$1,750 per month) and disposal (\$10,000 annually) equals \$31,000 per year. Woonsocket's total waste management budget for FY2010 was \$2,732,126; as a result, the city spent 1.1% of its total municipal waste budget on mattresses ( $31,000/2,732,126=0.011$ ).<sup>8</sup>

### *North Smithfield*

During FY2011, North Smithfield also spent 1.1% of its solid waste budget on mattress disposal. The city offers separate mattress pickups (170 pickups during FY2011) which cost the community \$6,817. This figure includes labor and gas costs for the pickups (\$4,250), labor and gas costs for 37 trucks to haul the mattresses to RIRRC (\$2,220), tipping fees paid to RIRRC (\$2,047), minus the mattress fees collected from residents (\$1,700). During FY2011, North Smithfield's total solid waste budget was \$600,000.<sup>9</sup> As a result, the city spent 1.1% of its municipal waste budget on mattresses ( $6,817.50/600,000=0.0114$ ).

### *Burrillville*

During FY2011, Burrillville spent a relatively small 0.77% of its solid waste budget on mattress disposal. The town contracts with Coastal Recycling Group, which picks up the town's trash and recycling, and hauls mattresses to RIRRC. During FY2011, Burrillville collected 18.77 tons of segregated mattresses (at a price of \$250 per ton at RIRRC). The town spent \$3,300 to haul the mattresses and \$4,742 to dispose of them at RIRRC. Thus, total mattress hauling and disposal costs totaled \$8,072. Burrillville's total solid waste budget was \$1,049,000.<sup>10</sup> Thus, the town spent 0.77% of its solid waste budget on mattresses ( $8,072/1,049,000=0.0077$ ).

### *Middletown*

Middletown has passed the majority of the costs onto consumers, giving them the task of purchasing a bulk waste sticker and paying \$30 for each box spring or mattress, or bringing these items to a Newport transfer station, at which residents pay \$116 per ton with a \$10 minimum fee. The town operates only two bulk amnesty days for residents, resulting in diminished municipal costs. At the second bulk amnesty day in FY2011, Middletown collected 1.61 tons (40 units) of mattresses and box springs, at a cost of \$600.00. The town's annual budget for trash and

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<sup>7</sup> Nield, Joseph G. Jr. Director of Public Works, City of Central Falls. Personal Interview. 30 June 2011.

<sup>8</sup> Debrousse, Mike. Engineering Department, City of Woonsocket. Personal Interview. 28 June 2011.

<sup>9</sup> Kaehler, Donna. Recycling Coordinator, Town of North Smithfield. Personal Interview. 19 July 2011.

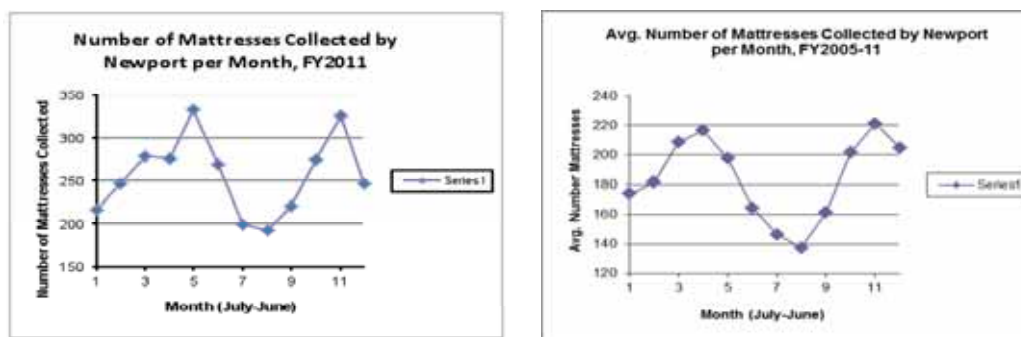
<sup>10</sup> Hall, Andrea. Recycling Coordinator, Town of Burrillville. Personal Interview. 22 July 2011.

recycling is \$1,036,000.<sup>11</sup> Data are not available for the first bulk amnesty day collection in FY2011; as a result, the percentage of Middletown's solid waste budget spent on mattresses has not been calculated. However, it is evident that Middletown spends relatively little on mattress hauling and disposal: Assuming that the first amnesty day resulted in an identical pick-up as the second one (40 units), then Middletown would have spent \$1,200 during FY2011 on mattress disposal. This results in an expenditure of only 0.12% of its solid waste budget (1,200/1,036,000=0.0012). This percentage is ten times lower the percent expenditures for the next-lowest municipalities, Woonsocket and North Smithfield, which spent 1.1% of their solid waste budgets on mattress disposal.

