Standardized Regulatory Impact Assessment (SRIA)

Used Mattress Recycling and Recovery Program

I. STATEMENT OF PURPOSE

The basic purpose of the Used Mattress Recovery and Recycling Program Regulations (referred to throughout as Regulations) is to clarify and help implement Senate Bill 254, the Used Mattress Recovery and Recycling Act (Hancock, Chapter 388, Statutes of 2013). The Act requires mattress manufacturers to create a non-profit mattress recycling organization (MRO) to develop, finance, and implement a new, convenient, and cost-effective recovery and recycling program (Program) for used mattresses generated in California. On November 5, 2014, CalRecycle approved the Mattress Recycling Council as a designated MRO under the Act. The MRC is a 501(c)(3) nonprofit organization that will undertake development of the Program and submit a plan to CalRecycle for approval. All mattress retailers will be required to collect a mattress recycling charge on any mattress sold in the state; these monies will then be remitted to the MRO. The MRO will develop a competitive bidding process to hire statewide service providers, i.e. mattress recyclers and transporters, to efficiently deliver access to mattress recycling.

The intent of the Act and Program are to reduce illegal dumping of mattresses; increase recycling of mattresses; reduce the public agency costs associated with the end-of-life management of used mattresses; and to support the statewide goal of source reducing, recycling or composting 75% of all solid waste by January 1, 2020. More broadly, the purpose is to protect public health, safety, and the environment.

The Regulations detail the requirements and administrative procedures necessary for CalRecycle to oversee and enforce the new Program, which will be developed by the manufacturers through a "mattress recycling organization" (MRO). In general, the Regulations apply to the MRO for submittal and approval of plans and reports; and additionally apply to manufacturers, renovators, retailers, distributors, and recyclers with respect to enforcement and reporting activities. The MRO will design the Program in accordance with the requirements of the statute and the Regulations. In designing the Program, the MRO will, among other things, lay out initial goals for mattress recycling within California, which the MRO will begin implementing, once the plan is approved by CalRecycle, in approximately January of 2016.

The projected economic costs for the Regulations themselves do not exceed the California Department of Finance's $50 million threshold for major regulations or the $10 million threshold to which CalRecycle is subject as part of the California Environmental Protection Agency (CalEPA). However, the implementation of the Program by the MRO, as required by statute, could approach or exceed the CalEPA threshold depending on how the MRO chooses to design and implement the Program. For example, the MRO will determine the type, number, and location of mattress drop-off locations; the type, number and location of recycling facilities, including whether or not they are located in California;

the final disposition of mattress components; and the financial incentives and mechanisms that promote each of these essential aspects of the used mattress infrastructure.

Therefore, this economic analysis evaluates the impacts of the Program as potentially designed by the MRO, including impacts directly related to compliance with the Regulations. The analysis incorporates macro-level assumptions for two possible Program scenarios: a 20-percent recycling rate and a 50-percent recycling rate (recognizing that the MRO may choose to implement a somewhat different Program design to reach those recycling rates). The economic impacts are reported for the Program in 2016, the twelve-month period after full implementation of the Regulations.

Thus CalRecycle's modeling indicates an increase in Gross Domestic Product (GDP) of roughly $11 to $26 million by 2016, based on the economic impact of the Program twelve months after the Regulations are fully implemented. CalRecycle also estimates the net economic impact (including fiscal impact) of the Program in 2016, 12 months after full implementation of the Regulations, to be $1.7 million for the 20-percent recycling rate scenario and $1.1 million for the 50-percent recycling rate scenario. However, the Program is not projected to reach the full recycling rate goals until 2024 under both scenarios; savings to consumers in avoided disposal fees will then be approximately $7.7 million and $19.3 million for the 20 percent and 50 percent recycling scenarios, respectively, (landfill operators will lose a similar amount). When indirect costs are added to these direct costs or benefits to specific stakeholder groups, the total may exceed $50 million, thus triggering the "major regulation" threshold.

II. METHODOLOGY

A. Economic Impact Method and Approach

MODELS AND BASELINE USED IN ANALYSIS

The Department estimated the direct impacts of the proposed Regulations and the subsequent MRO Program in an extensive, custom Excel spreadsheet, henceforth termed the Direct Impact Model. This model uses data derived from the report[1], *A Business Case for Mattress Recycling*, commissioned by Zero Waste Scotland on the used mattress recovery program in Scotland. Zero Waste Scotland is an organization funded by the Scottish government to provide education about its Zero Waste Plan (2010),[2] which aims to recycle 70% of all waste by 2025. While the Scottish government is interested in encouraging mattress recycling to achieve their Zero Waste Plan, they do not currently have any laws or regulations that mandate mattress recycling. However, the report provides a detailed economic analysis of their proposed mattress recycling program with economic data that are applicable for implementation of such a program in California.

The Scotland mattress recycling business case is based on a mattress recovery system where waste haulers drop off used mattresses at recycling locations. The mattresses are then consolidated at

[1] Chapman, Adrian and Caroline Bartlett, *A Business Case for Mattress Recycling in Scotland*, Oakdene Hollins Ltd., London, England. Report prepared for Zero Waste Scotland, December 2012.

