

# **Methodology for the Development of a Model Integrated Waste Tire Management Plan Framework for Baja California**



California Department of Resources Recycling and Recovery

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# Executive Summary

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This report was initiated at the request of the California Environmental Protection Agency, in recognition of the bi-national nature of waste tire problems in the California-Baja California border region. Specifically, Cal/EPA recognized that cooperation among jurisdictions on both sides of the border would be necessary to adequately address the continued illegal dumping of waste tires that cause problems in the border region.

To move this process forward, this report, which was provided under a 2011 contract with the California Department of Resources Recycling and Recovery (CalRecycle), is designed to provide technical assistance in the development of an integrated waste tire management plan for the State of Baja California. After the contract was initiated, the State of Baja California entered into negotiations with the Federal Government of Mexico, municipalities, and other stakeholders to develop and implement an integrated waste tire management plan specifically for Baja California, a draft of which had been developed by early 2012 (referred to as the “Draft BC Plan” – see Appendix 1).

Given these new developments, this report is intended to complement the efforts of the State of Baja California and other stakeholders in Mexico as they move forward. Intended to enhance cooperation between California and Baja California on issues of waste tire management, this report presents a methodology for problem solving and enhanced program integration. This methodology is intended to assist in the development of a model framework for Baja California’s integrated management of waste tires while also being applicable to the broader context of waste tire management in the California-Baja California border region.

Identifying current limits and opportunities for improving waste tire management systems in the California-Baja California border region, the report contains fundamental program components, design principles, and regional and international waste tire management experiences that Baja California could use to create an effective waste tire management program.

While the development of a model framework is beyond the scope of this study, the report discusses some framework options and potential connections to the current Draft BC Plan in order to demonstrate the usefulness of the methodology proposed. While some additional primary research was conducted, the majority of the report’s background information is a synthesis of prior research on the status of integrated waste tire management in the region.

This report begins with a discussion of the waste tire problem in the California-Baja border region (Section I and II), including the status of the infrastructure, management strategies, and regulatory systems in place to address this issue. The challenge for Baja California is to maximize the proper disposal of 1.5 million to 2 million waste tires per year. Of these, anywhere from one-third to one-half come from the United States, most initially as used tires imported from California to supply the market in Baja California.<sup>1</sup>

Currently, only about 40 percent of that total is captured by formal management systems in Baja California, the majority of which is used for tire-derived fuel for cement kilns.<sup>2</sup> The rest of these tires are either landfilled or informally disposed of, predominantly along the heavily populated San Diego-Tijuana metropolitan and Mexicali-Calexico border areas, and to a lesser extent along the rest of the 167-mile California-Baja California border.

The improper disposal of tires in this region poses a serious risk to public health, safety, and the environment on both sides of the border. If disposed in informal waste piles or improperly

managed dump sites, tires can be breeding grounds for vectors carrying a range of diseases, including malaria, dengue fever, encephalitis, West Nile virus, and yellow fever.<sup>3</sup> These tires can also leach chemicals into the soil and water tables and, in high enough concentrations, can generate sufficient gases to create a fire hazard and an air pollutant risk. Finally, many of these tires end up washing into border river basins, effectively disrupting riparian ecosystems.

As waste tires—and the environmental, health, and safety risks associated with them—traverse the political boundary between California and Baja California, this becomes a regional problem and thus requires regional cooperation.

California has been addressing the waste tire issue for more than two decades, with substantial program evolution, and in 2011 roughly 88 percent of the more than 40 million waste tires generated annually were diverted from landfills.<sup>4</sup> CalRecycle currently manages this program through registration requirements for all “generators,” haulers, and processors; a manifest and data processing system to track diversion and compliance; grants for local enforcement partners; and various market development grants to promote alternative outlets for the tires.

The Board of Equalization collects a \$1.75 tire fee assessed at the point of purchase of new tires in California. From that fee, 75 cents is transferred to the Air Pollution Control Fund and the remaining \$1 is transferred to CalRecycle where it is dedicated to managing waste tire-related issues. California state law prohibits the use of California tire fee outside the state’s jurisdictional borders except under limited circumstances.

Mexico has had a well-designed waste management plan at the federal level since 2003, and Baja California has had one in place since 2007. However, waste tire management has not been explicitly addressed. Recently, there has been an effort to refine these regulatory frameworks and institutions to more specifically address the issue of waste tires.<sup>5</sup>

In 2010, the Law for the Prevention and Integrated Management of Waste for the State of Baja California (LPGIRBC) was amended to clarify the responsibilities of tire importers in ensuring the proper management of all tires they import throughout their life-cycle.<sup>6</sup> In March 2012, the Mexican Senate approved reforms to the federal Law for the Prevention and Integrated Management of Waste (LGPGIR) that prohibit the improper disposal of waste tires and require management plans for waste tires, specifically.<sup>7</sup> This reform is still awaiting passage by the Chamber of Deputies.

These reforms will affect tire manufacturers, importers, retailers, and distributors as part the regulatory framework for “products that when disposed become special management waste and subject to a management plan.”<sup>8</sup> A supplementary amendment to the Law of Roads, Bridges and Auto Transport was also introduced as part of the federal legislative reform to create demand for rubberized asphalt concrete (RAC) by fostering the use of this product through the federal transport infrastructure project concessions process.<sup>9</sup>

On the programmatic side, as noted above, the State of Baja California is in negotiations with the Federal Government of Mexico, local Baja California municipalities, the tire industry, and other stakeholders to develop an integrated waste tire management plan specifically for Baja California.<sup>10</sup> Initiated in late 2011, with a draft prepared by early 2012, this plan follows up on the action points set in Baja California’s broader 2009-2013 Integrated Waste Management Plan.

The Draft BC Plan is a step toward clarifying jurisdictional responsibilities between states and municipalities for the management of waste tires as a specific waste stream. It also includes provisions for a manifest system for tracking waste tire transportation in the state, registration of

processors and storage facilities, and formalization of the previously voluntary tire-fee charged by tire retailers to consumers upon delivery of waste tires, to be used for maintenance of storage facilities and cleanup actions.

Physical infrastructure for the plan's implementation is also being constructed, with two temporary storage facilities now in place and one in operation. This will provide additional capacity above and beyond the current authorized disposal options which include the CEMEX cement kilns in Ensenada, Baja California, and Hermosillo, Sonora.

In Section III, this study introduces a policy analysis methodology for evaluating, prioritizing, and categorizing program design options common to most international programs of relevance to Baja California. The aim is to assist policy makers on both sides of the border in identifying program design components (i.e., modules) from other integrated waste management plans that are applicable to the California-Baja California border region.

Ultimately, this theoretical framework for a model plan highlights essential program modules that have proven to be effective elsewhere and that can eventually help close design gaps to consolidate the Draft BC Plan. It also identifies areas for complementary programs and cooperation between California and Baja California, as well as program coordination opportunities in regional waste management that can help advance programmatic goals on both sides of the border.

To demonstrate the usefulness of this theoretical methodology for the development of a model framework, the fourth section of the report presents several cases of "smart practices" in integrated waste tire management programs around the world, including California, the European Union (EU), and Ontario, Canada highlighting their key policy design parameters that can be considered independently and which may supplement the Draft BC Plan.

Each of these programs has a very different approach to the integrated management of waste tires in their jurisdictions, ranging from the EU's largely hands-off, private "Extended Producer Responsibility" (EPR) model, where industries have primary responsibility for managing waste tires per European Commission (EC) regulations; to California's government-run enforcement and market development program; to Ontario's very publically managed EPR system, where the province provides carefully calculated incentives to tire businesses along the whole waste tire commodity chain to prioritize higher value-added uses of waste tires.

In Section V, this study extracts the key policy design parameters from the cases discussed in the prior section, and highlights their roles in effective integrated waste tire management. Differing approaches to implementing the design parameters are noted and their applicability to Baja California is discussed in general terms. Key design parameters emerging as most relevant to a Baja California plan include: clearly prioritized policy outcomes; clear regulations ensuring incentives; effective enforcement mechanisms; sufficient monitoring; clear jurisdictional and stakeholder responsibilities; a sustainable and feasible source of funding; and well-developed, productive outlets for waste tires.

The report concludes with a discussion of some of the preliminary obstacles and opportunities to the integrated management of waste tires in the border region and notes some preliminary areas for improvement identified through application of the policy analysis model and lessons from international practices in waste tire management. These preliminary recommendations are intended as examples of the potential uses of the analysis model itself rather than comprehensive suggestions for Baja California.

Primary findings and recommendations:

- **Clearly Prioritized Policy Outcomes:** Currently there is a strong focus on increasing temporary storage capacity for waste tires in Baja California, but there is not yet the connected processing capacity or tire-derived product outlets, thus resulting in a growing strain on the capacity of these storage facilities. Prioritizing a hierarchy of “proper disposal or treatment” options could address imbalances such as these in the waste tire management system.
- **Clear Regulatory Controls Ensuring Incentives:** Recent changes to federal and state regulations for “special management waste” and waste tires, specifically, have clearly defined the types of waste tire disposal that are prohibited. However, incentives and/or sanctions for all parties in the waste tire supply chain have not been developed equally. In particular, new tire producers have been largely left out of the evolving management framework in Baja California to date. Additionally, given the difficulty of modeling outcomes from various incentives and sanctions, it may be beneficial to prepare potential adjustments to the incentives and sanctions if initial evidence from implementation shows problems arising.
- **Effective Enforcement Mechanisms:** While the Draft BC Plan assigns enforcement responsibility to municipalities, it does not clearly define implementation mechanisms. Tire-fee funding goes to the state, and thus it is unclear where funding for municipal enforcement will come from. California’s experience with providing local “enforcement grants” and training for local authorities may provide a useful design element for Baja California, given the municipal responsibility for enforcement in Baja California.
- **Sufficient Monitoring:** The difficulty in tracing all sources of waste tires ending up in Baja California prevents ideal targeting of programs and limits the potential funding that could be raised from tire fees charged to formal importers and other potential bilateral or regional cooperation arrangements. Increasing cross-border collaboration and innovation in developing tracking programs could assist in more accurately defining the problem.
- **Clear Jurisdictional and Stakeholder Responsibilities:** Recent changes to federal and state laws have clarified some of the jurisdictional confusion around waste tire management, but there are some lingering gaps and overlaps. The Draft BC Plan, for instance, does not include new tire distributor and retailer responsibilities, and the private sector seems to be reluctant to sign the memorandum of understanding (MOU) for the Draft BC Plan. Additionally, the federal government in Mexico has a separate working group developing a national integrated waste tire management plan, which could create confusion and uncertainty for the state plan and local implementation. Clarification of the responsibilities of new tire generators and the relationship between a potential national integrated waste tire management plan and the Draft BC Plan would reduce uncertainty of policy outcomes.
- **Sustainable and Feasible Source of Funding:** Financial constraints in the State of Baja California and the local municipalities limits funding for integrated waste tire management programs above and beyond the operation of temporary storage stations to which the current tire fee is dedicated. These financial limitations are compounded by limited support from the federal level, as well as difficulty in securing financial support for cross-border collaboration due to legal restrictions on the expenditure of California tire fees in Baja California. An EPR system for waste tire management in Baja California

could place administrative costs for managing the integrated waste tire program under the fee structure for the program, as opposed to being externalized onto the general municipal or state budgets. Additionally, maintaining a commitment to the Border Integrated Waste Tire Management Initiative in the Border 2020 program could translate the successes of waste tire pile cleanups along the border to longer term regional integrated management. There may be opportunities at the state level for expanding cooperation such as this as well.

- **Productive Alternatives for Waste Tires:** As noted above, current temporary storage facilities are beginning to experience capacity problems as the rate of diversion to these centers far exceeds the rate of tire-derived product processing and use. With a more complete systems analysis of tire markets and potential uses of tire-derived products in Baja California, these can be promoted directly through the fee program (if expanded beyond storage support), or embedded within an EPR plan. California's extensive experience with market development grants could provide a useful learning experience as well.
- **Regional Cooperation Opportunities:** As noted above, continued focus on the border integrated waste tire management initiative within Border 2020 could contribute to expansions of regional cooperation on the longer-term management of waste tires in the border region. Considering the option of developing a similar initiative at the state level between Baja California and California may allow a greater degree of context and detail to facilitate the development and implementation of the Draft BC Plan, for instance. Additionally, it is the opinion of the Center for Environmental Public Policy that on a more immediate basis, California and Baja California should cooperate on standardized manifests and tracking systems to help overcome one of the substantial obstacles to integrated waste tire management in the border region.

# I. Background/Introduction

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## ***Trans-border Regional Issue***

With nearly 6 million people living along the border region, and approximately 26 million vehicles passing from Baja California into California each year — with similar numbers likely going the other way — numerous tires have reached the end of their lives along the border, and a substantial proportion end up being dumped illegally.

The challenge for Baja California is to deal with the proper disposal and recycling of 1.5 million to 2 million waste tires each year, a majority of these in the border region of the state. New tire sales in Baja average around 500,000 per year, 650,000 to 700,000 used tires are formally imported from California, an additional 80,000 tires are imported on used and scrap cars from California, and another 300,000 to 500,000 waste tires end up in Baja California through un-tracked means.<sup>11</sup> While more than 30 percent are diverted to CEMEX cement kilns as a source of fuel and another 30 percent are used in formal and informal civil engineering projects, the remainder are either landfilled or dumped illegally. Many of these tires end up being illegally dumped along the 167-mile California-Baja California border.

The improper disposal of tires in this region poses a serious risk to public health, safety, and the environment, on both sides of the border. If disposed in informal waste piles or improperly managed dump sites, tires can become breeding grounds for vectors carrying a range of diseases, including malaria, dengue fever, encephalitis, West Nile virus, and yellow fever.<sup>12</sup> These tires can also leach chemicals into the soil and water tables, and, in high enough concentrations, can generate sufficient gases to create a fire hazard and an air pollutant risk. Finally, many of these tires end up washing into border river basins, effectively disrupting riparian ecosystems.

The economic imbalance of the border region is one of the fundamental components of the regional waste tire value chain. San Diego County is home to 3 million people, while Tijuana has 1.6 million inhabitants. The proximity of these populations and the flows of resources and people across the border create a significant trans-border metropolitan area with shared environmental problems and responsibilities.

However, in terms of financial capacity to address these problems, the differences are clear: the city of San Diego has an annual budget of around \$2.8 billion,<sup>13</sup> while the Tijuana municipality has access to \$48 million — less than 2 percent of San Diego's budget.