### *Newport*

The City of Newport does not pay a separate fee for mattress disposal; rather, it covers this cost as part of its contract with Waste Management. The total line item for trash collection on Newport's Waste Management contract in FY2011, which includes mattresses, is \$742,286. For the purposes of this study, Newport provided monthly mattress collection totals for FY2005-2011, the monthly averages of which are provided in the graph at right in Figure 1. This graph shows that the trends for mattress collection in FY2011 (Figure 1, left) correspond to the trends from FY2005 to 2011. The number of mattresses collected by the city in FY2011 peaked in November and May, months that may correspond to seasonal move out within the general population (November) and within the student population at Salve Regina University (May).<sup>12</sup>

Figure 1: Mattresses Collected in Newport, FY2011 as Compared with Averages, FY2005-11



**Fig. 1:** Mattress collection in Newport for FY2011 (left) spiked in November (333) and May (326), which may be explained by seasonal and university move-out dates. The absolute minimum occurred in February (192). The trend from FY2011 is consistent with monthly collection trends from 2005-2011 (right).

### *Providence*

During FY2010, the City of Providence spent 12.1% of its solid waste municipal budget on mattress disposal. Unlike other municipalities, Providence contracts directly with Waste Management for appointment pick-ups, from which point Waste Management transports the mattresses to an incineration facility rather than to Conigliaro Industries. Providence only

<sup>11</sup> Cronin, William. Recycling Coordinator, City of Middletown. Personal Interview. 29 June 2011.

<sup>12</sup> Littlefield, Kristin. Clean City Coordinator, City of Newport. Personal Interview. Data provided by the City of Newport. 11 July 2011.

transports mattresses to RIRRC when highway officials pick up mattresses from vacant lots.<sup>13</sup> It is evident that these parallel streams lead to elevated costs. Providence expended \$513,000 for the collection of 18,650 mattresses and box springs, at a cost of \$27.50 per mattress. The total cost for garbage pickup for the City of Providence in FY2010 was \$4,224,985.<sup>14</sup> As a result, the costs associated with hauling and disposing of mattresses accounted for 12.1% of the city's solid waste budget ( $513,000/4,224,984 = 0.121$ ).

Currently, Rhode Island taxpayers provide the municipal funds associated with proper treatment of this waste stream. As a result of the costs associated with transporting and properly disposing of mattresses, Rhode Island's municipalities have targeted mattress collection as a high priority. For a full comparison of mattress hauling and disposal costs, see Table 1.

Table 1: Municipal Costs Associated with Mattress Hauling and Disposal

<b>Municipality</b>	<b>Cost per Mattress or per Ton (\$)</b>	<b>Number of Mattresses Collected</b>	<b>Total Cost of Mattress Hauling and Disposal, FY2010 or FY2011 (\$)</b>	<b>Percentage of Solid Waste Budget Spent on Mattress Disposal</b>
<b>Central Falls</b>	15.00	363	18,163	3.6
<b>Woonsocket</b>	250 / ton	40 tons	31,000	1.1
<b>North Smithfield</b>	250 / ton	8.52 tons	6,817	1.1
<b>Burrillville</b>	250 / ton	18.77 tons	8,072	0.77
<b>Middletown</b>	15.00	N/A	N/A	N/A
<b>Newport</b>	N/A	2,616	N/A	N/A
<b>Providence</b>	27.50	18,650	513,000	12.1

**Table 1:** RI Municipalities pay for the hauling and disposal of hundreds of mattresses each year, constituting a range of 1.1 to 12.1 percent of the solid waste budgets of municipalities surveyed.

### Applying a Product Stewardship Model

A product stewardship model that engages producers, retailers, governments and consumers has been proposed as the most effective method for financing and administering a more effective take-back model for mattresses. Such a model, introduced as bill H5888 and S459 during Rhode Island's 2011 legislative session, has the potential to decrease the financial burden on municipalities for the collection and storage of mattresses and to reduce the costs born by RIRRC to ship mattresses to be recycled. Other producer responsibility systems have reduced the costs of recycling other products: for instance, PaintCare, a producer-funded nonprofit agency, has reduced the cost of recycling a can of paint from \$5-6 to \$0.35 per container.<sup>15</sup> By providing manufacturers with a financial stake in the recycling and reuse costs associated with their

<sup>13</sup> Brickle, Lindsey, Policy Analyst, City of Providence. Personal Interview. 23 June 2011.