[2] http://www.scotland.gov.uk/Topics/Environment/waste-and-pollution/Waste-1/wastestrategy

warehouse centers where deconstruction and recycling activities occur. Recovered materials provide revenue to recyclers based on current market value prices for the recyclable commodities. This system is similar in design to the one assumed for the 20-percent and 50-percent recycling scenarios in this economic analysis for implementation of a used mattress recycling program in California. In addition, there were similarities in cost data for Scotland and California, such as the cost and availability of leasing commercial and industrial buildings for processing and recycling activities. The following cost data and metrics were obtained from the Scotland report and used in this economic analysis (CalRecycle is not aware of any other sources of similar, detailed data on mattress recycling):

- Optimal warehouse space is 16,000 square feet for each recycling location;
- Each recycling location can process a maximum of 36,000 mattresses per year;
- Detailed operating expenditures were reported in about 25 cost categories and aggregated into larger categories. Labor and warehouse costs were separated from infrastructure costs and estimated per 1,000 mattresses;
- Employment in recycling was estimated to be ~6,500 mattresses handled/person/year, or 0.152 jobs/1,000 mattresses. Domestic wage rates were applied to the annual employment estimate;
- Annual warehouse space, based on mattress throughput, is 2.5 mattresses/year/square foot;
- The distribution of mattress type, based on sales information, is summarized in four major types with 68% of the total comprised of the conventional spring design;
- Recovered component material weights per mattress were summarized in nine types of recovered materials with steel, foam, and cotton comprising roughly 2/3 of the total recovered materials. Current domestic values for these materials were applied to determine revenue from sales of recyclable materials.

A fundamental difference between the Scotland and California programs is that California's program is based on a product stewardship model where the program is designed by a stewardship organization comprised of producers or manufacturers and funded by an assessment at the point of sale. In Scotland, the nascent program was being incentivized through grants and loans. The latest information indicates that the program is struggling without a sustainable funding mechanism in place and that, in order for the program to move forward, additional government intervention would be needed including potential policy changes that support an extended producer responsibility or product stewardship approach.

For indirect and induced economic impacts, the Department used the Regional Economic Models, Inc. (REMI) model, an analytical tool that is a one-region, 160-sector model which has been modified using California-specific data (for population, demographics and employment) as specified by the Department of Finance (DOF) on April 14, 2014. The REMI PI+ model employed for this analysis was "Software Build 1.5.2" (Build 3 283, June 4, 2013). The REMI model was chosen because it is a robust analytical tool that allows a California-specific comparison of current market conditions (baseline) to projected market and economic impacts on businesses complying with the Regulations.

The REMI analytic tool models a regional economy and analyzes year-by-year impacts and total impacts on a macroscopic scale. It uses an indirect approach to estimate economic impacts of the Program on businesses. The model also estimates the costs and benefits to individuals and impacts to the State economy as a whole.

This economic analysis compares the costs and benefits of the MRO implementing the Program for the first 12 months, as well as beyond, in comparison to a baseline. The baseline is assumed to be existing conditions (i.e., no Program in place) as forecasted by DOF through 2020, the study period that covers full implementation of the Regulations and beyond as the Program ramps up recovery of used mattresses. The annual economic changes projected to occur as a result of the Program (e.g. the "exogenous" changes in expenditures or incomes or jobs) are the net changes from the original baseline number for each variable until the recycling goal in each scenario is achieved.

ASSUMPTIONS

In order to develop an estimate of costs and benefits for 12 months after full implementation of the Regulations in 2016, CalRecycle had to create potential scenarios of what the MRO's full program may entail and what portion of those activities are likely to occur in the first 12 months. To do so, CalRecycle made a number of assumptions throughout the analysis. These assumptions include:

1. 4.6 million[3] mattresses and box springs will be sold in California in 2015. This analysis assumes that the baseline sales number will increase annually by 0.05% based on population growth and associated demand for mattresses. (Mattresses fall into five main categories: conventional mattress / box spring sets, polyurethane foam, latex, refurbished, and "soiled-unrecyclable." Program estimates are based on spring mattresses and their box-spring frames only, as these are the most prevalent type of mattress (68 percent of the total sold) and require more complex processing and recycling steps.)
2. Recovery infrastructure growth is assumed to occur within California (due to the bulky and heavy nature of mattresses and box springs) and infrastructure growth is assumed to progress according to a sigmoid function or S-shaped curve. This mathematical formula appropriately simulates the implementation of a used mattress recovery program as the start-up rate increases slowly initially, progressively accelerates as the program matures, and tapers off as the program approaches the recovery goal for each used mattress recovery and recycling scenario. This type of recovery rate function exhibits a hyperbolic (bell-shaped) distribution in the year-over-year percentage changes in the mattress recycling rate. Two cost scenarios were evaluated to illustrate two used mattress recovery and recycling goals (20 percent and 50 percent recovery goals, respectively) with the assumption that the program achieves the recovery goal by the year 2024.

[3] Oseth, Jane, Membership Services Manager, International Sleep Products Associations (ISPA), Alexandria, VA, 2012. Cited in Roland Geyer and Brandon Kuczenski, *Mattress and Box Spring Case Study: The Potential Impacts of Extended Producer Responsibility in California on Global Greenhouse Gas (GHG) Emissions*, University of California, Santa Barbara, May 2012, p. 6.