However, there is a long-standing spirit of cooperation between the two cities, states and nations, as demonstrated by letters of intent at all levels of government, as well as by the cooperation of businesses, trade associations, governmental and non-governmental groups working toward integrated waste tire management in the border region. The Border 2012 program, which has since evolved into the Border 2020 program, was initiated in 2002 and driven by the 1983 La Paz Agreement on Cooperation for the Protection and Improvement of the Environment in the Border Area. The program included substantial funding and cooperative programs to clean up large waste tire piles along the U.S.-Mexico border.<sup>14</sup>

As part of the Border 2012 focus on waste tires, a letter of intent to develop a U.S.-Mexico Border Scrap Tire Management Initiative was signed by the U.S. Environmental Protection Agency (US EPA) and the Mexican Ministry of Environment and Natural Resources (SEMARNAT) in 2006. Actions were taken to address high-profile, large waste tire piles along the US-Mexico border.<sup>15</sup>

In the context of these bi-national cooperative programs, the vast majority of large, illegal tire piles along the border have been cleaned up. An informal field investigation by the Baja California Secretariat of Environmental Protection (BCSPA) and SEMARNAT reported that there are no longer any large, informal tire piles in Baja California.<sup>16</sup> However, there are numerous smaller piles in addition to the dispersed illegal dumping of waste tires in cities.

While progress has been made, significant additional environmental and health burdens and clean-up costs remain. Addressing them will require continued cooperation, both at the bi-national and regional level.

In summary, as waste tires—and the environmental, health, and safety risks associated with them—traverse the political boundary between California and Baja California, this becomes a regional problem and thus requires regional cooperation.

### ***Current Waste Tire Management Status in the Border Region*** **California**

California has been addressing the waste tire issue for more than two decades and in 2011 managed to divert from landfills 88 percent of the more than 40 million waste tires that are generated each year in the state. CalRecycle's tire program manages these tires through permitted waste tire facilities, registered waste tire haulers, and a manifest reporting system. It partners and provides grants to local enforcement agencies to assist in compliance with the overall registration and manifest tracking system. In addition, the program encourages the recycling of tires and provides market development support through grant and loan programs, and research and technical assistance.

CalRecycle's tire program is funded by \$1 of the \$1.75 tire fee assessed at the point of purchase of new tires, and this fee is dedicated to managing used and waste tire-related issues in California. Further information on CalRecycle's enforcement activities can be found at <http://www.calrecycle.ca.gov/Tires/Enforcement/>

The serious, shared risks to health, safety, and the environment that are the result of border waste tire buildups are acknowledged by California government. Indeed, in its latest Five-Year Plan, CalRecycle added this contract to provide technical assistance to the State of Baja California to further the development and effectiveness of its own integrated waste tire management plan.

Previously, it had commissioned a study to quantify the number and flow of California waste tires that are improperly disposed of in Mexico.<sup>17</sup> Additionally, to determine the extent of the improper disposal of waste tires in the border region, California has funded projects to identify illegal dumping sites and piles in the border region, such as one to use satellite imagery to identify sites.<sup>18</sup> Additional information regarding California's tire program can be found in its latest [Five-Year Plan](#).

However, California state law prohibits the use of California tire fees outside the state's borders except under limited circumstances. This prevents CalRecycle from spending tire fees on tire burdens in Mexico caused by waste tires that did not come from California or on tires that were reused in Mexico prior to disposal (and thus were not "waste tires" upon entering Mexico). Tire fees may incidentally address a tire burden in a "sister-state" or in Mexico but only to the extent that the burden adversely impacts California and was caused by California waste tires. Currently, the limited information and tracking systems in place make the task of confirming the condition (e.g. "used" or "waste") and total quantity of California tires entering Mexico extremely difficult.

## Baja California

Currently, only about 40 percent of the total waste tires accumulating in Baja California each year are captured by formal management systems, a majority of which are used for tire-derived fuel for cement kilns. The rest of these tires are either landfilled or informally disposed, predominantly along the heavily populated San Diego-Tijuana metropolitan and Mexicali-Calexico border areas, and to a lesser extent along the rest of 167-mile California-Baja California border.

Substantial progress has been made in the cleanup of the largest legacy tire piles in the state, as noted previously, so attention and resources are now shifting to integrated management of the annual accrual of waste tires in Baja California.

Mexico has had a well-designed waste management plan at the federal level since 2003, and Baja California has had one in place since 2007. However, waste tire management was not explicitly addressed. Recently, there has been an effort to refine these regulatory frameworks and institutions to more specifically address the issue of waste tires.<sup>19</sup>

In 2010, the Law for the Prevention and Integrated Management of Waste for the State of Baja California (LPGIRBC) was amended to clarify the responsibilities of tire importers in ensuring the proper management of all tires they import throughout their life-cycle.<sup>20</sup> In March 2012, the Mexican Senate approved reforms to federal Law for the Prevention and Integrated Management of Waste (LGPGIR) that prohibits the improper disposal of waste tires. The reforms affect tire manufacturers, importers, retailers and distributors as part the regulatory framework for “products that when disposed become special management waste and subject to a management plan.”<sup>21</sup>

A supplementary amendment to the Law of Roads, Bridges and Auto Transport (LCPAF) was also introduced as part of the federal legislative package to create demand for RAC by fostering the use of this product through the federal transport infrastructure project concessions process.<sup>22</sup> The federal reforms await passage by the Chamber of Deputies.

Tire fees have been implemented in various forms since 2008, but were formalized with inclusion in the 2010 Baja California revenue code.<sup>23</sup> All importers of used tires are required to demonstrate “proper” disposal of an equal or greater number of tires than they import, and can pay a fee of four pesos per passenger tire to the Baja California Secretariat of Environmental Protection (SPABC) to dispose of them at one of two new, state-run, monofill storage sites (one in Mexicali and another in Tijuana).

They can also opt to dispose of their tires using other methods accepted by SPABC, including at privately run disposal sites or cement kilns, but they must still obtain certificates of disposal from SPABC in order to obtain their import quotas. Half of the tire fund created from this fee is being used to maintain the two state-run storage facilities and fund the cleanup of tire piles, while the other 50 percent enters the state general fund.

On the program side, the State of Baja California is in negotiations with the Mexican federal government, local municipalities, the tire industry, and other stakeholders to implement an integrated waste tire management plan specifically for Baja California (Draft BC Plan).<sup>24</sup> This plan helps clarify jurisdictional responsibilities between states and municipalities for the management of waste tires as a specific waste stream. It also includes provisions for a manifest system for tracking waste tire transportation in the state, and for the registration of processors and storage facilities.

here are still hurdles to the actual implementation of the plan, and the evolution of the problem at the bi-national and national level may affect its development as discussed in the methodology section of this report (Section III). Despite this, as the negotiations surrounding the Draft BC Plan are contingent upon the political will of all parties (and there is a presidential election in July 2012 and governorship elections in 2013), Baja California officials are not waiting for a final agreement to start implementation of various components of the Draft BC Plan.

## II. Institutional Building Blocks: Toward Integrated Waste Tire Management Programs in Baja California

Table 1: Overview of Jurisdictional and Legal Relationships in Baja California

Jurisdictional Scale	Waste Tire Management Authority	Laws of Relevance
<b>Federal</b>		Political Constitution of the United Mexican States  NOM (Mexican Official Standard)  LCPAF (Federal Law of Roads, Bridges and Auto Transport)
SEMARNAT  (Secretary of the Environment and Natural Resources)	-Hazardous Waste Management Authority  -Sets broad guidance on Integrated Waste Management Plans	LGPGIR  (General Law for the Prevention and Integrated Management of Waste of 2003)
Ministry of Economy	-Sets import quotas for used tires contingent upon certificates of proper disposal from state environmental agencies	
<b>State</b>		
SPABC  (Baja California Environmental Protection Agency)	-Special Management Waste (solid waste produced in quantities >10 tons/year) authority  -Primary developer of integrated waste management plans	LPGIRBC  (Law for the Prevention and Integrated Management of Waste of 2007)
<b>Municipal</b>		
Secretariats of Ecology and Urban Development  Directorates of Environmental Protection	-Manage municipal solid waste  -Enforce state waste regulations	

This section begins with a discussion of recent institutional and programmatic developments advancing integrated waste tire management in Baja California. This includes a progress report on the development of some essential components for an integrated plan. It will then introduce the underlying institutional and legal framework that provides a basis for the development of an integrated waste management plan in the State of Baja California. Lastly, it will present some program activities developed at the municipal level within the state.

## ***Recent Institutional and Programmatic Developments***

In October 2010, reforms to the Law for the Prevention and Integrated Management of Waste for the State of Baja California (LPGIRBC) were published.<sup>25</sup> They stipulated the obligations that stakeholders who work in the vulcanization, retreading, and sale of new and used tires (“generators”) must meet by 2012.

The Baja secretariat of environmental protection, in coordination with the secretariat of economy, SEMARNAT, and the state chamber of commerce, determines the quantity of used tires to be allotted to 120 registered importers with the commitment that each importer will dispose of a quantity of tires equal to or greater than those imported in authorized collection centers.

Additionally, in 2010, Baja California authorities added the tire fee collected from used tire importers to the revenue code.<sup>26</sup> While the tire fee had existed previously as a voluntary fee and was tied to used tire import quotas in 2007, formalizing it into the revenue code promises greater longevity.

The fee is structured so that all used tire importers are required to show certificates of proper disposal for a number of tires equivalent to their import quota. This is accomplished either by paying the SPABC four pesos<sup>27</sup> per passenger tire in order to dispose of them at a state-run storage facility or by paying a fee to a SPABC-certified private operator such as CEMEX to dispose of the tires.

Without certificates demonstrating proper disposal, tire importers will be unable to receive import quota allotments from the federal Ministry of Economy. The importers can choose whether and how to recover that fee, including by charging customers for each waste tire collected or including it in the cost of purchased used and/or new tires sold.

Officials have noted that, due to current incentive structures and the nature of the used and new tire markets in Baja California, tire importers seem to be collecting consumers’ old tires for free, as they need the tires in order to properly dispose of them, and don’t feel consumers would return them if charged the new fee.

It is unclear whether they are internalizing this cost or passing it on to consumers in price increases. This tire fee does not apply to retailers who sell only new tires, however, because they would not have any incentive to collect and dispose of waste tires.

The SPABC is using 50 percent of the tire fee funding to support the public temporary storage facilities in Mexicali and Tijuana as well as potential cleanup costs. The Mexicali site is operational and the Tijuana site was expected to be accepting tires by July 2012. These two sites are capable of holding up to 6 million tires in total, if needed, and are expected to accept around 750,000 waste tires per year, although this estimate is based entirely on the used tire import quota for Baja California at this point. The Tijuana site is expected to take in about 250,000 tires per year.

The proposed 2012 reforms to the federal LGPGIR (prohibiting the improper disposal of waste tires by tire manufacturers, importers, retailers, and distributors) was an attempt to clarify responsibilities for and jurisdiction over “special management waste” (any waste produced in quantities greater than 10 tons per year).<sup>28</sup>

The vast majority of point sources for waste tires fall into this category, as discussed further in Section II.B. The amendment to the LCPAF, noted above, is the first legislation at the federal

level to attempt to directly subsidize an alternative, tire-derived product demand.<sup>29</sup> This demonstrates a growing awareness of the waste tire management issue.

Finally, in accordance with Article 19, Section IX of the LGPGIR, SEMARNAT also recently implemented a new federal standard (NOM) establishing the criteria for special waste management classification, listing, and plan formulation.<sup>30</sup> In particular, this new standard sets the guidelines for states to request that SEMARNAT make additions to the list of special management waste, the standards for plan design, and procedures.

### **Ongoing Multi-Stakeholder Negotiations**

In late 2011 and early 2012, Baja California developed a draft integrated waste tire management plan (Draft BC Plan), following up on the action point set in its broader 2009-2013 Integrated Waste Management Plan.<sup>31</sup> While the final plan is still in development, it aims to establish a coordinated program to prevent the establishment of illegal tire piles and tire fires in the border region.

The plan moves to clarify the jurisdictional responsibilities of the federal, state, and local authorities in relation to waste tire management, and sets forth specific responsibilities for each. The Federal government's responsibility will be to manage the import quotas for used tires entering the state of Baja California when the state has met all of its commitments under the plan. For its part, the state has agreed to assume most of the registration, tracking, and regulatory responsibilities over importers of used tires, storage facilities, and processors.

The state has also agreed to assess and manage rights-fees associated with the program. Municipalities agreed to be the enforcers of these regulations by conducting all inspections, locating illegal sites, and monitoring and imposing sanctions, thus assuming many of the costs. The primary changes this represents to Baja California's current management of waste tires are the added responsibilities for municipalities and the inclusion of previously ignored private operators, such as junk yards that dismantle cars.

However, at the federal level, authorities are developing a more ambitious strategy to establish a national integrated waste tire management plan that could eventually preempt Baja California's local and regional efforts.

While there has been federal support to clean up large pile sites within the context of bi-national efforts, there seems to be reluctance to support ad-hoc needs from Mexican border states with federal funds. In addition, SEMARNAT, in collaboration with the National Car Registry (REPUVE), the federal procurement agency, car manufacturers, dealerships, and the cement and steel industry, has developed a draft integrated management plan for end-of-life vehicles, including attached used and scrap tires, that focuses on reduction, reuse and recycling.

This description of the current efforts within Baja California to address waste tire management showcases the goal of developing an inclusive, collaborative approach to problem solving. If realized, it will serve as a valuable and effective mechanism toward integrated management in the border region.

While initiatives are also progressing at the federal and international levels, the attitude of the Baja California State Agency for Environmental Protection is to not wait for the Mexican federal government, bi-national processes, and/or enhanced cooperation with California but to keep progressing toward more effective measures within their capacity and capabilities as these other processes unfold.

## ***Jurisdictional Context***

### **Federal Government**

The Federal Agency of Environment and Natural Resources in Mexico is the Secretariat of the Environment and Natural Resources, commonly known as SEMARNAT. The SEMARNAT coordinates and evaluates policies and guidelines for environmental protection and sustainable usage of natural resources at the national level. The SEMARNAT has explicit jurisdiction over all hazardous materials.

The Secretariat of the Economy also has a role in waste management. It is the federal agency responsible for authorizing and distributing the annual used tire importation quotas. These quotas are negotiated yearly by the Secretariat, federal, and state government authorities, and Mexican national and state tire dealer associations.

However, changing administrations at the federal level can hold significant sway over the direction of federal initiatives relating to scrap tire management. With new administrations and new appointments to the relevant secretariats and ministries, the uncertain fate of current programs, such as the federal plans for a national integrated waste tire management plan, can cause state and municipal governments to put their own plans on hold.

### **State Government**

The Baja California Secretariat of Environmental Protection (SPABC) is the agency responsible for applying state-level policy for environmental protection, including waste management policies and provisions. The SPABC has legal jurisdiction over non-hazardous waste, and over “special management” waste, which refers to any waste generated by a single entity in quantities greater than 10 tons annually. State governments and municipalities generally share responsibility for handling urban solid waste and special management waste.

### **Municipal Government**

Municipalities may assist the state and federal governments in efforts to promote large scale environmental protection. Since 1983, municipalities have been able to raise revenue through property taxes, user fees, and other local services. However, most municipal funds are obtained from the state and federal governments instead of from their own collection efforts.