<sup>14</sup> Brickle, Lindsey. "Other Solid Waste Costs." Data Provided by City of Providence. 22 June 2011.

<sup>15</sup> "Products and Fees." *PaintCare* Online. Available [http://www.paintcare.org/products\\_fee.php](http://www.paintcare.org/products_fee.php). 14 June 2011.

products, the product stewardship model also has the potential to encourage designs that are more resource-efficient, recyclable, and less toxic.<sup>16</sup>

### *Retail Involvement*

Currently, retailers play a role in hauling away old mattresses when they deliver new ones to Rhode Island consumers. As part of this study, five out of six retailers surveyed were found to operate take-back programs for old mattresses. The majority of these programs involve a third party that transports the mattresses from the retailer's warehouse to a local waste management facility, or to a recycling center directly. One retailer, Raymour and Flanigan, operates its own recycling center in Liverpool, NY, where it processes mattresses from northeast customers.<sup>17</sup> Another, Cardi's, collects approximately 100 mattresses per week from customers in Massachusetts, Rhode Island and Connecticut, from which point it ships the mattresses to a recycling facility in New Bedford, MA.<sup>18</sup> Two of the retailers surveyed operate their take-back programs free of charge. According to the International Sleep Products Association (ISPA), an organization representing mattress manufacturers, retailers currently collect old mattresses approximately 50% of the time when they deliver a new one.<sup>19</sup> It would be possible for retailers, producers, and/or producer-funded third parties to play a larger role in mattress take-back and disposal without significantly altering existing infrastructure.

### *Legislative Involvement*

Both the RI House and Senate producer responsibility bills would create a system of shared responsibility for mattress take-back, in which producers, retailers, consumers, and state agencies play a role in the recycling of mattresses at the end of their life cycles.<sup>20</sup> This "shared responsibility" model can take many forms, with manufacturers, retailers, residents, and municipalities playing diverse roles depending on the program. It is imperative that the final program assigns defined tasks among stakeholders in a way that optimizes the take-back system while lifting the financial burden from taxpayers and municipalities.

A national stakeholder group agreed at an April 2011 meeting hosted by the Product Stewardship Institute (PSI) that the coalition should establish pilot projects for mattress recycling.<sup>21</sup> The group included representatives from the mattress manufacturing industry, waste management, recyclers, the environmental community, and state, regional, and local governments.<sup>22</sup> One goal expressed at the meeting is the need to "develop a long-term financing system to manage mattresses and box springs in a manner that alleviates the financial burden

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<sup>16</sup> An Act Relating to Health and Safety – Product Stewardship for Discarded Products. Rhode Island House of Representatives. H5888 (2011). 23-86-2.

<sup>17</sup> Customer Service Representative. Raymour & Flanigan. Personal Interview. 9 June 2011.

<sup>18</sup> Diorio, Edward. Warehouse Manager. Cardi's Furniture. Personal Interview. 26 June 2011.

<sup>19</sup> "PSI National Mattress Stewardship Meeting." *Product Stewardship Institute*. Hartford, Connecticut. 11 April 2011. Powerpoint. 16.

<sup>20</sup> An Act Relating to Health and Safety – Product Stewardship for Discarded Products. 23-86-1.

<sup>21</sup> "National Mattress Stewardship Meeting: Meeting Summary." *Product Stewardship Institute*. Hartford, Connecticut. 11 April 2011. 8.

<sup>22</sup> "Participant List." *Product Stewardship Institute*. 12 April 2011. Online. Available [http://www.productstewardship.us/associations/6596/files/FINAL\\_Participant\\_List\\_4\\_12\\_11.pdf](http://www.productstewardship.us/associations/6596/files/FINAL_Participant_List_4_12_11.pdf). 20 July 2011.