3. The Direct Impact Model analysis relies significantly on variables derived from cost data and metrics obtained from the Scotland report as discussed above. The Department assumes that the used mattress recovery and recycling program designed by the MRO will have operational component requirements consistent with the estimates prepared for the mattress recycling program in Scotland. These components include the warehouse space, labor and equipment requirements for mattress recycling.
4. Landfill disposal savings are based on an estimated model disposal fee of $9 per mattress. This disposal fee is a median number based on the findings reported in a May 2012 review of illegal mattress dumping in California.[4] The landfill disposal fee for mattresses is assumed to increase at an annual rate of 3.5 percent based on the findings presented in a 2013 World Bank Report.[5]
5. Infrastructure costs were considered in the economic analysis but construction costs are negligible as there is currently ample surplus warehouse space.
6. Transportation of used mattresses is assumed to incur no cost change from the baseline, as total hauling distance to recycling centers is considered approximately equivalent to the total hauling distance to landfill disposal sites.
7. Program oversight, including education and outreach, is the same for both scenarios, at 30 staff for the retail sector and 6.5 staff for CalRecycle. The staffing costs include overhead, and increase annually by 1.5%.
8. The REMI model inputs require splitting the landfill disposal fees not paid as a result of increased recovery and recycling of used mattresses. The annual reductions in fees paid are assumed to be split equally in two parts: 50% are savings to the self-disposal population (resulting in increased consumer spending elsewhere in the economy), and 50% are treated as decreased disposal costs to the retail mattress sales establishments (some of which already cover the costs of removing of old mattresses from customers' homes).

B. Specific Categories of Individuals and Business Enterprises Affected

The primary impact of the Regulations and Program will be to individuals and establishments (i.e., hotels, commercial residences and hospitals) who purchase mattresses, and the wholesale and retail firms that sell mattresses. However, the impacts are undifferentiated among the purchasing individuals and firms; all are expected to incur similar impacts on a per-mattress basis. There are no localized or regionalized impacts, and no differentiated demographic impacts.

On a group basis, the Regulations and Program may impact the following North American Industry Classifications System (NAICS) sectors displayed in Table 1.

Table 1: Industry Groups Affected by the Mattress Recycling Regulations

[4] *Illegal Dumping Technical Advisory Committee Informal Illegal Dumping Mattress Survey,* IDTAC, Sacramento: 2012.

[5] *What a Waste: A Global Review of Solid Waste Management*, <http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1334852610766/AnnexE.pdf>

NAICS CODE DESCRIPTION	2012 NAICS
Furniture Stores Mattress Merchant Retailers	442110
Administration of Air and Water Resources and Solid Waste Management Programs	924110
Waste Management and Remediation Services Solid Waste Landfill	562212
Remediation and Other Waste Management Svcs. Materials Recovery Facilities	562920

The Mattress Manufacturing industry (NAICS 337910) is not included in the above list, as the Regulations are expected to have no impact on the manufacturing of mattresses. Currently California has no manufacturers producing new mattresses, and six used mattresses recyclers. However, NAICS 442110 ("Furniture Stores") lists 4,720 locations, while tax records from the Board of Equalization indicate approximately 10,000 California business entities in these same categories. This number includes 5,215 retail establishments that are "nonemployers" submitting revenue reports ranging from $50,162 to $72,318 per year. These nonemployer entities are likely upholsterers, furniture refurbishers, etc. who are very unlikely to be selling new mattresses. Therefore, the total number of businesses affected by this regulation is estimated to be no more than 5,000 rather than the 10,000 businesses in the Board of Equalization tax records.

From a macro economic analysis perspective, there will likely be no net economic impact on individuals. While the Program is required by statute to provide free take-back of used mattresses, it may also impose an assessment on the sale of new mattresses to fund the Program, thereby offsetting potential consumer savings. Depending on how the MRO designs and implements the program, fees could be higher than assumed in this economic assessment, which would result in additional economic impacts. There may be distributional impacts that are not accounted for in this analysis; however, the potential design features of the program are difficult to predict at this time.

C. Inputs into the Assessment of Economic Impact

The Department modeled two potential cost scenarios by choosing two different recovery rates for the Program, 20 percent and 50 percent. The 20 percent scenario was chosen because it mirrors similar goals in the existing carpet stewardship program which is already being implemented. The 50 percent scenario was chosen as an upper-edge comparison. Appendices I and II present two sets of tables showing the results of the Direct Impacts Model, and the conversion of these outputs into inputs for the REMI analysis.

The input variables assume a progressive 0.05% annual increase in the number of used mattresses available for recycling due to the annual increase of population and assumed growth in collection infrastructure.

Sources used to assess additional input variables, such as avoided landfill disposal fees and recycling facility labor costs, include CalRecycle's waste characterization data, reports from national and international mattress recycling businesses, and reports on mattress recycling programs in other countries. Projected mattress sales were determined using industry data from the International Sleep Products Association and population data from the California Department of Finance. Disposal trends were determined separately, using mattress construction type and disposal shares from the Scottish study. The UC Santa Barbara study cited above was used for general verification purposes, as the labor estimate in the UC Santa Barbara study was insufficiently detailed to use as a primary source.

The analysis assumes the Regulations will be fully implemented by approximately January 1, 2016, and that implementation of the Program by the MRO would begin immediately thereafter per statutory timelines. The analysis compares the subsequent 12-month period ending in 2016 to the baseline before implementation to determine the economic impacts. However, full costs of Program implementation by the MRO will continue until the recovery and recycling goals in the Program are met. Assuming the 20 percent and 50 percent scenarios, this would occur in 2024.