Mexican states are divided into municipalities, which are roughly equivalent to counties in the United States. Each municipality is administratively autonomous. Citizens elect a municipal president, who heads a municipal council that is responsible for providing all the public services for their constituents.

Baja California is divided into only five municipalities: Ensenada, Mexicali, Tecate, Tijuana, and Playas de Rosarito. The municipalities in Baja California cover large areas incorporating several separated cities or towns that do not necessarily conform to a single urban area. Each municipality is responsible for public services such as water and sewage, street lighting, public safety, traffic, cleaning services, and maintenance.

### **International Cooperation Mechanisms**

Given that the State of Baja California shares a border with the United States, it is possible to use international entities as a resource to help implement the Draft BC Plan. At the federal level there

has been a high level of cooperation and funding to address border environmental problems derived from the 1983 Agreement on Cooperation for the Protection and Improvement of the Environment in the Border Area (La Paz Agreement).<sup>32</sup> This agreement formed the legal basis for the creation of U.S.-Mexico Border 2012 Program in 2002, which is a collaboration between the United States and Mexico “to improve the environment and to protect the health of the nearly 12 million people living along the border.”<sup>33</sup>

The Integrated Border Environmental Plan for the U.S.-Mexico Border Area (1992-1994), the creation of the Border Environmental Commission (BECC) and the North American Development Bank both in 1994, and the series of border plans (i.e., Border XXI, the Border 2012 Program, and its new phase, currently in draft format, Border 2020) demonstrate the cooperative intentions behind a bi-national effort that seeks to reduce air pollution, provide clean drinking water, and reduce hazardous waste along the U.S.-Mexico border.

Because Baja California shares a border with the United States, some of these institutions can function as bi-national mechanisms to facilitate Baja California’s Waste Tire Management efforts along the U.S.-Mexico border area specifically.

In addition to these general, bi-national cooperation initiatives, several actions have been taken focused on waste tires specifically. Beginning with a letter of intent signed by the U.S. EPA and SEMARNAT in 2004, the Border 2012 group followed up in 2006 with the U.S.-Mexico Border Scrap Tire Integrated Management Initiative (the Tire Initiative), which focused not only on clean-up actions, but cooperation on research on scrap tire generation, market development, and waste tire regulatory development as well.<sup>34</sup>

In 2008, 10 border states signed a memorandum of understanding in support of this initiative, underscoring the importance of the issue to the region.

Some progress has been achieved. As reported by SEMARNAT at the 2011 U.S.-Mexico Border Scrap Tire Meeting in San Diego, both the INNOR and El Centinela scrap tire sites in Baja California, which together contained more than 1,250,000 tires, were cleaned up.<sup>35</sup> Tires were shredded and used as fuel in various cement kilns in México. To date, more than 6.8 million tires have been recovered in the border region.

SEMARNAT is also working to prevent the creation of more scrap tire yards by working closely with local governments to meet local needs; develop better management practices; promote the cleanup of small yards; promote greater cooperation and coordination between local, state, and federal authorities; and promote greater participation from private industry.

SEMARNAT also is working on joint U.S.-Mexico efforts to establish policies for scrap tire management in the border region, which address better cross-border coordination among state and local governments, integrated regulatory and management frameworks, and capacity-building efforts. SEMARNAT hopes to have a national management plan in place soon that can be shared and coordinated with local and state authorities and other stakeholders.<sup>36</sup>

However, new management and collaborative approaches are needed, and a number of initiatives have been proposed. For instance, the BECC has suggested using a model based on multi-stakeholder partnerships to advance waste tire management strategies. However, the BECC also points to the need for further studies on the development of scrap tire processing technologies and their adaptation to local needs, better outreach to citizen groups, defining a regulatory framework for the integrated management plan, and developing a market for scrap tire materials.<sup>37</sup>

In its materials management and clean site goals, the Border 2020 Program also outlines its intention to continue to work on preventing scrap tire piles and enhancing recycling capacity, as well as supporting the institutional capacity to clean up contaminated sites.<sup>38</sup> While the largest cases of legacy tire pile sites have been resolved, current Border 2020 discussions still emphasize the need to continue work addressing cross-border scrap tire issues.<sup>39</sup>

At the regional level, Cal/EPA and SPABC entered into a non-binding collaboration agreement on March 25, 2010, in which they stated their intention to cooperate on the issue of waste tire management and outlined areas of possible cooperation. With this report, CalRecycle is contributing technical support to the exploration of pertinent frameworks for the development of an integrated waste tire management plan for the State of Baja California, which could further address this regional waste management issue.

## **Legal Context**

### **The Political Constitution of the United Mexican States**

The Mexican Federal Constitution of 1917 addresses waste management in Article 115,<sup>40</sup> which recognizes only municipalities as public service providers. According to Article 115, “municipalities are responsible for the cleaning, collection, transfer, treatment, and final disposal of waste.”<sup>41</sup> The Article does not refer specifically to the reach of its associated environmental and health protection functions or objectives.<sup>42</sup> This constitutional provision translates into an obligation for municipal governments to provide waste collection and disposal for their citizens but not for commercial and industrial activities. Additionally, this provision does not explicitly limit the capacity of municipal regulation over urban waste generators.<sup>43</sup>

### **Federal Law**

The federal law that governs waste management in Mexico is the General Law for the Prevention and Integrated Management of Waste of 2003 (LGPGIR).<sup>44</sup> The LGPGIR makes the federal government responsible for hazardous waste<sup>45</sup> and emphasizes the need for federal authorities to collaborate with municipal governments and other government agencies to create the necessary infrastructure for the integrated management of waste.<sup>46</sup> The LGPGIR instructs state and municipal governments to develop programs for the prevention and integrated management of waste streams, and for the remediation of contaminated sites. Under the LGPGIR, state and municipal governments are tasked with drafting and implementing programs for the prevention and integrated management of solid urban waste and for waste that requires special handling.

The LGPGIR gives municipal governments jurisdiction over solid urban waste, but instructs them to coordinate with the state government and with interested social sectors to develop municipal programs for the prevention and integrated management of solid urban waste, which must comply with the provisions contained in the relevant state program.<sup>47</sup>

The LGPGIR imposes a legal duty for municipalities to: (1) issue the necessary regulations and other legal and administrative provisions to comply with the LGPGIR;<sup>48</sup> (2) control solid urban waste;<sup>49</sup> (3) provide on their own, or through service providers, integrated management for solid urban waste, in compliance with the LGPGIR, and other state legislation;<sup>50</sup> (4) grant permits for integrated management of solid urban waste;<sup>51</sup> (5) establish and maintain an up-to-date registry for large generators of solid urban waste;<sup>52</sup> (6) verify compliance with this law, along with other laws and ordinances that address solid urban waste;<sup>53</sup> (7) impose sanctions and all applicable security measures to enforce the LGPGIR;<sup>54</sup> (8) collaborate in efforts to control hazardous waste generated by micro-generators and impose the appropriate sanctions when necessary;<sup>55</sup> (9)

prevent pollution and promote the remediation of areas that contain hazardous materials and hazardous waste;<sup>56</sup> (10) collect payments for integrated solid waste management services and programs;<sup>57</sup> (11) use the revenue generated to strengthen and further promote similar waste management programs;<sup>58</sup> and (12) enforce all other applicable laws and regulations related to integrated waste management.<sup>59</sup>

The federal LGPGIR does not specify whether waste tires are to be considered a solid urban waste or a special management waste. If waste tires are classified as solid urban waste, then they fall under the jurisdiction of municipal governments. However, if designated as a special management waste, then they may be regulated by the municipal government but they fall under the supervision of the state government entities.

The federal law specifies that solid urban waste that is generated from a source that produces more than 10 tons per year must be considered special management waste. All large generators of waste tires fall into this category and should therefore be required to follow the special management waste laws, which are managed by the state government.

It may be feasible to construe the federal LGPGIR so broadly as to classify municipalities themselves as a “major generators of waste.” As such, each municipality would be required to classify the totality of its waste (which would surely exceed the 10-ton minimum and include scrap tires) as a special management waste that must then be incorporated into the states’ integrated waste management plans. Doing so would permit a uniform approach to waste tire management across the state of Baja California.

This would be an ideal approach if conditions in each municipality are sufficiently similar that a state-level waste tire management plan would be capable of addressing local conditions. On the other hand, a uniform approach would not be desirable if each municipality differs significantly and requires specially crafted local regulations to manage waste tires.

The federal LGPGIR also provides a rough guide for the formulation of State Waste Tire Management Plans. The federal LGPGIR indicates that the state and municipal governments should draft and implement local programs for the prevention and integrated management of solid urban waste and for waste that requires special handling (this should apply to micro-generators of waste tires) through the use of the basic template for integrated waste management.

These programs should seek to manage waste streams, assess the infrastructure available to satisfy the demand for services, specify local objectives and goals to prevent waste generation, improve the management of solid urban waste, and include strategies and timelines for the accomplishment of these goals. Municipal and state programs should also propose financing mechanisms, promote collaboration between various municipal programs, and outline the technical assistance that the federal Ministry can provide in the support of such programs.

More recently, in March 2012, the Mexican Senate passed an amendment to the LGPGIR specifically addressing waste tires and assigning formal responsibility for their management to producers and importers of new and used tires.<sup>60</sup> The Federal Government of Mexico has also proposed an amendment to the Law of Roads, Bridges and Auto Transport to foster demand for rubberized asphalt concrete (RAC) through federal transport infrastructure project procurement.<sup>61</sup>

## **State Law**

Baja California has a state law in place that addresses waste management, called the Law for the Prevention and Integrated Management of Waste of 2007 (LPGIRBC).<sup>62</sup> This state law promotes

the recycling of reusable waste and provides certain statewide measures to regulate special management waste.<sup>63</sup>

The LPGIRBC requires that municipal governments act under the state government's supervision to create and authorize the operation of transfer centers for tire recycling and waste tire disposal.<sup>64</sup> It also requires all persons who engage in used tire commerce or in retreading to dispose of their waste tires only in authorized transfer stations or recycling centers.

The LPGIRBC specifies certain regulations that the municipal authorities must oversee, among them those related to the management of solid urban waste. The LPGIRBC also specifies that municipalities must promote the establishment of programs to advance integrated waste management.

This includes minimizing the waste generated by large municipal sources;<sup>65</sup> coordinating with the state secretary to develop alternative markets for recycled solid urban waste;<sup>66</sup> determining operational costs; establishing a system for collecting fees for waste management services;<sup>67</sup> registering and authorizing activities related to the operation of solid waste sites;<sup>68</sup> and, finally, inspecting, enforcing, and sanctioning persons who violate the LPGIRBC regulations.<sup>69</sup>

The LPGIRBC also establishes special regulations for generators of solid urban waste.<sup>70</sup> These regulations apply to both micro-generators of waste tires (operators producing less than 10 tons per year of solid waste) and large generators of waste.

Article 10 of the LPGIRBC specifies that generators of solid urban waste and of special management waste are liable for the entire life cycle of the waste they generate.<sup>71</sup> Therefore, these generators are liable for the management, collection, acquisition, transport, recycling, treatment, and final disposal of such waste or for delivering it to an approved final treatment facility.<sup>72</sup>

Additionally, all generators of solid urban waste or special management waste must participate in programs to prevent and reduce the generation of solid waste.<sup>73</sup> Such generators must also pay for the requisite cleaning services to treat solid urban waste or for the management of such waste.<sup>74</sup> Generators must also pay for taxes and charges that ensue from the violation of the state law and other applicable ordinances.<sup>75</sup>

The LPGIRBC also outlines specific regulations for large generators of special management waste.<sup>76</sup> All large generators of special management waste are required to obtain state authorization by properly registering their facility.<sup>77</sup> Additionally, large generators are required to maintain an annual record of the volume and type of waste generated and how the waste was managed.<sup>78</sup> This annual record must be preserved for two years so that it may be supplied to the state Secretary, when requested.<sup>79</sup>

Large generators are also responsible for the storage, transport, recycling, treatment, and final disposal of waste that is generated in large volumes, including special management waste.<sup>80</sup> Large generators must alternatively deliver such waste to authorized waste treatment facilities.<sup>81</sup> They must comply with safety regulations and identify, label, and classify the waste.<sup>82</sup> Furthermore, large generators of special management waste must notify authorities in case of emergency, accident, or the loss of a waste that the generator has produced.<sup>83</sup> Finally, large generators must take proper security measures to prevent environmental impacts and ecological emergencies.<sup>84</sup>

The LPGIRBC establishes a set of general prohibitions that can be applied to waste management plans for specific waste streams.<sup>85</sup> Under the LPGIRBC, it is prohibited to discharge solid urban waste or special management waste in unauthorized locations.<sup>86</sup> It is also prohibited to extract

solid urban waste or special management waste from final disposal sites, to reclassify such waste, or to scavenge for work inside or outside of final waste disposal sites.<sup>87</sup>

Furthermore, the LPGIRBC prohibits the creation of unauthorized waste disposal facilities, the burning of any type of waste in the open air,<sup>88</sup> the mixing of solid urban waste/special management waste into water bodies, and the mixing of such waste with other hazardous substances.<sup>89</sup> Lastly, the LPGIRBC makes it illegal to deposit waste that might potentially accumulate in the ground and become hazardous to the natural environment.<sup>90</sup>

Additionally, there is a strong foundation in place for sanctioning potential violators of these prohibitions.<sup>91</sup> The state of Baja California has merely codified these sanctions in the LPGIRBC.<sup>92</sup> These sanctions may be administered by the municipal or state authorities.<sup>93</sup> The LPGIRBC specifies that waste generators, possessors, or service providers who deliver waste to unauthorized entities will share liability for doing so.<sup>94</sup>

Also, when there are various responsible parties and it is impossible to determine the extent of each person's participation in distributing the waste, all participating parties will assume an equal share in the total liability.<sup>95</sup>

The LPGIRBC provides for both administrative and criminal sanctions for violators of waste management laws.<sup>96</sup> Administrative sanctions include formal warnings and fines that range from the equivalent of 200 to 20,000 days of minimum wage payment in the state of Baja California.<sup>97</sup> Criminal sanctions include imprisonment for up to 36 hours when the person opposes or obstructs enforcement of the LPGIRBC.<sup>98</sup>

The LPGIRBC also calls for the closure of a facility (either temporarily or permanently) when the offender has not complied with the law's terms and conditions or with corrective measures imposed by the law; in the case of repeated offenses that result in negative effects to the environment; or when the offender violates the law on three or more occasions.<sup>99</sup> The LPGIRBC codifies liability for damages.<sup>100</sup>

Specifically, all generators of solid urban waste and special management waste, and all operators of such waste facilities, will be held liable for civil and penal offenses and for the harm they cause to the natural environment.<sup>101</sup>

In 2010, Baja California amended the LPGIRBC to include provisions for waste tire management, including formalizing the responsibility of all importers of new and used tires in the management of the entire life cycle.<sup>102</sup>

### **Programmatic Activities at the Municipal Level**

Municipal governments in Baja California have initiated local community cleaning programs to safely dispose of waste. These programs exist, in some form, in each of the five municipalities of Baja California (Ensenada, Mexicali, Tecate, Tijuana, and Playas de Rosarito). The existing programs are not continuous waste management programs targeting waste tires. Instead, they are periodic cleaning events that take place occasionally and are administered at the community level.