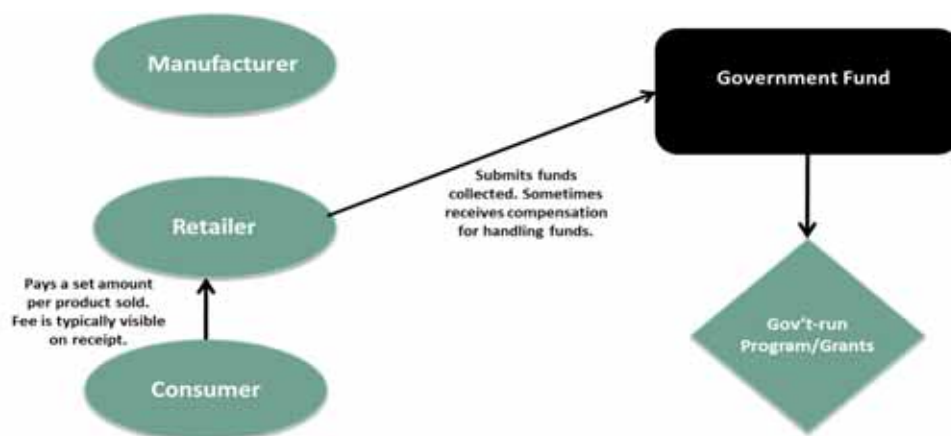


faced by governments.”<sup>23</sup> Due to the need for pilot programs, it is important to envision potential recycling models that can act as alternates to the status quo. Several such models are outlined below.

### *Financing*

There are two primary product stewardship financing models for mattress take-back, both of which would relieve the financial burden from municipalities. First, governments can place an Advanced Recycling Fee (ARF) on new products. This fee is applied at the point of sale and can be visible or invisible to consumers. In effect, it covers the cost of recycling products that were purchased years ago, continuing to finance recycling over time (Figure 2).<sup>24</sup> In the U.S., many state governments have placed ARFs on products such as tires, motor oil, paint, and lead-acid batteries. The fees are often pooled into a government-managed fund; when this is the case, producers play a minor role in managing the system.<sup>25</sup>

Figure 2: Diagram of ARF Financing Model



**Fig. 2:** Advanced Recycle Fees are applied at the point of sale, when consumers purchase products from retailers. These fees are pooled to fund the recycling of all products in the waste stream.

Second, producers can internalize the end-of-life management of their products into the cost of doing business. This model represents Extended Producer Responsibility (EPR), as manufacturers take full financial responsibility for the recycling of their products. As part of a Cost Internalization model, manufacturers include the full costs of recycling their products in the prices of their products to be sold (Figure 3).<sup>26</sup> This model provides financial incentives for mattress producers to reduce negative environmental impacts of their products, improve mattress durability, and reduce costs. It also gives them an opportunity to directly manage the recycling of their products, physically (if the producers establish their own recycling facilities) and/or financially (if they use the extra costs associated with mattress production to fund an external

<sup>23</sup> “PSI National Mattress Stewardship Meeting.” *Product Stewardship Institute*. Hartford, Connecticut. 11 April 2011. Powerpoint. 15.

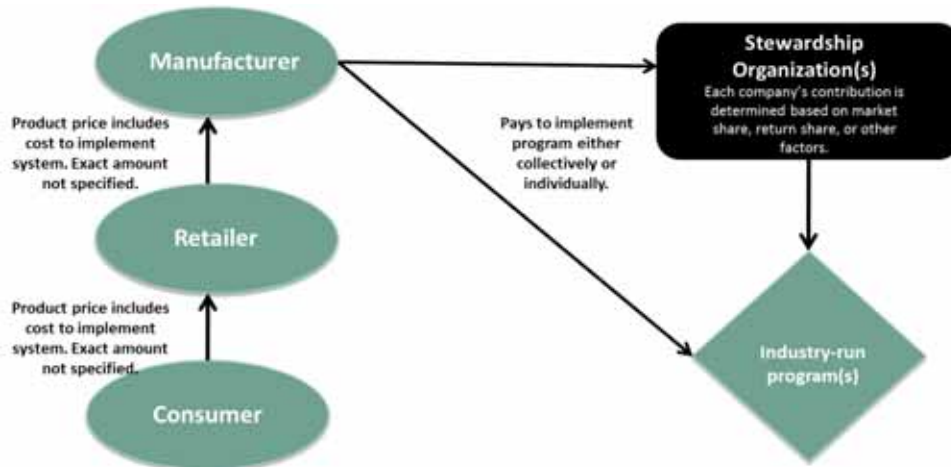
<sup>24</sup> “Figure 2: Diagram of ARF Financing Scheme.” PSI Networking Webinar. *Who Pays for EPR?* 18 May 2011.

<sup>25</sup> “Mattress Stewardship Briefing Document.” *Product Stewardship Institute*. 1 April 2011. 17-8.