The complete analysis of all economic impacts, including costs by sector and changes in employment, involved two steps. The first step was to analyze the direct costs of all compliance and regulatory activities that result from the Program. Once these were obtained, the second step was to insert the resulting annualized cost estimates for relevant employment sectors into the REMI software. The software allows estimation of indirect and induced effects of the proposed Program for the two cost scenarios.

The direct economic impact calculations from the Direct Impact Model are summarized for each of the two cost scenarios in Appendix I. The output from the Direct Impact Model then provided the input variables for the REMI model. Appendices I and II present the calculations used to estimate the total costs of the assumed Program scenarios.

DIRECT IMPACTS ESTIMATE

The Direct Impact Model analysis relied heavily on the study mentioned previously on the mattress recycling program in Scotland. That report examined in detail the cost components for recycling mattresses, in terms of cost and labor units per one thousand mattresses. The methodology and several variables for the Program analysis also were adapted from the report on the Scotland program. The cost units were converted to U.S. equivalent weights and currency, and modified to the specific conditions in California. The specific variables estimated are shown in Table 2, below.

Table 2: Variables Included in Direct Impacts Estimates

VARIABLE	DETAILS
Mattress Recovery Rate	Begins at current rate of 3% (no Program), peaks at 20% for Scenario 1 or 50% for Scenario 2.
Number of Mattresses Recovered	Annual number of mattresses deconstructed.
Value of Materials Recovered	Value of component materials at market rates.
Infrastructure Costs	Annual cost primarily of warehouse space rental.

Labor Costs	Annual cost of labor by job category (administrative).
New Jobs	Number of direct jobs created in handling used mattresses.
Avoided Consumer Disposal Fees	Landfill disposal fees – begins at current $9/mattress, increasing 3% annually thereafter.
Oversight, Education & Outreach Costs	Estimated administrative and regulatory costs with Program implementation (6.5 PYs, plus 30 FTE positions in retail admin).
Net Annual Cost (Benefit)	With the offset of the landfill disposal fee savings, annual net costs become positive in 2020 for the 20% scenario, and positive in 2017 for the 50% scenario.

The output table that displays the results of the first step (i.e., the Direct Impact Model for the 20% and 50% maximum recycling rate scenarios) is displayed in **Appendix I**.

INDIRECT IMPACTS ESTIMATE (REMI analysis)

The results from the Direct Impact Model cost estimates then become inputs into the REMI-based indirect cost analysis. Of the 8,400 specific REMI model policy variables available, CalRecycle selected six variables for the model, as shown in Table 3 below. These six variables encompass the most direct economic impacts that are appropriate for the costs and savings that result from the development of the used mattress recycling program. Appendix II provides the actual values for the projected years for each of these variables.

Table 3: Direct Costs Converted to Policy Input Variables in REMI[6]

VARIABLE DESCRIPTION	UNITS	MACROECONOMIC IMPACT	NAICS CATEGORY
Oversight Ed. & Outreach	(in Mill. $)	Production Cost	Office admin. Svcs.; Facilities support svcs.
Oversight Ed. & Outreach	(in Mill. $)	Exogenous Final Demand	Office admin. Svcs.; Facilities support svcs.
Landfill Revenue Reduction	(05 Fixed Nat'l Mill. $)	Industry Sales/Exog Prod'n w/o Empt Invmt & Compensation	Waste mgmt. & remediation services
Half Landfill Savings	(05 Fixed Nat'l Mill. $)	Proprietor's Income	Retail Trade
Half Landfill Savings	(05 chained, Mill. $)	Consumer Price (Amount)	Furniture & Furnishings
Jobs Created	(Thousands)	Indust. Empmt (Indust Sales / Exogenous Prod'n) (No.)	Waste management & remediation svcs.

[6] Exogenous refers to economic changes that occur outside of the model whose impacts are projected as a result of the Program, i.e. the "exogenous" changes in expenditures or incomes or jobs, are measured on an annual basis and displayed in the output tables as net changes for each variable, from the original baseline number.

The economic changes projected to occur as a result of the Program (the "exogenous" changes in expenditures or incomes or jobs) are measured on an annual basis for both input and output tables. The inputs to REMI are shown in tables in Appendix II, and displayed as net changes for each variable from the original baseline number.

However, the direct cost estimates do not transfer directly as inputs to the REMI model for these reasons:

1. Not all of the calculated costs and benefits from the Direct Impact Model are needed for determining the indirect costs and benefits, so a subset of the Direct Impact Model outputs are chosen for inputs into the REMI-based indirect cost model. In addition, the savings from landfill disposal fees are assumed to be split 50/50 by the owner-disposers and the retailer-disposers. Thus, the consequences of non-payment of landfill disposal fees appear (in all or part) in three different policy variables in the REMI model (i.e., the three landfill-related entries in Table 3; these also are shown in Appendix II, along with identifiers from the REMI model [X6330, X1889 and 404]).
2. Costs in the Direct Impact analysis were based on 2012 expenditures, but the REMI model is based on 2005 dollars. Thus, the output values from the Direct Impact analysis had to be converted to 2005 for input into REMI (the jobs estimate is not modified).
3. The "Oversight Education and Outreach" expenditures become two separate offsetting inputs in the REMI model, and the direct estimate of new jobs becomes the sixth variable in the model.
4. Other variables in the Direct Impact analysis also had to be converted to the units used by the REMI model, either millions or billions for the cost values, and all jobs estimates in thousands.