### **ENSENADA**

The municipality of Ensenada manages waste tires by using them as an ingredient to manufacture cement at a large cement kiln.<sup>103</sup> The cement kiln utilizes waste tires (in their entirety) as a combustible agent. The waste tires help to raise the heat of the ingredients to reach the necessary level to manufacture cement.

The method for transporting waste tires to the local cement kiln is well coordinated. Local tire dealers must apply for a permit before they can import tires into Mexico. Upon issuing a permit, the state government requires that a quantity equal to the quantity of imported tires be properly disposed of in a pre-approved facility. The only pre-approved facilities currently operational are the local cement kiln and the municipal tire collection centers. The SPABC keeps an up-to-date record on the total number of tires imported by each dealer and the number of tires that each dealer properly discarded in a pre-approved facility.

The regulatory structure that exists for the importation of tires, which is closely monitored by a state-mandated quota system, provides a strong foundation for properly discarding waste tires. Initially, the cement kiln in Ensenada received waste tires from all parts of the state. Now, the cement kiln uses waste tires that are predominantly found in the municipality. The existence of a large cement kiln in Ensenada that consumes large quantities of waste tires for fuel makes waste tire disposal less of a management priority for Ensenada than for other municipalities.

Furthermore, Ensenada has several local programs to reduce trash in the municipality. Although they do not target waste tires directly, they still have a net positive effect in reducing the hazards caused by waste tires.

In Ensenada, as in other municipalities, there is a general problem with the accumulation of solid waste. The Municipal Directorship for Public Services runs a program which takes place in a different neighborhood every other Sunday. The program involves an informational campaign to inform citizens that municipal dump trucks will come by to collect all large waste items (including large household items like refrigerators, stoves, couches, etc.). These large items often end up dumped in private yards and public spaces. This program also collects waste tires.

The waste tires are taken to the two pre-approved waste tire disposal centers. Another program that indirectly helps to relieve the waste tire problem is jointly coordinated by the Municipal Directorates of Ecology, Transit, and Public Services. The Directorates travel to various neighborhoods and set up information booths to respond to citizens' questions and complaints and also to inform them about proper waste tire disposal facilities and the dates for the cleanup program so that households can be prepared to discard all waste materials during cleanup events.

## **MEXICALI**

While there is not a permanent program to address waste tires in Mexicali, there is a new state disposal site in the Mexicali Valley. This disposal site receives waste tires from several events in various neighborhoods where local delegations ask that residents help to take waste tires to a temporary collection center. Tire companies or the municipal authorities then transport the collected tires to the final disposal site.<sup>104</sup>

According to authorities, between 2,000 and 8,000 tires have already been collected from several local dumps. They have been transported to an authorized final disposal site, which can currently handle around 750,000 waste tires. These cleanup events are not programmed on a periodic basis but instead take place sporadically. They are either planned by volunteer organizations, tire dealers, or local businesses. Local businesses, which have a vested interest in the appearance and cleanliness of the municipality, often organize cleanup efforts with their own funds.

During these cleanup drives, waste tires are taken either to final disposal sites or to local recycling facilities. From the state disposal site, a certain quantity is sent to the Ensenada cement kiln, and the rest are handled by recycling companies that are required to obtain permits from the State Economic Department in order to expand their use of the waste.

## TECATE

The municipality of Tecate employs a three-pronged approach to address waste tire problems.<sup>105</sup>

The first prong involves the Municipal Resources Department, which manages a waste collection program in different neighborhoods. About once a month, the Municipal Resources Department travels to different neighborhoods and collects waste tires that are then sent to transfer centers for recycling and disposal.

The second prong involves municipal support for local non-governmental organizations in their efforts to clean the municipality. These programs arrange periodic neighborhood visits to collect waste, including solid waste that accumulates in unauthorized locations. The Municipal Ecology Department, under the Directorship for Urban Administration, collects waste tires that are found in the midst of the solid waste. The collected waste tires are then sent one of three locations: (1) the temporary waste tire landfill that is adjacent to the authorized location for solid waste disposal (in the neighborhood known as Guajardo); (2) the temporary waste tire storage facility (Taller del Ayuntamiento); or (3) a local, authorized landfill where solid urban waste is generally disposed.

The third prong involves municipal coordination with the SPABC to dispose of tires in the Municipality of Mexicali. Tecate coordinates with the State Secretariat for Environmental Protection and solicits authorization to dispose of waste tires at temporary waste tire transfer stations in Mexicali. This state program allows Tecate to dispose of 10,000 waste tires at no cost to the municipality. The waste tires are transported to the authorized location with the help of volunteers who load the tires in Tecate and transport them to Mexicali. Tire dealers have also expressed an interest in collaborating in these efforts but have not done so.

There are upwards of 70,000 waste tires in the temporary storage site in Tecate. The municipality has been allowed to dispose of about 10,000 of these in Mexicali for free. However, Tecate lacks the funds to dispose of the remaining 60,000 tires. In the past, Ensenada would accept waste tires from across the state to be burned in its kiln. Today, however, Ensenada charges 6 pesos per tire to dispose of waste tires from outside the municipality, and Tecate can't pay the fee.

One temporary method for alleviating the waste tire problem in Tecate is through federal funding. The federal government provides yearly funding for a temporary employment program for the Municipality of Tecate. The amount of this fund varies on a yearly basis. The Municipality of Tecate uses these federal funds to employ citizens to provide cleaning services for the municipality. These citizens help to identify unauthorized locations for waste tire disposal and to properly dispose of the waste tires encountered during the cleaning process.

## TIJUANA

According to Tijuana's Municipal Environmental Protection Directorate, waste tires are governed by the exclusive jurisdiction of the state government entities.<sup>106</sup> According to the Municipality of Tijuana's interpretation of the law, waste tires are categorized as a special management waste. Currently, Tijuana does not have a program in place that specifically targets waste tires. However, the municipality of Tijuana has arranged meetings, mediated by the Municipal Directorship for Environmental Protection, to persuade local tire dealers and business owners to establish best practices for disposing of waste tires.

The reason Tijuana is not closely involved with waste tire management at the municipal level is that the city is divided into nine large, urban, and widely dispersed, separate delegations. This makes it much more difficult for Tijuana to address waste tire management at the municipal level

than it is for municipalities like Ensenada, which is also large, with 24 delegations, but whose *urban* zones are concentrated into two to three delegations.

Because of Tijuana's size, cleanup efforts are conducted by local organizations under the leadership of the distinct delegations. These cleanup efforts have the support of the Secretariat of Ecology and Urban Development but are led by the Municipal Director for Public Services through the distinct delegations.

The municipality of Tijuana recognizes the harm caused by waste tires and would like to have a greater ability to address the problem. However, given that the Municipal Environmental Protection Directorate receives only 300,000 pesos (approximately \$23,300 U.S.) annually and has only two full-time employees, it is incapable of implementing an effective waste tire management program.

Instead, the Municipal Environmental Protection Directorate enforces regulations that are codified by state law and covered by state funds. It functions as a source of direction without being fully operative as an enforcement agency. Despite the lack of resources for enforcement, the directorship does promote general environmental stewardship and supports the efforts of the Municipal Directorship for Public Services, which is in charge of providing cleanup services to the municipality. In doing so, the Directorship inadvertently alleviates the waste tire problem by taking tires to pre-approved final disposal facilities or to recycling facilities.

## **PLAYAS DE ROSARITO**

Playas de Rosarito has an incentive-based waste tire cleanup program.<sup>107</sup> The community participates in this program by taking waste tires to pre-approved facilities. Citizens are paid two pesos (15 cents) for each tire they deliver. This cleanup program is headed by the municipal Secretariat for Urban Administration. The program takes place periodically for a few months during the year. The collected tires are shredded and either stored at local landfills for future disposal or immediately disposed of at the local landfill.

As in Tecate, some waste tires in Playas de Rosarito were permitted to be discarded at the previous temporary waste tire transfer station in Mexicali. This outlet was not sufficient, however, to cope with the quantity of waste tires located in Playas de Rosarito. With the opening of the new temporary storage facility in Mexicali, this may change.

### ***NGOs and Community Organizations***

The role of non-governmental organizations, particularly environmental and conservation groups, should be highlighted, as their work consistently points to areas where regulation and government action can be improved on both sides of the border. These groups provide evidence, analysis, and alternative approaches to address the environmental, health, and other risks that the waste tire problem presents to citizens and ecosystems in the State of Baja California and along the shared border with California. They also monitor implementation of governmental programs and engage in cleanup efforts and waste management projects in the region.

# III. Proposed Methodology for Constructing a Model Framework

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## ***The Method of Policy Analysis***

The method of policy analysis introduced here is based on more than four decades of experience at the University of California, Berkeley developing methodologies to improve policy design and implementation.<sup>108</sup> Policy analysis is an interdisciplinary approach to problem-solving in the public sector. It provides a structured method for resolving policy challenges, fine-tuning governmental programs during the implementation phase, and adjusting for a policy's unexpected effects — in other words, for learning by doing.

In short, it is a common sense set of steps to discipline our thinking and analysis during the iterative process of addressing policy issues. This methodology may prove useful for the design of ambitious programs or for plans that require a systems analysis to a policy challenge for better integration and management.

Policy-making occurs in a political context, so awareness of all the external factors and social interests that influence design and decision-making in the policy formulation process is important. Policy analysis allows the analyst to present the most educated guesses on what solution(s) can be applied to a particular problem given the current level knowledge. The political process will then determine actual implementation.

Good policy analysis increases the likelihood of action and finding common ground among stakeholders on how to go about solving a problem that affects society.

This section will outline the concepts and methodology introduced by this report in order to assist in developing a model integrated waste tire management plan for the California-Baja California border region. It will not fully develop a solution or a plan; it will only present conceptual and practical illustrations utilizing these theoretical frameworks.

This section defines some of the key theoretical terms and methodologies. In short, it uses policy analysis and a comparative perspective to analyze smart design practices from current programs in California, the European Union, and Ontario, Canada, in order to suggest potential enhancements in program development, integration, and implementation in the California-Baja California border region.

## **Problem Definition and Evolution in Policy Design and Objectives**

A clear understanding of the problem may take time to develop and could require substantial investment in research and analysis in the process of determining which information is relevant to the issue at hand. The problem definition is not static; it may evolve. This is particularly relevant to a trans-border environmental problem since two countries need to address the issue, both at the bilateral and the regional level.

The discussion of the waste tire problem in the California-Baja border region presented in this section, including the status of the infrastructure, management, and regulatory systems currently in place, is based primarily on a synthesis of prior research. Some additional primary research was conducted, primarily to update the state of affairs on the status of integrated waste tire management in Baja California, Mexico (see Sections I and II).

Traditionally, a useful way to define a problem is to quantify the issue and define its impact by conceptualizing it as rates of growth, size, speed, etc. This process helps emphasize the policy objective by pointing to solutions that would minimize or maximize the effects of the problem. For instance, the current challenge for Baja California is to maximize the proper disposal of 1.5 million to 2 million waste tires per year, anywhere from one-third to one-half of which come from United States, most initially as used tires.<sup>109</sup>

According to research conducted by the National Autonomous University of Mexico, of the 25 million waste tires produced at the national level, only 5 percent are recycled and 2 percent are properly stored. A similar percentage is used as tire-derived fuel (TDF) for cement and brick production.<sup>110</sup>

As noted above, for Baja California, only about 40 percent of the waste tires accumulating in the state are captured by formal management systems, and the majority of waste tires captured are being used as fuel for cement kilns.<sup>111</sup> The rest of these tires are either landfilled or informally disposed, mostly along the heavily populated San Diego-Tijuana metropolitan area, the Mexicali-Calexico border crossing, and to a lesser extent along the rest of California-Baja California border.

To address this problem, the Mexican federal government, through its Ministry of Economy, has an import quota system that sets a limit on the number of used tires entering Mexico. In the case of Baja California, the 2011 quota was set at 719,000. For 2012, used tire importers have requested that this amount be doubled. In contrast, the Rubber Industry Association of Mexico is lobbying to eliminate import quotas and completely ban imports of used tires.

The tire issue has gained bilateral attention due to the accumulation of a dangerous quantity of tires at illegal sites and because of poor implementation at legal sites. These sites were identified by the Border 2012 initiative and were targeted under its Goal 3, which called for the cleanup of the three largest sites along the border.

Two of these sites were located in Baja California: Centinela, with 1.2 million tires, and INNOR, with 415,000 tires. With financial and in-kind contributions in the amount of \$800,000 from the U.S. EPA to Mexico, the cleanup of these two sites was completed in 2004 and 2005, respectively. Ultimately, all the INNOR tires were transported to CEMEX's Ensenada cement kiln. Centinela's tires, however, were also transported to the CEMEX kilns located outside of Baja California, in the capital city of the neighboring state of Sonora, Hermosillo, to manage overflow at the Mexicali storage facility.

Additionally, in 2011 a private contractor managing cleanup of one of the large legacy piles in Baja California, for the first time, exported a portion of the collected tires to China for processing as TDF. Notably, during the Border 2012 Waste Policy Forum meetings, a waste tire working group was created, and the U.S.-Mexico Scrap Tire Integrated Management Initiative was launched. However, problems evolve, and as jurisdictions advance in the implementation of policy solutions, programmatic focus may also change (see Section II regarding the new priorities of the Border 2020 Program). Today, the high-profile issue of legacy piles is less salient.

Since 2007, the State of Baja California has been developing and implementing different actions toward a comprehensive, integrated plan to address the waste tire issue at the local level as described in Section I.

However, the federal support derived from the Border 2012 program for targeting large waste tire sites and the local governments' own successes in developing mechanisms and infrastructure for

collecting tires through cleanup campaigns and ad hoc incentive programs has resulted in too many tires being accumulated in the official “temporary storage facilities.”

This situation now calls for second generation policy solutions to the state and border regional problem. Two of the major current challenges are processing capacity and proper market development channels for the productive use of the waste tires.