<sup>26</sup> “Figure 3: Diagram of Cost Internalization Scheme.” PSI Networking Webinar. *Who Pays for EPR?* 18 May 2011.

recycling program).<sup>27</sup> According to the ISPA, the cost to operate a national mattress disposal program could be covered by as little as \$1.00 per mattress and box spring.<sup>28</sup>

Figure 3: Diagram of Cost Internalization Model



**Fig. 3:** Under an EPR model, manufacturers internalize recycling costs into the price of each item sold. External or industry-run organizations manage the extra revenue to fund the recycling of products in the waste stream.

### Existing Product Stewardship Programs

In the U.S., producers have voluntarily established industry-wide take-back programs for rechargeable batteries and thermostats. The Call2Recycle and Thermostat Recycling Corporation were both developed by producers in order to provide consumers with free recycling and education programs. Revenues from built-in product fees cover the full operational costs of both programs.<sup>29</sup> Rhode Island has established product stewardship programs through legislative action for three product streams: mercury automobile switches, electronics, and thermostats.<sup>30</sup> To date, the mercury automobile switch law has resulted in the collection of 28,062 automobile switches containing a total of 61.74 lbs of mercury.<sup>31</sup> The e-waste take-back law has resulted in the collection of 2,823,396 lbs. of computers, laptops, monitors and televisions in 2009, for a total of 2.68 lbs. per capita.<sup>32</sup> (The thermostat law was launched in 2011, and therefore has yet to produce collection data.) In Denmark, the beverage industry founded a company, called Dansk

<sup>27</sup> Mattress Stewardship Briefing Document. 18.

<sup>28</sup> Whistler, John, et al., Mattress Disposal Task Force. "Used Mattress Disposal and Component Recycling – Opportunities and Challenges." *International Sleep Products Association*. 30 September 2004. Online. Available <http://www.sleepproducts.org/Sustainability/docs/UsedMattressesDisposalReport.pdf>. 13 June 2011. 13.

<sup>29</sup> Mattress Stewardship Briefing Document. 18.

<sup>30</sup> "EPR Laws." *Product Policy Institute*. Online. Available <http://www.productpolicy.org/content/epr-laws>. 15 July 2011.

<sup>31</sup> "ELVS Mercury Switch Recovery Program: Rhode Island." *The Environmental Quality Company*. Online. Available <http://www.eqonline.com/services/ELVS-Mercury-Switch-Recovery-Program/state-report-all.asp>. 20 July 2011.

<sup>32</sup> "How much e-waste is collected in states with electronics recycling laws?" *Electronics Take Back Coalition*. Online. Available [http://www.electronicstakeback.com/wp-content/uploads/Collection\\_Volumes\\_by\\_State.pdf](http://www.electronicstakeback.com/wp-content/uploads/Collection_Volumes_by_State.pdf). 20 July 2011.



Retursystem, to manage and finance the recycling of the bottles and cans sold in the country. The invisible cost added to each beverage container sold in Denmark covers costs of operating Dansk Retursystem as well as the transport and recycling of all of the items returned. Consumers, for their part, pay a deposit internalized into the cost of the beverage containers, and receive a rebate of 0.20 to \$0.60 per returned container, providing positive financial incentives for consumers to recycle their goods.<sup>33</sup>

### *Envisioning Alternate Mattress Take-Back Models*

There are several aims associated with a new model of collecting and recycling mattresses. Six goals for such programs have been identified:

- 1.) Decreasing financial and logistical burdens on municipalities;
- 2.) Designing products to be more readily reused, recycled, or otherwise handled in the most sustainable manner possible;
- 3.) Encouraging a paradigm shift toward taking end-of-life product considerations into account during the design process;
- 4.) Creating jobs in Rhode Island;
- 5.) Creating “green jobs” in the environmental sector; and
- 6.) Recovering the full costs of mattress disposal for RIRRC

Table 2 describes the parties that could be responsible for transport, storage, financing, and recycling, given each of these goals. The parties considered for each of these responsibilities are the retailers, producers, municipalities, and third parties: independent agencies financed by producers (which can be operated either by state agencies or the manufacturers themselves). Consumers also play a role in mattress hauling and disposal, for instance, when they transport a mattress directly to RIRRC or pay an increased up-front cost given an ARF or Cost Internalization recycling financing method. However, for the purposes of this analysis, consumers are not considered an entity capable of overseeing the entire transport, storage, financing or recycling mechanisms associated with mattresses. For an analysis of parties that have been identified as the most effective to transport, store, finance, and recycle mattresses in Rhode Island given each of the six goals outlined above, see Table 2.