D. Outputs from the Assessment of Economic Impact

The broad economic impact analysis provided by the REMI model generates estimates that include indirect and induced impacts as shown in Table 4 below. The forecasted costs of the Program include total employment and employment by industry sector, GDP, and relative composite output and value added. Employment for three major industry sectors are shown: retail sales, waste management and remediation services, and government employment. The "Total Employment" line includes all other additional jobs, beyond the three selected NAICS categories shown. Results for both cost scenarios are also shown.

The MRO is required to submit the Used Mattress Recovery and Recycling Plan by July 1, 2015. CalRecycle will review the Plan and the Program will be underway by approximately January 2016. At this point the Regulations will be fully implemented and implementation of the Program by the MRO will begin. Table 4 shows two years, 2016 and 2017, to show the economic impacts of the Program after full implementation of the Regulations.

Table 4: Macroeconomic Impacts Under Two Scenarios[7]

[7] Input-output data shows the flow of commodities from production through intermediate use by industries and purchases by final users. This data is developed as a set of matrices or tables for each year. The REMI "USE" matrix

Scenario 1: 20 Percent Used Mattress Recycling Rate

	(2005 $)	Indirect and Direct Costs with 20% Mattress Recycling Rate	
	Measure	2016	2017
Total Employment	Jobs	143	207
Retail Sales Employment	Jobs	2	8
Waste Mgmt. & Remediation Svcs.	Jobs	42	64
Government Employment	Jobs	10	15
Gross Domestic Product	$ Mill.	$11.0	$15.0
Output	$ Mill.	$18.0	$27.0
Value Added	$ Mill.	$11.0	$16.0

Scenario 2: 50 Percent Used Mattress Recycling Rate

	(2005 $)	Indirect and Direct Costs with 50% Mattress Recycling Rate	
	Measure	2016	2017
Total Employment	Jobs	324	520
Retail Sales Employment	Jobs	18	40
Waste Mgmt. & Remediation Svcs.	Jobs	106	173
Government Employment	Jobs	24	39
Gross Domestic Product	$ Mill.	$26.0	$42.0
Output	$ Mill.	$45.0	$72.0
Value Added	$ Mill.	$26.0	$43.0

E. Agency's Interpretation of Results of the Assessment of Economic Impact

The macroeconomic impact estimates for both of the Program scenarios projected by the REMI model are largely limited to employment and economic activity in the California economy. Impacts in other states are negligible. The REMI model utilizes the mix of expenditure reductions and expenditure increases resulting from the implementation of the Program, and estimates the macroeconomic effects multiplied several times over through the State's economy.

The increase in Government Employment projected by the REMI model shows 10 to 24 new employees in 2016. While 6.5 of these new jobs are directly related to the Regulation, the remainder of the jobs

contains the sales of commodities sold to intermediate consumers and final demand. In addition, it contains the intermediate inputs and value added factors of production to industries for the production of their product.

are not derived from direct Program expenditures, but instead from the projected increase in broad indirect and induced economic activity in California. There will be a reduction in revenue to the landfill operators, which is included in the economic model. Staffing and equipment operations impacts at landfills will be negligible at both the 20% and 50% of mattress recycling rate. The REMI model projects that there is a GDP increase, or value added, of $11 to $26 million by 2016 for the two cost scenarios, respectively. Beyond 2016, the costs of expanding the used mattress recycling infrastructure are increasingly offset by the savings, resulting in a positive net annual benefit. Under the 20-percent recycling rate scenario, the Direct Impacts Model projects that by 2020 the net annual cost turns positive at $332,000; for the 50-percent recycling rate scenario, the net annual cost turns positive at just over $682,000 by 2017.

III. CRITERIA

A. Creation or Elimination of Jobs

Jobs will be created through implementation of the Program as the used mattress recovery and recycling infrastructure is developed over time. The majority of these jobs which will be at mattress recycling facilities, collection sites, and transportation companies. Job losses in other sectors are estimated to be negligible or nonexistent.

Table 5 below shows the estimates for new jobs. For the 20 percent recycling scenario, the Direct Impact Model estimates that 75 new jobs will be created that are directly related to mattress recycling by 2016 (economic impact of the Program at 12 months after implementation of the Regulation). The recycling rate in 2016 will be around 8 percent. By the time the recycling rate reaches the 20 percent rate in 2024, it is estimated that 133 direct new jobs will result.

For the 50 percent recycling scenario, the Direct Impact Model estimates that 99 new jobs will be created by 2016 with a recycling rate of nearly 13 percent. The Program will reach the 50 percent recycling rate in 2024 with a total of 278 direct new jobs created.