The Institute for Regional Studies of the Californias at San Diego State University conducted a study for CalRecycle in 2009 detailing the nature of used and waste tire flows in the border region (Border Tire Flow Report).<sup>112</sup>

The Border Tire Flow Report found that during 2009 used tires sell for roughly the same price on either side of the border: about 310 pesos (\$23 U.S.) in California and about 270 pesos (\$20 U.S.) in Baja. They also noted, however, that new tires cost significantly more in Baja: 810 pesos (\$60 U.S.) compared to about 607 pesos (\$45 U.S.) in California, resulting in greater demand for used tires in Mexico. California’s used tires flow into Mexico through various legal and illegal means, contributing from 25 to more than 50 percent of the 1.5 million waste tires in Baja California needing disposal each year, depending upon the scale of the informal flow. In 2008, 637,500 used tires arrived in Baja through legal imports, 15 percent less than the official import quota set by Mexico’s federal government. The number of tires arriving illegally is unknown but has been estimated to be between 10 percent and 150 percent of the official flow.<sup>113</sup>

While customs agents dispute the higher of these two numbers, citing a lack of any sufficiently large seizures of illegal tires at the border to warrant them, it is possible that a high number of tires could be crossing the border in small, hard-to-detect shipments. The flow of California’s used tires into Mexico has been a concern primarily because many of these tires are near the end of their useful life and often ending up being dumped illegally and then washed into watersheds along the border.

### **Understanding the Product Life Cycle: Key Decision-Making Nodes**

The waste tire management issue is not unique to Baja California and the border region. There are other jurisdictions, governments, and international organizations working to develop effective tire management solutions. Their experiences can serve as a resource to identify smart practices that could be extrapolated to the Baja California context if appropriate. This report suggests that it is useful to consider other regions’ experiences with waste tire management. The more we can manage the value chain of a tire’s life cycle, the more we may have control over where to maximize or minimize particular managerial decision-making actions. See Figure 2 for an example of the system modeling concept.

To illustrate, as one follows the life-cycle of a tire from production to end-of-life, decisions are made about management priorities, such as whether to store waste tires appropriately under industry or official norms (as in the case of Mexico’s NOM 161, official quality standards approved by the Ministry of Economy for classifying and processing waste). Storage can also occur at officially authorized and certified facilities or at irregular sites.

At this decision-making point, the solution should tend to maximize the proper storage of the waste tire and minimize or eliminate lower standards, improper, or illegal storage. Figure 2 also shows system “exit” uses, or end-of-life processing supported by market development alternatives, which while productive may have better or worse environmental impacts (e.g., energy use in cement production vs. RAC used in civil engineering projects). These

considerations may also influence the problem definition as we begin to implement more advanced integrated management programs and innovative solutions.

As stated in Section III, as part of the overall policy challenge for Baja California to maximize the proper disposal of 1.5 million to 2 million waste tires per year, preliminary successes in developing some aspects of an integrated waste tire management plan in the state (such as providing infrastructure for collecting tires through cleanup campaigns and ad hoc incentive programs) has developed into a situation in which too many tires are now being accumulated in the official “temporary storage facilities.”

In the development of integrated waste tire management programs, bottlenecks can occur when timing of program capacities is not easily managed or when unforeseen changes to the supply chain occur. Therefore, plans need to be able to adapt and to incorporate second generation, and potentially third generation (based on results from the previous generation of implementation experiences), policy solutions that address the new constraints or opportunities in the value chain as policy makers learn by doing. Thus, programs evolve by incorporating refinements based on implementation experience.

For Baja California, a major current bottleneck in the effective management of waste tires is the over-accumulation of waste tires in temporary storage sites while processing capacities are still in development.<sup>114</sup> Thus, a second generation adjustment to current waste tire management programs might divert some resources from further expanding storage capacity to developing processing capacity directly linked to already existing potential outlets, such as RAC used in public road and highway development.

However, development of this processing capacity will have to take into consideration the conditions implemented in the first generation storage solution, and how that storage has affected, for instance, the quality of the rubber to be ground, and thus the likelihood it may meet engineering standards for ground rubber end uses such as RAC.

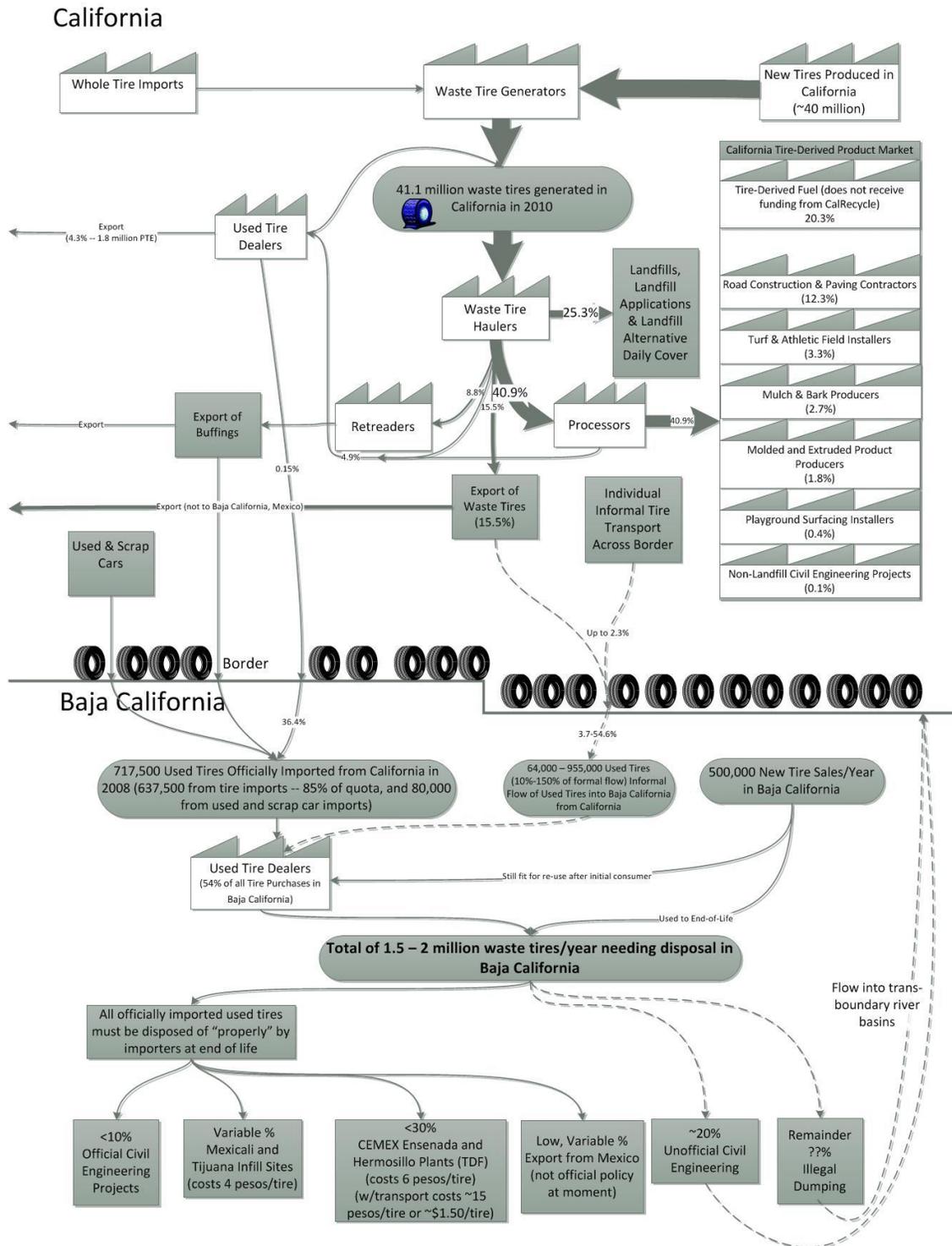
The recent proposed amendment to the Federal Law of Roads, Bridges, and Auto Transport in Mexico, noted in Section II.c, that mandates RAC use in federal transportation projects, is a step toward this. The State of Baja California may consider selling its accumulated stock of waste tires from the temporary storage facilities to businesses that will provide RAC to construction companies for new infrastructure projects.

These proposed amendments to the federal general laws of waste and transport await passage by the Mexican Chamber of Deputies but illustrate how regulation can support maximizing or minimizing rates of use and processing within the life-cycle of a tire. Moving forward with RAC will require crumb rubber processing capacity, which does not now exist in Baja California.

A major limiting factor at this point is the cost of the processing equipment. Additionally, while the RAC standards and requirements may spur demand, with changing administrations, it is unclear how confident any private investors would be in developing this crumb rubber capacity, as well as whether crumb rubber imports from oversupply in the U.S. and Canada would overwhelm any startup operations in Baja California without more direct federal intervention.

At the local level, the ad hoc cleanup efforts, temporary incentive programs, and disposal fees negotiated by the state to better manage waste tires have resulted in an increase in the rate of proper “temporary” disposal of tires in Mexicali. The upcoming Tijuana disposal center will serve to alleviate saturation in Mexicali.

However, the challenge is to increase the processing and market outlets for the scrap tires, hopefully finding a higher value-added use for the accumulated reserves of waste tires now in storage. So far, the development of alternative, tire-derived product markets and outlets seems to be a key challenge for Baja California's plan.



**Figure 2: Model of the life-cycle of tires in the California-Baja California border region. Percentages represent the proportion of total annual waste tires managed by the respective jurisdiction.**

## Key Policy Design Parameters and Modularity

This report introduces the notion of key policy design parameters as essential, primary components of any integrated waste tire management plan.<sup>115</sup> Key policy design parameters are those features in program design that are essential for the effective functioning and performance of a policy, program, or regulatory approach. These key parameters are drawn from evaluations of common features across diverse international integrated management programs.

Evaluating the common components of different international programs allows an analysis of the core parameters required for their basic functioning. These key parameters may look slightly different across programs (e.g. clear responsibility assigned to tire producers in Ontario, Canada and the E.U. EPR programs look quite different), but their core function is the same (i.e. establishing clearly defined responsibility).

Once the key policy design parameters are drawn out from international smart practice cases, a generalized, simplified model program can be synthesized to allow further analysis of design and implementation strategies targeted to specific contexts. Conceptually, policy makers can then break down the key policy design parameters into individual components or modules that can stand by themselves and be developed incrementally if the overall program goals and comprehensive program implementation are not politically or financially feasible at that time.

Integrated environmental management planning flexibly combines and blends these separate components of a larger programmatic approach to best address the dynamic contents and functions of ecosystem management and its governance (i.e., international treaties, national laws, local regulations, etc.).

By breaking a simplified, but extensive model program into small, discrete policy modules, the overall program can be adapted to local contexts as well as be implemented in a more politically and financially flexible manner. To do this, however, requires an understanding of the inter-relationships between the modules and how the sequence in which various modules are implemented affects the overall program goals.

For instance, if a jurisdiction decides to implement alternative outlet modules (such as market development grants or RAC use mandates) before implementing clear responsibility modules (such as defining responsibilities for the collection of waste tires), there will likely be insufficient supply to meet the demand, which could result in a loss of early investors in tire-derived products (TDP) or regulatory gridlock as mandates cannot be met.

To develop a model framework for Baja California that adequately addresses these risks, builds upon the state's existing institutional efforts and programs, and is flexible enough to respond to changing political, economic, social, and environmental contexts, we recommend a modular policy approach focusing on key policy design parameters.

This method will allow the existing system proposed by the Draft BC Plan to evolve into more complete phases as the market, political, and technical capacity conditions emerge, while also prioritizing program objectives and performance areas. Also, if federal or bi-national policy evolves into more comprehensive national and/or regional systems, well-functioning operational modules can be integrated into more ambitious programs.

The process of dissecting international smart practices for waste tire management into key policy design blocks begins by asking, "What can be implemented independently but still contribute to the overall change desired?" With regard to working toward more regional approaches, further

review of coordinated standardized practices and features of independent programs should also be considered such as tracking, information collection, exchange and management systems, and enforcement practices.

## Evaluation Criteria

After analyzing the problem and envisioning potential solutions, the policy analysis method calls for evaluating the recommended alternatives to project their outcomes. These criteria also allow for the identification of the ideal design parameters given each alternative's particular social, environmental, political, and economic context. While some of the particular criteria may change depending upon the context, several general criteria can be applied to all.

### Fiscal Impact and Sustainability

Evaluating funding mechanisms for waste tire management programs requires not only attention to the initial funding source but also to its medium- and long-term sustainability. This would include analysis of progressive versus regressive financing options, market impacts, stability, and dedicated nature of the funding source, among other potential factors.

- **Costs:** Introducing or implementing policy programs to address the waste tires will have substantial costs associated with program administration, enforcement, and other prioritized program elements. In establishing a framework, these costs will need to be identified and addressed for any successful policy program.
- **Sources of Funding:** For the long-term success of policy programs, the funding sources must be identified and established. Sources could include, but are not limited to, taxes, local and state user and processor fees, tipping charges, federal budget allocations, and international partnerships and cooperation.

In the U.S., fund sources have included fees assessed at the point of purchase of new tires (e.g. California, Arizona, New York, Illinois, Virginia), fees assessed at annual vehicle registration (e.g. New Mexico, Michigan), and solid waste transporter registration fees (e.g. Texas), or “tipping fees” on a per-ton basis assessed on all waste managed at municipal waste landfills and resource recovery facilities in the state (e.g. Pennsylvania).

The type of funding can be determined by the overall program strategy, but in general, the funding source should have a mechanism that ensures the funds raised are earmarked for the waste tire management plan.

Additionally, the point of collection of the funding source can impact the funds' reliability. If tire fees are collected at the point of disposal, for instance, there will likely be a tendency for consumers to avoid official disposal avenues, and thus avoid paying the fee.

Even with point of collection tailored to the context and program goals, however, without mandated collection, there will likely be some avoidance of payments. In the U.S., for instance, many states still allow consumers to keep their used tires when purchasing new ones to avoid the fee. This allows many used tires to escape the formal used and waste tire regulatory systems, especially closer to the border where there are easy and lucrative resale options.

In general, it is more common to see requirements that tire retailers accept used and waste tires from consumers (e.g. California and New York) than mandates that consumers *must* leave their used tires with the retailers upon purchase of new tires.

- **Political Survivability:** Tire fees can be subject to fluctuation and political pressures. Most states include so-called “sunset clauses” in their tire fees, although these are often extended. Tire fees in various U.S. states have fluctuated substantially since their inception, and there is significant pressure from the industry to reduce these fees across the board. Working to diversify the funding source for waste tire management and enforcement can be difficult. Multiple funding sources would reduce some of this risk, although it is quite rare among integrated waste management programs.

### Political Feasibility

This criterion can include issues such as feasibility of policy guidelines under current institutional contexts, legality under current regulatory frameworks, and political acceptability, both to the electorate and to relevant administrations.

- **Political Acceptability:** Changing political alliances, economic circumstances, and social and environmental conditions can alter political will. For many international programs, the initial impetus for a program was not common recognition of the need to better manage waste tires, but rather large-scale tire fires that triggered immediate political will. Analyzing these particular conditions, but also evaluating the political acceptability of policy components under these changing contexts, is important to determine both feasibility and longer-term sustainability of overall programs.
- **Legality:** Policy options should assess management of used and waste tires within jurisdictions as well as across jurisdictional boundaries. Overlapping institutional jurisdictions, management responsibilities, and fundraising options require clarification to establish standardized integrated waste plans.