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<sup>33</sup> “Areas Covered.” *Dansk Retursystem*. Online. Available [http://www.dansk-retursystem.dk/content/us/the\\_danish\\_system/areas\\_covered](http://www.dansk-retursystem.dk/content/us/the_danish_system/areas_covered). 10 May 2011.

Table 2: Avenues for Achieving Goals of Potential Take-Back Models

	<b>Current System</b>			
	<b>Transport</b>	<b>Storage</b>	<b>Financing</b>	<b>Recycling</b>
<b>Active Entities</b>	Municipalities, Retailers	Municipalities, RIRRC	Municipalities	RIRRC, Contracting with Conigliaro
	<b>Parties to Most Effectively Handle Roles</b>			
<b>Goals</b>	<b>Transport</b>	<b>Storage</b>	<b>Financing</b>	<b>Recycling</b>
<b>Decrease burden on municipalities</b>	Retailers, Producers, Third Party	Retailers, Producers, Third Party	Retailers, Producers, Third Party	Retailers, Producers, or Third Party (Contract)
<b>Green Design</b>	Any	Any	Producers, Third Party	Producers, Third Party (Contract)
<b>EPR Paradigm Shift</b>	Producers, Third Party	Producers, Third Party	Producers, Third Party	Producers, Third Party (Contract)
<b>RI Job Creation</b>	Any	Any	Any	RI Recycling Facility
<b>Green Job Creation</b>	Any	Any	Any	RI Recycling Facility
<b>Recover Full Costs for RIRRC</b>	Any	Any	Any	Any

**Table 2:** An analysis of six goals and the subsequent parties most effective to handle mattress transport, storage, financing and recycling. Producers are not part of the current system, but have been identified as among the most effective parties to decrease the burden on municipalities, design products to be more easily recycled, and/or encourage a paradigm shift toward extended producer responsibility.

If, for instance, the goal is to decrease the financial burden on municipalities for the hauling and disposal costs associated with mattress removal, then the most effective way to do so is for retailers, producers, and/or a producer-financed third party to transport and store the mattresses, pay for their removal and disposal, and contract directly with a recycling agency. As a result of such a system, municipalities would not carry the financial burden of the hauling, labor, disposal, or recycling costs of the mattresses or box springs. Although municipalities may be tasked with hauling away errant mattresses left by residents who do not comply with the EPR program, this burden would be markedly lower than the one municipalities currently bear, and could be reimbursed by producers. It is also possible for a municipality to continue to haul mattresses to recycling stations or RIRRC, but for retailers, producers and/or a third party to reimburse the municipality for these costs. This second option retains the existing municipal waste management transportation infrastructure, yet alleviates the municipalities' financial burden.

If the goal is to design products to be more easily recycled, then producers are the only entity with the ability to achieve this goal, as they are the parties overseeing the manufacturing of the mattresses at the design stages. Producers with a financial incentive to decrease costs are more likely to design mattresses that can be more easily broken down into component pieces.

If the goal is to implement a standard for producer responsibility, then producers would be the most effective party to handle the transport, storage and financing of mattress disposal, given their position as the target of the paradigm shift toward making manufacturers more responsible for their products at the end of their lives.

If the goal is to create green jobs in Rhode Island, then the state may want to consider providing incentives for the establishment of a local mattress recycling facility. Such centers have been shown to create local jobs in the emerging “green” economy: For example, St. Vincent de Paul, which operates a recycling facility in Oakland, California, employs 17 workers, who learn transferable skills such as machine operation and warehouse safety.<sup>34</sup> The plant recycles 85% of the contents of a typical mattress, and can sell the resulting scrap metal, wood, foam and other component parts to interested parties such as carpet manufacturers, landscapers, and steel corporations.<sup>35</sup> Revenues from the mattresses and other recycling programs benefit more than 84,000 low-income, homeless, and at-risk individuals annually.<sup>36</sup> Conigliaro Industries, located approximately 50 miles from RIRRC in Framingham, MA, sends quilt scrap to carpet manufactures; long fibers to makers of shoddy cloth for mattresses and automobiles; cotton fibers to producers of oil filters, mats and stuffing; and steel springs to become other metal products, such as tools, automobiles, and construction materials.<sup>37</sup>

If the goal is only to enable RIRRC to break even on mattress disposal (in other words, not to lose \$2-3 per mattress of box spring) or to decrease the costs for RIRRC, then those costs could be passed onto any party—municipalities, retailers, producers, or a third party—as long as it covers the full costs of mattress handling and processing currently born by the Resource Recovery Corporation.