Table 5: Scenario Cost Summaries

Scenario 1 - Direct Impact Model Costs Summary, 20% Recovery

	(2012 $)	Direct Costs and Benefits with 20% Mattress Recycling Rate	
	Measure	2016	2017
Mattress Recovery Rate	Pct.	8.1%	12.5%
Number of Mattresses Recovered	No.	253	390
Value of Materials Recovered	$ mil.	$0.8	$1.2
Infrastructure Costs	$ mil.	$1.0	$1.5
Labor Costs	$ mil.	$1.2	$1.8
New Jobs	No.	75	97

Avoided Consumer Disposal Fees (-)	$ mil.	$2.4	$3.8
Oversight, Education & Outreach	$ mil.	$2.7	$2.8
Net Annual Cost (Net Benefit)	$ mil.	$1.7	$1.1

Scenario - 2 Direct Impact Model Costs Summary, 50% Recovery

	(2012 $)	Direct Costs and Benefits with 50% Mattress Recycling Rate	
	Measure	2016	2017
Mattress Recovery Rate	Pct.	12.9%	25.9%
Number of Mattresses Recovered	No.	404	810
Value of Materials Recovered	$ mil.	$1.3	$2.5
Infrastructure Costs	$ mil.	$1.5	$3.1
Labor Costs	$ mil.	$1.8	$3.7
New Jobs	No.	99	161
Avoided Consumer Disposal Fees (-)	$ mil.	$3.8	$7.8
Oversight, Education & Outreach	$ mil.	$2.7	$2.8
Net Annual Cost (Net Benefit)	$ mil.	$1.1	($0.7)

The REMI analysis estimates jobs, including those created through indirect and induced impacts, as 143 new jobs for the 20-percent recycling scenario by 2016 and 324 new jobs for the 50-percent recycling scenario. These job numbers are higher than the Direct Impact Model estimates because they include additional jobs created by indirect and induced economic impacts.

Of the total new jobs directly created, 6.5 of the positions are government oversight positions at CalRecycle. The remainder are the estimated full-time-equivalent jobs for the MRO to develop and implement the Program.

B. Creation of New Businesses or Elimination of Existing Businesses

No businesses are expected to be eliminated in California, and many are, in fact, predicted to be created or augmented (see section A, above). First, existing recyclers, collectors, and transporters will likely have an opportunity to participate in the program through a contracting process overseen by the MRO. Second, CalRecycle estimates that as a result of the MRO's Program, if half of the eligible used mattresses are recycled, at least 45 new business locations would be needed to deconstruct the collected mattresses. (Whether these locations are each individually owned by entrepreneurs, or whether several firms each own several, remains unknown.) The recycled material components derived from the mattresses would be further processed through existing commodities channels, and no new locations are expected.

C. Competitive Advantages or Disadvantages for Businesses

No competitive advantages or disadvantages for businesses are expected as a result of the Regulations because they apply equally to all manufacturers, renovators, and retailers within California or selling mattresses within California. In other words, out-of-state entities would be covered by the same requirements as those in California; therefore, the Regulations would not impact the ability of California businesses to compete with those in other states to produce goods or services.

D. Increase or Decrease of Investment

The results of this analysis do not indicate whether the proposed Regulations would either increase or decrease investment in the State. However, given the number of jobs increased and the expansion of mattress recycling business locations mentioned above, it is reasonable to assume an increase of investment in the state.

E. Incentives for Innovation in Products, Materials, or Processes

Current mattress recycling technology is rudimentary and consists of manual labor: cutting into the fabric ticking and separating the wood, steel, foam, and fabric. These recycled commodities are then sold (fabric, steel, and foam), or composted (wood). As the Program encourages recyclers to participate more extensively and attempt to recover more used materials, innovative mattress processing technology may be developed, potentially leading to additional design and manufacturing jobs in the state. More broadly, the Program will dramatically expand what is now only a fledgling industry in California – mattress recycling – creating an incentive for new businesses to profit from this market opportunity.

F. Benefits of the Regulations

Currently used mattresses in California represent a significant environmental and economic problem. Most are sent to landfill or illegally disposed (e.g. abandoned on public lands, etc.), and recycling is minimal. For example:

- In one 12-month period, remediation expenses exceeded $220,000 to address more than 2,800 illegal mattress dumping reports in the City of Oakland alone (many of which involved multiple mattresses).[8]
- As of July, 2014 only six mattress recycling companies service California's 38 million citizens.[9]

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[8] Mattress Dumping Complaints and Costs, FY 2010-2011. Raw data, City of Oakland.

[9] "Recycling Locations." *Mattress Recycling Council*. 09 July 2014. <http://www.mattressrecyclingcouncil.org/recycling-locations/>.

- Geyer and Kuczenski estimate the used mattress recycling rate in the state is less than 5 percent annually,[10] a small percentage of the estimated 4.2 million mattresses and box springs discarded each year in California.[11]
- Recycling the 4.2 million mattresses and box springs instead of landfilling them potentially could reduce greenhouse gasses by more than 132,000 tons of CO2e per year, or 45 percent of the greenhouse gases produced in manufacturing and landfilling them.[12] (The economic quantification of these changes is beyond the scope of this assessment.)
- Redirecting mattresses to recycling will avoid average landfill fees of about $9 per mattress.[13]

The Regulations and Program established by the MRO will significantly mitigate these problems and lower taxpayer costs (although it is difficult to quantify these costs until the program is fully designed and implemented by the MRO):

- Local governments will be able to redirect staff from dealing with illegal disposal of mattresses to other priorities that have been neglected during recent years of budget shortfalls, since mattress producers will now be responsible for overseeing their products through end-of-life.
- Public agency costs for the end-of-life management of used mattresses will be reduced, including expenditures for solid waste management and remediation of illegal disposal.
- Incentive payments provided by the Program will reduce illegal dumping, blight, and associated health hazards.
- Mattresses will be kept out of landfills as mandated recycling programs come on line, bringing recycling jobs and related businesses to California and dramatically boosting what is now a minor industry in the state.
- Increased recycling of metals, plastics and other materials from used mattresses will reduce greenhouse gases, both by decreasing the need for energy-intensive virgin resources and by lowering methane-generating materials in landfills.
- Removing heavy, bulky mattresses from landfills will assist California in achieving its goal of reducing, recycling or composting 75% recycling of all solid waste by January 1, 2020.