### Flexibility

Policy dynamics require flexibility as different components of a program are implemented. Various policy design parameters must be evaluated for flexibility to determine if they can be separated and developed incrementally. Additionally, program elements must be sustained through changing political and economic conditions, and thus should be evaluated for their ability to operate under a variety of conditions. The programs should have flexibility in internal structure (i.e. the ability to change institutional relationships that may affect the program’s fate), as well as external responses (i.e. the ability to adapt responses to changing conditions rather than rely entirely on rigid established procedures).

### Effectiveness

Individual program components’ effectiveness need to be analyzed to determine whether the program is reaching the overall goals set by each jurisdiction. It is important to assess how each design parameter actually moves the overall program toward its short-, medium-, and long-term goals. Additionally, individual policy design elements can be evaluated for their likelihood to induce desired (or undesired) indirect effects.

Jurisdictions may have multiple goals (e.g. not only diversion of waste tires from illegal sites but promotion of the highest value-added markets for waste tires) so the evaluations should consider principal and secondary goals. Goals such as efficiency and equity are also important when evaluating the effectiveness of policy design components. For instance, a process evaluation can enhance a program’s performance at different stages as it seeks more integration at the local and regional levels.

## **Alternatives, Policy Options, and Innovative Solutions**

Policy analysis provides alternative strategies to solve or mitigate a given problem. The systems model can allow a comprehensive review of them. Innovative analysis, or “thinking outside the box,” can move beyond the current smart practices in waste tire management plan design. This report presents several examples of smart practices but they are not all-inclusive. For instance, managing demand for new tires, either through research on more resilient tire materials or through expansion of public transportation networks, would likely have a very large impact on quantities of waste tires produced. The suggested methodology allows the policy maker to identify and learn from experience which programs can best address their needs, as well as identify others that need to be designed locally.

# IV. Smart Policy Design and Implementation Practices

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A brief discussion of the background and current status of three different waste tire management strategies allows comparison and grouping of some of the similar design parameters of each system. Brief mention will also be made of several other programs to provide a variety of approaches. California, Ontario, Canada and the European Union (as generalized from a majority of member states programs and EU regulations) present an interesting mix of program types, each with components that, when viewed apart from the broader programs, provide some potential building blocks for a model framework.

The tables used in this section are color-coded according to the relative importance assigned to each design parameter. Dark green represents primary or special focus within a program. Light green denotes program elements that are well-integrated but not necessarily given special emphasis. Yellow-coded elements represent those assigned less relevance to a particular program.

Primary or Key Focus Parameter	Integrated Parameter, but not a Primary Focus	De-prioritized Parameter

## California

California has extensive experience with waste tire management, which allows for the evaluation of various policy outcomes over time. The state’s geographic proximity to Baja California also makes it a particularly relevant example.

### Problem Definition

California must manage approximately 40 million tires per year. Current legislation and programs define the problem of waste tires as primarily a problem of waste diversion from landfills and illegal disposal. Implicit in this focus on diversion is the underlying concern for dangers posed by illegal tire piles, including fire danger and other risks to public health and the environment. Program implementation must take into consideration that California has an informal waste hierarchy in legislation affecting waste tires: whole tires are banned from landfills and CalRecycle is prohibited from using tire fees to promote the use of tire-derived fuel.<sup>116</sup>

### Policy Objective

CalRecycle’s primary waste tire program objective is maximizing the diversion of waste tires away from illegal dumps and landfills. This diversion rate helps CalRecycle measure the success of its management programs, along with the number of tires “cleaned up” or removed from illegal dump sites. Implicit in this strategy is reducing environmental and health risks from improper disposal of waste tires.

## Key Policy Design Parameters

### Emphasis of California Policy Design Parameters

Prioritized Outcomes	Clear Regulation	Enforcement	Monitoring	Clear Responsibility	Sustainable Funding	Alternative Outlets

California’s top priority outcome, as noted, is maximizing the diversion of waste tires from landfills. While it does not explicitly promote a waste hierarchy model (i.e. higher value added uses prioritized in program support over lower value-added uses), it has elected to restrict funding from the tire fee to promotion of higher value-added uses of waste tires, and has formally barred the use of these funds for promoting tire-derived fuel.

As discussed below, California has substantial regulation aimed at waste tire management. Whole tires are banned from unauthorized disposal sites, which include most traditional landfills, and formalized registration and reporting requirements have been established for the key players in the waste tire management chain. While the manifest tracking system was more comprehensive in the past, it still provides a useful example of a system appropriate for its primary intended use: determining the pick-up and delivery locations of waste tire shipments in the state. Additionally, with the implementation of the Waste Tire Management System (WTMS) and future potential for increased adoption of electronic manifesting, the system is poised to expand its current capabilities.

Of particular relevance to regional cooperation, both SB 772 (Ducheny, Chapter 214, Statutes of 2005) and SB 167 (Ducheny, Chapter 333, Statutes of 2009) mandate attention to border region-specific management issues and goals.

California assesses a fee on new tire purchases to fund its tire programs. The fees are then distributed by the state government. The largest share of waste tire funding is directed toward market development research and grants, which has given the state experience with a variety of market development options.

Initially, California focused on promoting the processing capacity and efficiency of converting waste tires to intermediate products, such as crumb rubber. As processing capacity began to surpass demand, CalRecycle began reaching out to large potential consumers of rubberized asphalt concrete (RAC) and other tire-derived products (TDPs) in order to spur the demand side of the market. The current Five-Year Plan includes an expansion of work with small, medium, and large jurisdictions to promote the purchase of TDPs.<sup>117</sup>

California mandates a certain proportion of rubberized asphalt concrete in all highway construction and maintenance carried out by the California Department of Transportation<sup>118</sup> and is investigating more targeted incentive systems for promoting the demand side of TDP markets.

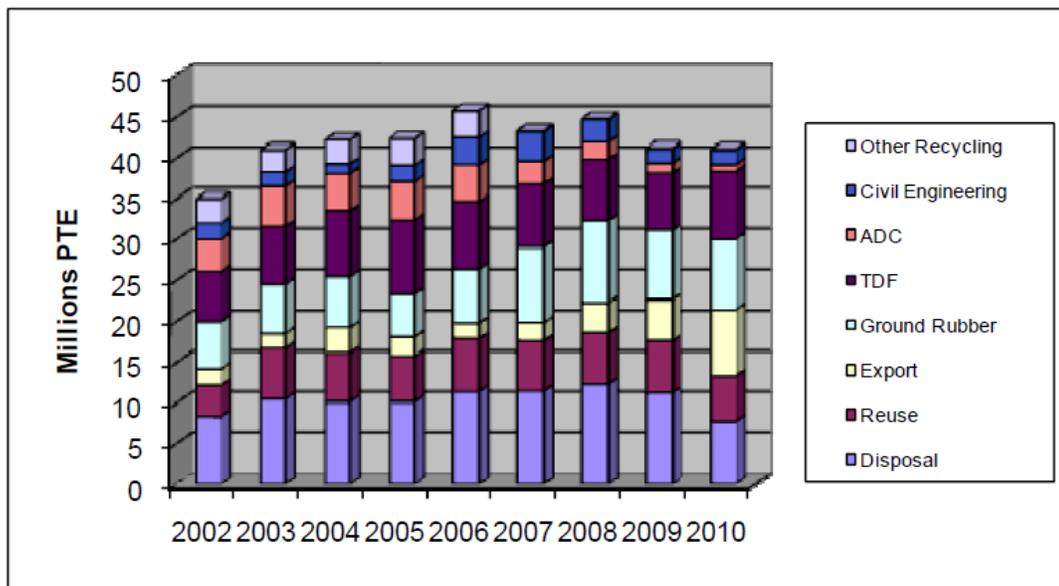
## Costs

California budgeted approximately \$44 million to the management of waste tires in fiscal year 2011-2012.<sup>119</sup> About 45 percent of this total was spent on market development. Enforcement and administration of the program each comprise about 18 percent of the program and 9 percent is allocated to cleanups. The majority of California's largest illegal tire piles have been cleaned up, however, reducing the need for large program outlays.

## History and Outcomes

California adopted its first comprehensive waste tire management law in 1989 (AB 1843, W. Brown, Chapter 974, Statutes of 1989), which included a tire fee assessed at the point of return of waste tires, directives to promote markets for alternatives to landfilling tires, and requirements to develop regulations for the storage of waste tires. Tire hauler registration requirements were first implemented in 1993 (SB 744, McCorquodale, Chapter 19, Statutes of 1993), enforcement by local police and highway patrol in 1996 (AB 2108, Mazzoni, Chapter 304, Statutes of 1996), and a comprehensive manifest tracking system in 2000 (SB 876, Escutia, Chapter 838, Statutes of 2000). The tire fee was revised from being assessed at the point of return of waste tires to being assessed at the point of purchase of new tires in 1996 (AB 2108) because people were illegally dumping or stockpiling waste tires rather than paying the fee to deliver them to retailers.

Through these programs, California has been able to divert approximately 80 percent of the waste tires generated annually from landfills.<sup>120</sup> Figure 3 below reflects the evolving diversion patterns for California waste tires. CalRecycle notes that changing demand for waste tires for tire-derived fuel domestically and abroad has occurred primarily due to changes in the international market, such as global oil price increases.<sup>121</sup>



**Figure 3: Nine-Year Trend for California Waste Tire End-Uses\***

Source: CalRecycle 2011.

\*PTE: passenger tire-equivalents

## **The European Union Program**

### **Problem Definition**

The European Commission is the executive body of the EU and sets EU-wide policy. The primary EC regulation determining waste tire management design defines the problem clearly as waste tires that end up in landfills.<sup>122</sup> The implicit problem is potential health and environmental impacts from exposure to large whole waste tires previously disposed in landfills. Because the EC now bans whole and shredded tires from landfills, the regulation also implicitly identifies loss of potential value from waste tires as a problem.

### **Policy Objective**

The EC regulation bans the disposal of whole and shredded tires in landfills. The EC policy assigns clear responsibility for waste tire management to tire producers and requires them to develop and implement a management plan.

### **Key Policy Design Parameters**

#### **Emphasis of EU Policy Design Parameters**

<b>Prioritized outcomes</b>	<b>Clear Regulation</b>	<b>Enforcement</b>	<b>Monitoring</b>	<b>Clear Responsibility</b>	<b>Sustainable Funding</b>	<b>Alternative Outlets</b>

The member states have a variety of program designs, but a majority of them have implemented programs that could roughly be considered “extended producer responsibility”<sup>123</sup> systems. In these systems governments assign primary responsibility for the stewardship of a product and its appropriate end uses to the producers of the products themselves, but, in the EU models, do little to design the key elements of plans.

The EU member states do not develop comprehensive integrated tire management plans or assess tire fees at the point of purchase to fund government programs. Rather, a nonprofit industry association representing the major tire “generators” designs and operates the integrated management of waste tires through fees the generators assess at the point of sale of new tires.

The EU passed the initial directive prohibiting whole tire and shredded tire disposal; member states set regulations on reporting to consumers and member governments; and the industry association takes responsibility for developing an integrated management plan and managing the distribution and final processing of waste tires.

This type of program tends to encourage the distribution of waste tires to current markets rather than encouraging new markets, which jurisdictions often favor due to their value-added and job creation potential. In Europe, the dominant end points for the increasing diversion of waste tires from landfills have been pretty equally split between tire-derived fuel (TDF) uses and material recovery (e.g. RAC applications).

### **Costs**

This study was unable to detail the costs of specific member country programs due to the limitations of the contract. However, it should be noted that, since responsibility lies almost

entirely with private producers, public institutions are mostly left with auditing and enforcement costs, as well as continued cleanup costs for legacy waste tire sites.

**History and Outcomes**

Two EU Directives spurred integrated waste tire management programs among member countries. The first was the passage of the EC Directive 1999/31 prohibiting the landfilling of whole waste tires by 2003, and of shredded tires by 2006.<sup>124</sup> While many states already had some degree of waste tire management in place, landfilling was still a substantial end point (32 percent in 1996) for many of the waste tires produced in Europe. By 2009 this amount had dropped to 4 percent.<sup>125</sup>

**Ontario Tire Stewardship Program**

**Problem Definition**

Ontario manages approximately 20 million passenger tire-equivalents (PTEs) per year. While illegal waste tire piles were a political trigger for initiating an integrated waste tire management program (as in many other jurisdictions including the U.S.-Mexico border), Ontario defined the problem in terms of lost potential value, along with potential environmental and health impacts. This meant that Ontario approached the issue with a variety of potential solutions rather than a strict prohibition.

**Policy Objective**

Waste Diversion Ontario incorporated a waste hierarchy qualifier to the development of the integrated waste management plan: the highest value-added tire-derived products receive priority incentives, with landfilling and tire-derived fuel uses serving only as last resorts if there is no other way to process the remaining waste tire supply.

Much as the EC Directive on landfill disposal of tires spurred the development of producer responsibility programs, Ontario clearly established its own preferred outcomes before designing its program: maximizing value-added from the waste tire recycling program.

**Key Policy Design Parameters**

**Emphasis of Ontario Policy Design Parameters**

Prioritized outcomes	Clear Regulation	Enforcement	Monitoring	Clear Responsibility	Sustainable Funding	Alternative Outlets

The Ontario Tire Stewardship Program represents another point on the spectrum of integrated waste tire management programs. Much like the European Union model, Ontario holds the generators of waste tires (producers and importers) as the primary responsible party for reuse or recycling, following the principles of extended producer responsibility.

The Ontario program differs from that of the EU in that the province assigns responsibility through a fee charged to generators or “stewards” per tire they introduce into the Ontario market. Unlike the most common programs in the European Union, Waste Diversion Ontario (the provincial government waste department) established the industry funding organization (Ontario

Tire Stewardship) that collects the fees, designs the management plans, and implements the overall tire stewardship program, rather than it being a purely private operation.

These pre-qualifiers led to some unique waste tire management program provisions. The requirement that the highest value-added uses for waste tires be promoted more heavily dictated accurate tracking of the flows of waste tires within the province of Ontario as well as beyond its borders. The Ontario Tire Stewardship interpreted the Waste Diversion Act to require tracking of tires to end use, including if they are exported as tire-derived products. This tracking system represents one of the most complete “cradle-to-grave” tracking systems among international programs reviewed during this project.

### **Costs**

The overall program costs for fiscal year 2009 were C \$73 million (U.S. \$64 million).<sup>126</sup> The program was entirely funded by fees collected from stewards. The largest budget elements for the Ontario program are the payments and incentives provided to waste tire transporters and processors, each comprising approximately 30 percent of program costs.<sup>127</sup> Incentives and payments to collectors are the third largest expenditure, at approximately 15 percent of program budget. Administration of the program is set at about 4 percent of the total program budget and stockpile cleanup at about 3 percent.