## *Conclusion*

In order for municipalities to bear fewer costs associated with the hauling and disposal of mattresses in Rhode Island, retailers, producers, and/or producer-funded third parties will need to handle aspects of the storage, transport, and financing of mattress take-back. Many options exist for how to operate a new model for mattress recycling, and each includes an array of choices about financial and physical responsibility.

Ultimately, the optimal situation would be achieve all six goals outlined above, with the result of decreasing the burden on municipalities, optimizing mattress eco-design, helping to instill a cradle-to-cradle philosophy, creating green jobs in Rhode Island, and recovering costs for RIRRC. Of the mechanisms considered, the one that emerges as best-suited to achieve all of these goals is the establishment of a producer-funded third party that both finances mattress storage, transport, and recycling, and transports mattresses to independent recycling facilities,

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<sup>34</sup> “DR3 Mattress Recycling.” *St. Vincent de Paul Society of Lane County*. Online. Available [http://www.svdv.us/assets/sitefiles/dr3\\_mattress\\_recycling.pdf](http://www.svdv.us/assets/sitefiles/dr3_mattress_recycling.pdf). 15 June 2011.

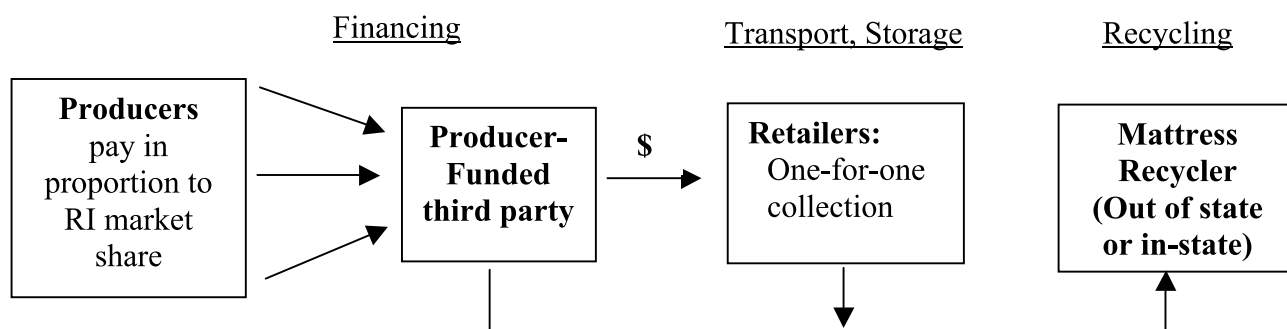
<sup>35</sup> ISPA. “Product Stewardship Institute Mattress Initiative: Mattress Industry Overview.” *Product Stewardship Institute*. Powerpoint. 11 April 2011. 12.

<sup>36</sup> DR3 Mattress Recycling.

<sup>37</sup> “How we recycle mattresses and where the components go.” *Conigliaro Industries*. Information provided by Michelle Tosches-Taparauskys, National Project Manager. 14 July 2011.

such as an out of state mattress recycler or an in-state facility. Such a third party should collect funds from mattress manufacturers in proportion to manufacturers' market share in Rhode Island in order to avoid a disproportionate financial burden on smaller manufactures. Retailers could continue existing one-for-one collections when they deliver new mattresses, and the producer-funded third party could collect all other mattresses in order to alleviate the burden from municipalities. Such a model is illustrated in Figure 4 (below).

Figure 4: An Optimal Mattress Take-Back Model



**Figure 4:** An optimal take-back program achieves all six goals outlined above, and involves a producer-funded third party that funds and operates mattress transport, storage and recycling.

A producer-funded third party can effectively eliminate the financial and logistical burden currently borne by municipalities for the collection, storage, and transport of mattresses. It can provide a streamlined method for both financing existing retail collection programs and transporting mattresses directly to Conigliaro Industries or an in-state facility for recycling. It is the author's recommendation that Rhode Island stakeholders consider establishing a producer-funded third party as the most effective entity to achieve all goals identified with mattress collection and recycling in Rhode Island.