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[10] Roland Geyer and Brandon Kuczenski, *Mattress and Box Spring Case Study: The Potential Impacts of Extended Producer Responsibility in California on Global Greenhouse Gas (GHG) Emissions*, University of California, Santa Barbara, May 2012, p. 14.

[11] "MATTRESSES." *California Product Stewardship Council*. 09 July 2014. <http://www.calpsc.org/products/mattresses>.

[12] Roland Geyer and Brandon Kuczenski, *Mattress and Box Spring Case Study: The Potential Impacts of Extended Producer Responsibility in California on Global Greenhouse Gas (GHG) Emissions*, University of California, Santa Barbara, May 2012, p.10-11.

[13] *Illegal Dumping Technical Advisory Committee Informal Illegal Dumping Mattress Survey,* IDTAC, Sacramento: 2012.

IV. CONCLUSIONS

A. Costs and Benefits Due to the Regulations

The Department estimates the direct net economic impact of the Program (including the fiscal impact) is $1.7 million in 2016 (after full implementation of the Regulation) for the 20 percent recycling scenario. The estimated net economic impact of the Program for the 50 percent recycling scenario is $1.1 million in 2016. However, the 20 percent recycling scenario results in an annual positive net benefit of $1.26 million after achieving the 20 percent recycling rate in 2024. The 50 percent recycling scenario results in an annual positive net benefit of $7.78 million in 2024.

As delineated above, the Regulations and Program established by the MRO will provide significant benefits, including:

- Local governments will be able to redirect staff to other priorities that have been neglected during recent years of budget shortfalls, since mattress producers will now be responsible for overseeing their products through end-of-life.
- Public agency costs for the end-of-life management of used mattresses will be reduced, including expenditures for solid waste management and remediation of illegal disposal.
- Incentive payments provided by the Program will reduce illegal dumping, blight, and associated health hazards.
- Mattresses will be kept out of landfills as mandated recycling programs come on line, bringing recycling jobs and related businesses to California and dramatically boosting what is now a minor industry in the state.
- Increased recycling of metals, plastics and other materials from used mattresses will reduce greenhouse gases, both by decreasing the need for energy-intensive virgin resources and by lowering methane-generating materials in landfills.
- Removing heavy, bulky mattresses from landfills will assist California in achieving its goal of reducing, recycling or composting 75% recycling of all solid waste by January 1, 2020.

B. Costs and Benefits of Regulatory Alternatives and Reason(s) for Rejecting Alternative(s)

Alternative 1: Do not adopt a regulation; rely solely on statute.

Cost: Regulations provide the essential clarity and administrative procedures for the MRO related to submittal and approval of plans and reports, and also provide additional clarity and procedures with respect to enforcement activities for the MRO, manufacturers, renovators, retailers, distributors, and recyclers. Without regulations, the cost of establishing a new Program for the recovery and recycling of used mattresses, as required by statute, would remain the same. Without regulations, the cost of submitting plans and reports and enforcing Program

implementation, as required by statute, would also remain the same. Without regulations, there could be additional costs incurred by CalRecycle and the MRO related to multiple submittal of plans and reports, because clear expectations of administrative procedures would not be detailed. Similar additional costs could occur with enforcement activities.

Benefits: This alternative would not achieve any of the benefits listed in the above section - Costs and Benefits Due to the Regulations. For this alternative, time and resources typically expended for adoption of a regulation would not be incurred.

Reason for Rejecting: The no action alternative would not address the stated need for the Regulations, namely to clarify and help implement the Used Mattress Recovery and Recycling Act and to protect public health, safety, and the environment. The additional clarity and procedures detailed in the Regulations will result in a more cost-effective and streamlined implementation of the Program required by statute.

Alternative 2: Require program participants to report additional data regarding the end use of materials from recycled mattresses, and descriptions of the products or commodities for which these materials are ultimately used.

Cost: Increased administrative and reporting costs would be required for this alternative, with no cost savings.

Benefits: This alternative would provide an indication of the market for recycled commodities and the end uses of materials obtained from used mattresses. Understanding the fate of recycled materials would allow CalRecycle to better estimate the economic and life-cycle benefits of the Program.

Reason for Rejecting: This alternative and its reporting requirements would be cost-prohibitive to the program because it would require mattress manufacturers, retailers, renovators, and recyclers to expend extra resources collecting new information that is not easily attainable under current information collection practices. Because the Program has not yet been designed or implemented, there is no evidence to suggest that collection of this additional data is required to implement a successful Program. Thus, this alternative was rejected.

C. Impact on General Fund and Special Funds

CalRecycle has determined the proposed Regulations do not impose a mandate on local agencies or school districts.