Because the program’s emphasis restructures the incentives underlying the tire-derived product market that contribute to lower value-added uses of waste tires, the budget percentages assigned to incentive payments should be evaluated in that light.

### **Outcomes**

Ontario has achieved a 93 percent diversion rate of the approximately 20 million waste tires generated annually.

## V. Identifying Key Policy Design Parameters

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The scope and development of an integrated management plan may depend on financial and technical capacity of the jurisdiction implementing the program, and on the range of limiting political, economic, social, and environmental factors. This report suggests that policy analysis can identify the key policy design parameters from international smart practices most appropriate to local constraints and opportunities. These key policy design parameters are the principal policy elements deemed necessary to any functioning integrated waste tire management program. There are numerous additional elements not included in this list that would be required to actually implement a program, but highlighting these key elements serves to direct a jurisdiction's attention to ensuring concrete connections between its overall management goals, the major program elements key to attaining those goals, and the primary policy mechanisms available to develop those elements. Therefore, this list is not a comprehensive list of all policy considerations relevant to integrated waste tire management programs, but rather a tool to identify and prioritize general policy options.

### ***Clearly Identified, Prioritized Policy Outcomes***

What are the jurisdiction's objectives in terms of waste tire management? Implementing policy without clearly prioritized goals can lead to problematic intermediary outcomes, such as the excessive accumulation of waste tires in temporary storage facilities. Each of the jurisdictions in Section IV has clearly identified desired outcomes, but their priorities are not identical. California's identified priority is to maximize diversion of waste tires from landfills, without directly promoting tire-derived fuel. The EU identifies the elimination of landfilling of waste tires as its primary objective but does not prioritize any mechanisms to implement this, beyond the basic EC regulation banning the landfilling of whole and scrap tires. Finally, Ontario emphasizes development of higher value-added uses of tire-derived products (TDPs) in its program and establishes comprehensive guidelines in the promotion of these outcomes. Interestingly, while many integrated waste tire management programs include source reduction of the number of waste tires produced each year as a goal, few prioritize this in their overall program implementation.

### ***Clear Regulation Ensuring Incentives***

Depending upon the jurisdiction's short-, medium-, and long-term end goals for waste tire management, regulations restricting undesired outcomes and/or promoting desired outcomes for waste tires need to be passed.

In the case of the EU, this involved outright banning of the disposal of whole and shredded tires in landfills. In California, whole tire landfilling is prohibited, but shredded tires may be landfilled and tire monofills (sites only allowing tires) are permitted. While not formally established as incentives, California provides numerous market development grants and loans to facilitate alternative outlets for waste tires diverted from landfills. Ontario does not have formal restrictions on landfilling of waste tires (whole or shredded), but its tire stewardship plan has an incentive structure that prioritizes all other uses of waste tires. It provides larger incentives to processors of higher value-added intermediate TDPs, with crumb rubber receiving the highest incentive. Additionally, these incentives are only paid to processors upon proof of each sale of processed rubber to customers also complying with the waste hierarchy set by the program (e.g. they cannot sell crumb rubber to cement kilns if they want the incentive payment). Mexico restricts illegal

disposal of special management wastes, of which waste tires are included in quantities above 10 tons, but does not prohibit their disposal in standard landfills. However, it has tied provision of import quotas for used tire importers, to the proper disposal of those imported tires, and thus has some incentive structures in place.

Additional measures are required to support implementation of these key regulations. For instance, in California, these additional regulatory efforts include license and/or registration requirements for all used and waste tire haulers, as well as permitting and inspection of storage facilities, and processors. Additional information regarding California's hauler activities can be found at: <http://www.calrecycle.ca.gov/Tires/Manifest/>

## **Enforcement Mechanisms**

Any mandate is worthless without enforcement. In the case of waste tire management, enforcement ensures that all transporters are actually keeping and turning in the necessary tracking data, as well as following through on deliveries to approved processing or disposal sites. This can be accomplished through existing transportation authorities. At weigh stations or other transportation points, these trip logs can be checked randomly to ensure compliance. The following are examples of enforcement strategies that have been used by California, the EU, and Ontario.

- California works with “enforcement partners,” including local law enforcement agencies and the California Highway Patrol, and provides training to those partners using tire fee funding — AB 2108, adopted in 1996, allowed for traffic or peace officers to enforce waste tire hauler registration requirements.<sup>128</sup> Additionally, CalRecycle has its own dedicated enforcement staff.
- In the EU, enforcement strategies vary by country, but many use regular audits to ensure compliance.
- Ontario uses an audit system to reconcile the reporting made by collectors, haulers, and processors in the manifest reports in three-year cycles. Additionally, the Waste Diversion Act of 2002 empowers provincial officers to act as enforcers of the requirements of the act, including the tracking and manifest system.<sup>129</sup>

## **Monitoring**

There must be an ability to track tires in order to enforce mandates on how waste tires are treated. This includes the registration of all parties collecting, transporting, and processing tires and a manifest system to record tire transactions between these groups. Additionally, the data must be entered in a form that is easily accessible for analysis of enforcement or policy design, implementation, or evaluation purposes.

- The California manifest system tracks waste tires from their return by consumers at retailers, to hauler drop-off at a disposal site, processor, or export point. All haulers, processors, and disposal sites also are required to be registered with CalRecycle. While initially more comprehensive, the tracking system was simplified in response to stakeholder complaints about the paperwork burden. It currently provides sufficient detail to track rough diversion rates for waste tires remaining in California but is more limited in tracking tire flows leaving California and those passing through California.<sup>130</sup> California's manifest system keeps records along all steps of the waste tire life-cycle, including generation/importation, sale, re-

sale, and disposal/export. This is accomplished, in part, through the use of “comprehensive trip logs” kept by all official transporters of waste tires in the state.

- In the EU, while systems vary state to state, haulers are required to be registered with relevant departments in member states.
- Ontario also uses a manifest system, but one that includes detailed processor tracking as well as reconciliation at each transaction stage (i.e. each party fills out a manifest form). They require tire-derived product processors to provide proof of end-use tracking for their customers to ensure proper end use (e.g. preferably not disposal or tire-derived fuel (TDF) uses as prioritized by Ontario), and this includes end-uses of any waste tires exported from the province. Collectors, haulers and processors are all required to fill out components of the manifest and track the quantity and type of all tires they deal with. All parties in the waste tire management plan are required to be registered.

### ***Responsibility and Stewardship Clearly Defined***

Responsibility for the proper disposal of waste tires must be clearly assigned and mandated in order to ensure that waste tire diversion mandates are met.

- California does not assign formal responsibility to industry, but California tire retailers become the initial responsible parties due to the nature of the waste tire collection system. California retailers that sell new tires are the initial source of used and waste tire collection. The retailer becomes the predominant congregation point for waste tires because most customers buy new tires and leave their old tires behind for disposal. These retailers are also the entities that collect the California tire fee from consumers. This is paired with broad programmatic guidelines, regulations, and financial support CalRecycle provides through its management of the state tire fee.
- Most EU member states assign formal responsibility to tire generators (producers and importers). Generators are required to devise management plans, but it is up to them how to manage the specifics of waste tire diversion from landfills.
- Ontario assigns responsibility to tire generators (called “stewards”), but a collectively established nonprofit, funded by the “stewards” and overseen by the public waste management agency, designs and implements the actual management plans for waste tires in the province.

### ***Funding Mechanism***

Fees at the point of sale have been the most successful and sustainable options for jurisdictions looking to raise money for waste tire programs. General income taxes collected by states can be used but often require consistent political will to maintain as a dedicated funding source. General waste fees have similarly been used, but also require consistent prioritization of waste tires as an issue within departmental budget planning. Having a funding source dedicated to waste tire management is a key component of a sustainable waste tire management effort (e.g. a tire fee should be used exclusively for the management of waste tires, rather than entering a jurisdiction’s general fund).

- California’s tire program is funded by a fee on new tires and is administered by CalRecycle, although responsibility for management of the actual disposal or processing of waste tires is passed down the waste tire supply chain from the point of initial collection at retailers, to haulers, and finally to end-use or disposal facilities. The retailer may retain 1½ percent of the

tire fee as reimbursement for any costs associated with the collection of the fee (California Public Resource Code Section 42885).

- The EU lets the tire generators decide how to raise money for their integrated waste tire management programs (extended producer responsibility). However, member states cover through normal taxes enforcement costs to prevent illegal dumping and to clean up illegal disposal sites (e.g. police services).
- Ontario mandates the industry funding organization (nonprofit set up to run the integrated management plan), collects fees from tire generators (per tire generated), and carefully doles out these fees to the collectors, haulers, and processors based on market analysis of costs and benefits at various points in the value chain.

### ***Productive Use of Waste Tires and Market Development***

There must be viable, end-use alternatives available to counter the undesirable disposal/use of waste tires established by the jurisdiction. If no alternatives exist, tires will likely continue to be disposed of informally. Use of rubberized asphalt concrete (RAC) in urban areas for transportation infrastructure is a potential market that can use significant amounts of tires. However, RAC requires engineering specifications to be effectively implemented. In some cases, a storage site may be necessary until capacity to process is reached — such as monofill sites. Tire-derived fuel is currently a substantial consumer of waste tires in Baja California (consuming roughly 33 percent of scrap tires/year), but is often evaluated against options that have higher value-added use in jurisdictions with integrated waste tire management plans. There are many decentralized uses of scrap tires in construction in Baja California that could receive government endorsement, thus contributing to their growth and ensuring standards are being met in construction.

- California funds market development through loans for processors and grants for new end-users of tire-derived products. California (and the U.S. Department of Transportation) also requires a certain percentage of all road maintenance/construction to use RAC, thus creating some degree of stable demand for tire-derived products.
- The EU puts responsibility on the private sector for the development of these alternatives, only providing the directive that the tires cannot be landfilled and the enforcing sanctions against those who violate the law. By not specifying uses or providing market supports, one result is that many tires go toward lower value-added, but well-established, uses such as TDF (~50 percent across the EU).
- Ontario requires the development of a comprehensive integrated management plan by the nonprofit organization set up to manage waste tires, or by companies if their program is approved by the provincial government. Additionally, Ontario is implementing a hierarchical system of processing incentives to encourage processing waste tires into higher value-added products. To do this, Ontario has conducted extensive market analyses to provide tiered subsidies to higher value-added manufacturers of tire-derived rubber products.

### ***Placing Key Policy Design Parameters into a Model Framework***

Once the problem has been well-defined, the system analyzed, and key policy design principles identified, these principles can be organized into a framework for a model integrated management plan. The model framework does not present every aspect of working integrated management plans (especially given the great diversity of working programs), but instead organizes the key

policy design parameters into a model relevant to the local jurisdiction. The jurisdiction can then prioritize elements of the model framework into the self-contained modules that would be feasible to implement.

However, transforming a model framework into a functioning plan on the ground requires consideration of implementation policies, such as:

- registration and inspection requirements
- hauling standards
- information management systems
- financial tracking
- transport route mapping
- engineering standards, etc.

While it was beyond the scope of this report to construct a model framework, some basic steps are evident when combining our basic methodology and the key policy design principles pulled from international smart practices:

- The first step would be to more completely analyze the current waste tire management system to diagram and quantify the current management pathways for waste tires in Baja California. This would be an analysis of technical management pathways.
- Second, once these are mapped and quantified, the jurisdiction can rank those current pathways, plus others it wishes to promote, such as source reduction or higher value-added TDP. This would correspond to the “clearly prioritized policy outcomes” principle, and set the policy objectives of the jurisdiction.
- Third, the jurisdiction would then pull from international smart practices to evaluate program modules that best promote its preferred policy objectives, and/or penalize the prohibited pathways. This would pull from examples in the “clear regulations ensuring incentives,” and “productive use of waste tires” design principles, and would form a substantial portion of the model framework.
- Fourth, implementation questions must be addressed, involving several policy design principles: enforcement mechanisms; monitoring; and funding mechanism. This would form an additional sizeable portion of the framework and require some modeling of the impacts of particular implementation strategies on local conditions.
- Lastly, once these implementation requirements and modeled outcomes for particular incentive and sanction structures are analyzed, clear responsibilities for each implementation requirement must be set, corresponding to our “clearly defined responsibility” design principle.

This model plan would then serve as a road map for development and implementation of a final integrated waste tire management plan. Including evaluation measures and systematic reviews of progress and obstacles from experiences in implementing the program would allow jurisdictions to adapt the program as needed.

## VI. Concluding Remarks

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This report summarizes the evolution to date of the institutional and programmatic aspects of waste tire management in the State of Baja California. It assesses smart practices in the area of integrated waste tire management to help illustrate the usefulness of policy analysis methodology for problem-solving. It also offers concepts such as system modeling and key policy design parameters to enhance the problem-solving capacity in the region. The hope is that through use of this information within its own institutional, political, and economic context, among other considerations, Baja California can complement its current integrated waste management plan process and improve the impact of its current programs.

While a regional system remains an aspirational goal, the report's authors believe a positive step forward would be to expand the level of cooperation with regard to enforcement know-how and support from California to Mexican enforcement agencies, as well as coordination on standardized reporting, manifest collection, and information management with Baja California.\* California has been working on these strategies for several years now and has provided substantial support through Mexican tire hauler training, environmental education training, and materials and technical support, including this methodological report.

This report identifies a series of challenges remaining to the advancement of this approach in Baja California and the California- Baja California region. The goal was not to offer policy alternatives or actual policy analysis of existing policies but to present a useful method for addressing this issue and to support the effective design and implementation of an integrated management plan.

The following is a summary of key issues that data, studies, and observers have already identified. Here are a few examples that may need further research, design, planning, or consideration if they are to be resolved:

- The border acts as a congregation point for waste and used tires given the substantial markets for used tires on both sides of the U.S.-Mexico border. This region draws tires from other parts of the border states, and potentially from other states due to the strong market demand for used tires. The majority of the waste and used tires that congregate along the border stay along the border once they reach their end of life.
- While the State of Baja is quickly expanding its capacity for temporary storage of waste tires and municipalities are developing their own resources, the lack of existing disposal infrastructure historically has contributed to the accelerated accumulation of tire piles, including many smaller ones that have yet to be addressed.

### ***The Draft BC Plan: Obstacles and Opportunities***

Based on this context of implementation, the following are some preliminary obstacles and opportunities. They do not constitute fully developed policy recommendations to be followed by

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\* The views expressed in this report are those of the authors and do not necessarily reflect CalRecycle opinion or official policy.

Baja California and California on this matter. They are presented as examples of policy analysis results.

### **Clearly Prioritized Policy Outcomes**

While the Draft BC Plan prioritizes “proper disposal or treatment” of waste tires, it does not yet prioritize the different disposal options. The State of Baja now focuses on increasing temporary waste tire storage capacity, but not the connected processing capacity or tire-derived product (TDP) outlets, resulting in a growing strain on the capacity of these storage facilities.

- *Option: Rank regional and local priorities and determine waste tire outcomes that best meet these needs, (e.g. prevent illegal disposal of waste tires; promote high value-added uses of waste tires).*

### **Clear Regulation Ensuring Incentives**

The recent changes to federal and state regulations regarding “special management waste,” and more specifically waste tires, have more clearly defined the prohibitions on waste tire disposal and set a good starting framework for an integrated waste tire management plan. However, incentives and/or sanctions for all parties in the waste tire supply chain have not been developed equally. In particular, new tire producers have been largely left out of the evolving management framework in Baja California to date. Additionally, as implementation begins and evidence identifies potential problem points in the system, second generation adjustments can be made.

- *Option: Incorporate new tire generators into the evolving management framework.*
- *Option: Prepare potential second-generation improvements in order to plan for contingencies (e.g. mandating that consumers return old tires when they purchase replacements if the import quota/disposal receipt method currently in use is deemed ineffective).*
- *Option: Provide a fair and consistent marketplace for recycled tires through strong enforcement (e.g. enforcement and permitting, tire manifesting).*

### **Enforcement Mechanisms**

While the Draft BC Plan assigns enforcement responsibility to municipalities, it does not clearly define implementation mechanisms. Tire-fee funding goes to the state, and thus it is unclear where funding for municipal enforcement will come from.

- *Option: In addition to CalRecycle’s enforcement staff, California has been providing training and “enforcement grants” to local authorities to assist in enforcement actions. This can provide a useful design model because enforcement responsibility has been assigned to municipalities in Baja California.*

### **Monitoring**

The number of tires illegally imported across the border from California to Baja California (and potentially from other U.S. states through California to Baja California) is currently unknown, but it is a potentially large source of used and waste tires in Baja California and one that is hard to track.

The difficulty of tracing all sources of waste tires ending up in Baja California prevents the ideal targeting of programs, and also limits potential funding raised from tire fees charged to formal importers and other potential bilateral or regional cooperation arrangements. For a more integrated regional approach, it is clear that continued and expanded efforts to enhance the reliability of tire tracking in the border region utilizing California's technical assistance should remain a priority.

- *Option: Increase cross-border collaboration and innovation in developing tracking programs to more accurately define the problem. An environmental organization working along the border has suggested the use of U.S. Department of Transportation Codes that mark U.S. tires to track the origins of tires ending up in Baja California and those washing back into California river basins. This method could be applied more consistently as a component in tracking used and waste tires across the border without adding an additional burden to border authorities. Note: This tracking tool would not be able to determine the condition of the tires (e.g. as used or waste tires) at the point they moved across the border, only at the point of the audit, but it could provide a first step toward more accurately tracking cross-border tire flows.*
- *Occasional randomized audits for the presence of these codes among tire retailers in Baja California could provide data triangulation to augment the accuracy of tire import data for Baja California, and thus potentially increase tire-fee revenues for the state.*

### **Clearly Defined Responsibility**

New tire distributor and retailer responsibilities are currently absent from the Draft BC Plan and the private sector seems to be reluctant to sign the MOU on waste tire management at the local level. Additionally, new tires are not subject to the same sanctions as used tires because new tire retailers do not rely on quotas, as used tire importers do, for stock levels.

- *Option: As above. Develop incentives and/or sanctions for new tire producers to ensure they also meet their mandates for "proper" disposal of a quantity of waste tires equivalent to the number of new tires they introduce to the Baja California market.*

The federal government in Mexico has a working group addressing this issue at the national level and is seeking a broader solution through a national waste tire management strategy and, in the interim, a regional approach through the Border 2020 process. This could create confusion and uncertainty for the state plan and local implementation.

- *Option: Additional clarification of jurisdictional responsibilities in developing integrated waste tire management plans.*

### **Funding**

The tire fee is not 100 percent dedicated to waste tire management; a portion goes to the state general fund. Additionally, the portion dedicated to waste tire management is entirely allocated to the management of the two current temporary waste tire storage facilities. This provides little option for supporting other elements of a waste tire management plan.

- *Option: Consideration of a program that covers program costs within the integrated management plan itself, such as an extended producer responsibility*

*(EPR) program. With this approach, fees would be assessed at a level sufficient to meet all of the requirements of the integrated management plan, whether administered by the state or by an independent nonprofit, as in the case of Ontario, Canada. This would mean the state of Baja California would have to relinquish the portion of the tire fee revenue currently entering the general fund, however, which may be a difficult political decision.*

Broader financial constraints facing the State of Baja California and the local municipalities limits funding for integrated waste tire management programs beyond the current temporary waste tire storage facilities to which the current tire fee is dedicated. Financial support from outside the state is also limited. There are few federal funds available, and cross-border collaboration is difficult due to legal restrictions on the expenditure of California tire fees in Baja California.

- *Option: Explore opportunities for building greater regional and international cooperation mechanisms for integrated waste tire management. The Border 2012 program demonstrated the success of bi-national cooperation on cleanups of waste tire piles, and the border integrated waste tire management initiative is a strong foundation for longer-term cooperation. Additionally, there may be opportunities to initiate a similar program at the state level.*

### **Productive Alternatives for Waste Tires**

Underdeveloped tire-derived product markets and outlets in Mexico, high fees for disposal at several of the authorized disposal sites, and absence of a mandate for consumers to return waste tires to retailers combine to result in many tires being informally disposed.

- *Option: Once priorities are clearly established and ranked, options for promoting the most relevant TDP outlets can be analyzed. Again, California and other states have substantial experience learning from market development grant and loan programs and can likely provide Baja California with useful information on pitfalls and opportunities. There are a number of current uses of TDPs in Baja California that could be scaled up, including formal civil engineering applications for slope reinforcement and surface covering, as well as increased rubberized asphalt concrete (RAC) use given the new regulatory changes at the federal level.*

### **Some Key Regional Opportunities:**

- Cross-border cooperation
  - The bi-national cooperation effort, Border 2012, has been extended to Border 2020. While some priorities seem to have shifted away from waste tires now that the largest tire piles have been cleaned up, there is new language referring to collaboration in integrated management of waste tires more broadly.
  - The Border Environmental Cooperation Commission has been working for decades on these issues and can provide support for regional solutions in the context of negotiations between the U.S. and Mexican federal governments.
  - U.S. federal, state, and local agencies and jurisdictions should expand the provision of support to Baja California and the border region through technical assistance, training, and tire tracking data, where available. While CalRecycle

has primary responsibility for waste tire management in California, there are other agencies and jurisdictions that also can participate in these exchanges.

- Baja California should aim to standardize its monitoring, tracking, and manifest systems with California to enhance waste tire flow management in the border area.

Eventually, an innovative regional waste management system with specific, integrated waste management plans for different waste streams, including tires, could result in enhanced cooperation on U.S.-Mexico waste management that results in beneficial outcomes on both sides of the border. The Border 2020 forum is focusing on chemical and e-waste integrated management. Depending upon the outcomes, it may be transferable to the trans-border issue of waste tire accumulation as well.

While Baja California has independently shown leadership in addressing this issue, it also should take advantage of potential cooperation with broader efforts by developing program elements that could easily be incorporated into a national strategy following federal policy guidelines.

The Mexican federal plan may take time. Direct financial support from California or the Mexican federal government for the Baja California plan may never materialize given institutional constraints, divergence in programmatic priorities, and politics, among other factors.

However, Baja California's own actions can be enhanced despite budgetary constraints by integrating smart practices from other, more complete programs that transfer the cost burden for managing an integrated waste tire plan to large tire importers and producers.

Given the range of EPR/tire stewardship programs presented here, and California's experience with these programs in other sectors (e.g. carpet and paint), evaluating the potential for systems that transfer costs to waste tire "generators" (producers and importers) to be implemented in Baja California would be useful.

# Appendix 1: Abbreviations, Acronyms, and Glossary of Terms

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BECC—Border Environmental Cooperation Commission

Border 2012—A 10-year collaboration between Mexico and the United States from 2002 to 2012, under the legal structure of the 1983 La Paz Agreement, focusing on border cooperation on bi-national environmental and public health issues

Border 2020—The next phase of the Border 2012 program, extending through 2020

Cal/EPA—California Environmental Protection Agency

California-Mexico Border Region—As per definition by Border 2012 Agreement, region extending 100 kilometers on either side of the border of California and Baja California

CalRecycle—California Department of Resources Recycling and Recovery, in charge of managing public materials recycling programs, including California’s waste tire management system

CEMEX—Cementos de México (Mexican cement company)

Draft BC Plan—Draft Integrated Waste Tire Management Plan for Baja California (see appendix 2)

La Paz Agreement on Cooperation for the Protection and Improvement of the Environment in the Border Area, 1983

LGPGIR—Ley General para la Prevención y Gestión Integral de los Residuos (General Law for the Prevention and Integrated Waste Management), 2003

LPGIRBC—Ley De Prevencion Y Gestion Integral de Residuos Para El Estado De Baja California (Baja California Law for the Prevention and Integrated Waste Management), 2007

MOU—Memorandum of understanding

RAC (Rubberized Asphalt Concrete)—Road paving material made by blending ground-up recycled tires with asphalt to produce a binder which is then mixed with conventional aggregate materials.

SEMARNAT—Secretaría de Medio Ambiente y Recursos Naturales (Federal Secretariat of Environment and Natural Resources)

SPABC—Secretaría de Protección al Ambiente de Baja California (Secretariat of Environmental Protection for Baja California)

Special Management Waste—A classification in the LPGIR and LPGIRBC referring to solid waste produced in quantities greater than 10 tons per year by an individual entity. This waste falls under the jurisdictional responsibilities of the state rather than municipalities.

TDP (Tire-Derived Product)—Refers to products derived from a process using whole tires as a feedstock, including, but not limited to, shredding, crumbing, or chipping (California Public Resources Code 42805.7)

TDF (Tire-Derived-Fuel)—Using whole or shredded tires as direct fuel feedstock for heat or energy production, generally used in incinerators and cement kilns

Used Tire—Per the California Public Resources Code, defined as a tire no longer mounted on a vehicle but still suitable for use as a vehicle tire (California Public Resources Code Section 42806.5)

U.S. EPA—United States Environmental Protection Agency

Waste Tire—Per the California Public Resources Code, defined as a tire that is no longer mounted on a vehicle and is no longer suitable for use as a vehicle tire due to wear, damage, or deviation from the manufacturer's original specifications (California Public Resource Code Section 42807).

# Appendix 2: Draft Integrated Waste Tire Management Plan for the State of Baja California

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Based on general principles of environmental and economic sustainability provided by the legal and institutional context described above (and in section 3), which makes citizens responsible to protect and conserve the environment, Baja California is negotiating among key stakeholders a more integrated approach for the management and disposal of waste tires. The draft Coordination Agreement for the Development of Activities Related to the Integrated Sustainable Management and Final Disposal of Waste Tires in the State of Baja California is expected to be signed by the following parties this year:

- The Mexican Federal Government
- Executive Power of the State of Baja California – Governor
- Secretariat of Government of the State
- Secretariat of Environmental Protection of the State
- State Legislature – President of the Environmental Commission
- Municipal governments: Mexicali, Tecate, Tijuana, Playas de Rosarito, Ensenada
- Chambers of Commerce, Services and Tourism: Mexicali, Tijuana
- Tire importers (representation pending)
- New Tire Retailers and Distributors

The plan points to the need to develop instruments to enable intergovernmental and interagency collaboration to restore and preserve environmental quality in the state. In particular, it states that “it is important to foresee long-term solutions regarding the problem of improper accumulation of waste tires through the implementation of concrete actions that can contribute to the solution of the problem of this type of waste in piles along the border region that invade the natural environment and represent a grave waste management problem.”

Key objectives of the agreement beyond clean up and restoration of the environment is to avoid:

- Tire burning that affects air quality, soil and water contamination;
- Health hazards; and
- New piles and improper disposal of waste tires.

The signatory parties will agree to the following objectives of the program:

- Develop an information system about the waste tires generated in the State of Baja California;
- Coordinate the activities and jurisdictional competences of the municipal, state and federal authorities in the area of prevention and integrated management of waste;

- Involve all generators of this waste, from the consumer to importers, retail and bulk commerce of new and used tires, recyclers, junk yards, etc.;
- Locate and identify tire dump sites that need to be restored (i.e., clean up actions) with the participation of importers and municipal and state authorities;
- Conduct permanent waste tire cleanup operations and restoration of contaminated sites ( In these cases disposal of tires will be free); and
- Achieve proper management of the disposal of waste tires that guarantees the disposition, co-processing or reutilization according to standing norms of the State of Baja California.

The Federal Government will commit to the management of the imports quotas in response to the needs of the State only when the commitments stipulated in the agreement are met.

The State through the Secretariat of Environmental Protection commits to:

- Register and control the importation and final disposal of used tires in waste tire storage facilities (Centros de Acopio, in Spanish);
- Establish and/or authorize the operation of temporary waste tire disposal and recycling facilities in the metropolitan areas of the State's municipalities;
- Authorize in municipalities transference centers of waste tires in municipalities that would allow temporary storage of this waste; and
- Maintain rights fees for the disposal of waste tires, which would allow the State storage facilities to effectively operate the State storage facilities and to promote cleanup actions whenever necessary.

The environmental commission of the State Legislature commits to:

- Promote a culture of environmental responsibility of the public servants;
- Diminish the environmental impact generated of the administrative activities of its agencies and entities; and
- Promote and propose legislative and budgetary incentives to maintain and strengthen the co-responsibility of all stakeholders related to the business of tires in the State.

The municipalities commit to:

- Conduct inspections and vigilance to verify compliance with the law that affects commercial activities and services related to the business of managing tires, and if necessary impose the corresponding sanctions;
- Locate sites polluted with waste tires and propose clean up and restoration operations.

The Chambers commit to:

- Promote among their members involved in the business of tires the actions derived from the agreement.

The Used Tires Importers commit to:

- Observe, with regards to waste tires, the legal requirements of the (LPGIRBC), its statutory regulations;
- Register at the Secretariat of Environment Protection as generators of special management solid waste;
- Dispose of the waste tires and pneumatics, generated due to their activities, in temporary storage, recycling or final disposition facilities authorized by the Secretariat of Environmental Protection;
- Using the manifest system that the Secretariat of Environmental Protection will issue, in order to conduct the monitoring of the generation and management practices of the pneumatics and tires vulcanized, re-vulcanized, used and commercialized;
- Covering the fees for the rights and/or other contributions established in the environmental and tax laws; and
- Obtaining an annual certificate of non-dues owed when the integrated management of the totality of the tires and pneumatics established in the import permits granted by the federal authority (i.e., Ministry of Economy).

New tire producers' and retailers' commitments have not yet been established.

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