CalRecycle has further determined the proposed Regulations do not impact 1) any costs to local government, which must be reimbursed pursuant to Section 6 of Article XIII B of the California Constitution and Part 7 (commencing with Section 17500) of Division 4 of the Government Code; 2) any

savings or other impacts such as revenue changes to state agencies; and 3) any additional federal funding or reduction in federal funding to the state. However, at the local government level some current expenditures at the city and county level may be reduced, to the extent that the recycling of used mattresses will reduce the number dumped illegally on alleys and rural roadways. Some public agencies currently expend significant sums to retrieve and properly dispose of illegally dumped mattresses.

Additionally, CalRecycle has determined the proposed Regulations do not impose costs to local government which are not reimbursable under Section 6 of Article XIII B of the California Constitution but which will necessarily be incurred in reasonable compliance with the Regulations, and which could result in a revenue change(s). By design, the Program shifts such costs from local government to mattress producers. CalRecycle itself will incur costs in reasonable compliance, administration, implementation, and/or enforcement of the Regulations. However, these costs by statute are to be reimbursed by the MRO.

APPENDIX I

Summary of Direct Impact Model, with 20% Maximum Recycling

									INCLUDE AVOIDED CONSUMER DISPOSAL FEES
			subtract	add	add			add	
	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	TOTAL
	Recovery Rate	Number of Matresses Recovered	Mattresses Materials $ Recovered	Infrastructure Costs	Labor Costs	New Jobs	Avoided Consumer Disposal Fees	Oversight, Ed. & Outreach Costs	REGULATION'S ANNUAL NET COST OR (BENEFIT)
YEAR	3.0%	(x 1000)							(breakeven)
2015	3.6%	149.16	$468,359	$565,757	$678,787	59	$1,342,429	$2,705,000	$2,162,042
2016	8.1%	252.93	$794,209	$959,370	$1,151,038	75	$2,356,068	$2,745,575	$1,745,193
2017	12.5%	390.25	$1,225,382	$1,480,210	$1,775,934	97	$3,762,402	$2,786,150	$1,115,432

Summary of Direct Impact Model, with 50% Maximum Recycling

									INCLUDE AVOIDED CONSUMER DISPOSAL FEES
			subtract	add	add			add	
	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	TOTAL
	Recovery Rate	Number of Matresses Recovered	Mattresses Materials $ Recovered	Infrastructure Costs	Labor Costs	New Jobs	Avoided Consumer Disposal Fees	Oversight, Ed. & Outreach Costs	REGULATION'S ANNUAL NET COST OR (BENEFIT)
YEAR	3.0%	(x 1000)							(breakeven)
2015	5.8%	179.99	$565,176	$682,708	$819,104	64	$1,619,931	$2,705,000	$2,049,804
2016	12.9%	404.09	$1,268,828	$1,532,690	$1,838,899	99	$3,764,055	$2,745,575	$1,147,364
2017	25.9%	810.08	$2,543,659	$3,072,632	$3,686,499	161	$7,810,026	$2,786,150	($681,941)

APPENDIX II

Summary of Inputs to REMI Model, Converted from Outputs from Direct Impact Model

20% Mattress Recycling Scenario									
				2012	2013	2014	2015	2016	2017
OVERSIGHT ED. & OUTREACH	(in Mill. $)	Production Cost	x7889	0.00	0.00	0.00	2.3012	2.3357	2.3702
OVERSIGHT ED. & OUTREACH	(in Mill. $)	Exogenous Final Demand	X6525	0.00	0.00	0.00	2.3012	2.3357	2.3702
LANDFILL REVENUE REDUCTION	(05 Fixed Nat'l M$)	Industry Sales / Exog Prod'n w/out Empt Invmt & Compensation	X6330	0.00	0.00	0.00	-0.8452	-0.8944	-0.9974
HALF LANDFILL SAVINGS	(05 Fixed Nat'l M$)	Proprietor's Income	X1889	0.00	0.00	0.00	0.4226	0.7564	0.9556
HALF LANDFILL SAVINGS	(05 chained, M $)	Consumer Price (Amount)	404	0.00	0.00	0.00	-0.4226	-0.7564	-0.9556
JOBS CREATED	(thousands)	Indust. Empmt (Indust Sales / Exogenous Prod'n) (No.)	X4130	0.00	0.00	0.00	0.0170	0.0294	0.0358

50% Mattress Recycling Scenario									
				2012	2013	2014	2015	2016	2017
OVERSIGHT ED. & OUTREACH	(in Mill. $)	Production Cost	x7889	0.00	0.00	0.00	2.3012	2.3357	2.3702
OVERSIGHT ED. & OUTREACH	(in Mill. $)	Exogenous Final Demand	X6525	0.00	0.00	0.00	2.3012	2.3357	2.3702
LANDFILL REVENUE REDUCTION	(05 Fixed Nat'l M$)	Industry Sales / Exog Prod'n w/out Empt Invmt & Compensation	X6330	0.00	0.00	0.00	-0.8658	-0.9621	-1.2164
HALF LANDFILL SAVINGS	(05 Fixed Nat'l M$)	Proprietor's Income	X1889	0.00	0.00	0.00	0.4329	0.4811	0.6082
HALF LANDFILL SAVINGS	(05 chained, M $)	Consumer Price (Amount)	404	0.00	0.00	0.00	-0.4329	-0.4811	-0.6082
JOBS CREATED	(thousands)	Indust. Empmt (Indust Sales / Exogenous Prod'n) (No.)	X4130	0.00	0.00	0.00	0.0539	0.0552	0.0593