WASTE TIRE RECYCLING AND REUSE IN PENNSYLVANIA: AN ANALYSIS OF THE INDUSTRY, MARKETS, AND STATE USE, INCLUDING RUBBER MODIFIED ASPHALT

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TO MEMBERS OF THE GENERAL ASSEMBLY,

The Joint State Government Commission is pleased to present this staff report on Waste Tire Recycling and Reuse in Pennsylvania, a study undertaken pursuant to House Resolution 456 of 2005.

The Commission acknowledges, with gratitude, the staffs of the Pennsylvania Department of Environmental Protection, specifically the Bureau of Land Recycling and Waste Management, along with the Pennsylvania Department of Transportation, Pennsylvania Department of General Services, the Joint Legislative Air and Water Pollution Control and Conservation Committee, and all other departments and agencies that shared their knowledge and expertise for this study. In addition, the Commission also thanks those industry leaders, from across the Commonwealth, who are engaged in all aspects of waste tire recycling, for lending their time and assistance to this report.

Respectfully submitted,

Roger A. Madigan,
Chair

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INTRODUCTION

House Resolution 456 of 2005 (Printer's Number 2781), sponsored by Representative Ron Miller, charges the Joint State Government Commission to study: the use of rubberized asphalt (RA) in the other 49 states; the cost of using RA; the number of waste tires[1] removed from the waste stream; and the new market impact analysis. Due to the dynamics of the tire recycling market, the variety of products that are produced from different types of tires and the supply and demand cost relationship within the industry, it is necessary to look at the waste tire recycling system as a whole, to put this in context. The use of rubberized asphalt is, however, a major focus of this study. The report that follows is an attempt to put forth an accurate and useful snapshot of waste tire use in Pennsylvania. The topic of waste tires has suffered over the years from a lack of knowledge, a lack of resources and varying misconceptions and stigmas. Despite some shortcomings at the state and industry levels, great strides continue to be made in tire clean-up, markets continue to grow, and the economic vitality of businesses is improving. In fact, there are several national and international leaders in scrap tire recycling based in the state, who often go unnoticed but play a major role in controlling the flow and use of waste tires. The Commonwealth is also a key stakeholder in this venture and by working together, all sides can continue to move forward with tire pile clean-up and creating long term, sustainable markets.

From the time cars were invented, what to do with tires has posed a problem. With the onset of World War II, most scrap tires were reused or recycled due to a shortage of raw materials. After rationing ended and steel belted radials and synthetic rubber tires were introduced, they became more difficult to breakdown and piles of tires began to appear.[2] Most tire piles went unchecked until the late 1980's, when the problem was recognized. By the time legislation was adopted and monies appropriated to deal with the now illegal tire piles in 1996, the piles had grown to number some 36 million tires.[3] At the time, there were few businesses in place to deal with the piles or to use the annual generation of tires, but that has since changed. In some segments of the tire markets, Pennsylvania is now a national and international leader and has numerous success stories. The state has a well established industry that contributes to the tax rolls, employs hundreds of people, and helps deal with this valuable commodity.

[1] Throughout this report, tires are referred to as the statutorily defined waste tires. The case has been made, however, that tires are a scrap or commodity and not a waste due to their recycling and reuse potential. The reports use of the word waste, however, should not be interpreted as support for either definition.

[2] Wolf, Rhonda Brown, "Scrap tires an environmental health concern," Fort Detrick Standard, January 7, 2004, www.dcmilitary.com/dcmilitary_archives/stories/010704/26847-1/shtml.

[3] Department of Environmental Protection, "Update of the Pennsylvania Waste Tire Recycling Program," July 30, 2004.

Tire recycling is a vitally important business in today's Pennsylvania, both environmentally and economically, and has been featured on both the Discovery Channel's *Dirty Jobs* and PCN's *Tours*. Tire recycling can be a profitable business, but depending on the nature of the products produced or tires used, the margins can be very small making tire businesses rely on quantity to keep them operating in the black. For refiners and end users, it can be difficult to find the feedstock[4] they need to produce a finished product, which causes them to look outside the state or country to meet their needs. Those businesses that do not rely on the quantity of tires have discovered economic stability through a niche market, by delivering high quality products to serve their customers with specific needs.

To utilize a hard to process and dispose of commodity, those in the tire industry employ a mix of technology and innovation. Tires are difficult to break down as they are made to last and incorporate a mix of rubber, steel wire, fiber, and even newer materials like Kevlar, that are designed to last tens of thousands of miles and withstand the rigors and abuses of paved highways and roads. To that extent, tires are buoyant, collect and hold water and are heavy, averaging 20 pounds for a passenger and 50 pounds and up for a truck tire. For decades, tires have been looked at as a problem, but more recently, the focus has been on not simply developing products that incorporate recycled rubber, but rather promoting the value added aspects of this commodity as one that improves existing products and standard materials. Testing and evaluation is constantly taking place not only to find new uses, but to improve the quality of current goods in a constantly evolving and demanding marketplace.

The subject of waste tire recycling is far from new in Pennsylvania, and despite regional market dynamics and the successful use of different products, the state is unique from others in many cases. Because of the Commonwealth's climate, geography, transportation network, collection logistics, and processing infrastructure, recycled rubber products have met with varying success. In addition, the costs to produce the same tire product based on transportation, seasonal supply factors, re-use of generate by-products, layers of process and refining, end use value, infrastructure costs, and types of tires used differ considerably. These factors make the number of tires in certain projects difficult to determine, complicate project analysis, and skew state-to-state comparisons.

Tires have been viewed as a waste and as a recyclable, and many recycling and reuse options have been viewed with pessimism. While recycling and reuse is encouraged for items such as glass containers, newspapers, corrugated cardboard, office paper, aluminum cans, steel cans, plastics and leaf waste, waste tires often fall under the public's radar as a recyclable.[5] Although tire recycling is important and encouraged by the Department of Environmental Protection (DEP), it is also regulated as residual waste. Permits are required for tire storage, transport, and processing, as well as for air quality. Despite improvements over the years, a stigma surrounding tires still exists and many of their uses are viewed skeptically. A tire is something that meets the road, not as something that a child plays on or is used in the home.

[4] Feedstock refers to the raw tire material a processor or refiner needs for his business. This varies depending on the end use product being manufactured. For example, a processor making rubber mulch can use whole tires, where a refiner making rubber mats or sports turf, will need a pre-processed tire, reduced and cleaned to his specifications.
[5] Priority Recyclables, often referred to as the "Magic 8" are listed in Act 101 of 1988.

Pennsylvania has been performing well in both market development and tire clean-up, the two most important aspects surrounding this issue. The Commonwealth generates approximately 12 million tires annually, or roughly one tire per year for every resident, while nearly 10 million tires lay on piles throughout the state. The piles are decreasing as successful enforcement and remediation projects have combined to ease a potential problem that for decades has scarred our landscape and posed health and fire hazards. Progress is being made, but there is still work to be done. Since the lapse of Act 190 of 1996[6] monies, tire clean-up has suffered from inconsistent appropriations, a slowed pace of remediation, and a lack of continuity. The primary responsibility for tires fall under DEP's Bureau of Waste Management, which carries out enforcement and oversees clean-up, but other bureaus and agencies have been given authority over certain areas, contributing to the lack of a unified message. Many funds were established while others were tapped to fund tire pile clean-ups. General fund monies, permit fees and fines, and penalties together comprise the available resources. Pennsylvania levies a one dollar per tire fee on the purchase of new tires, but that money goes exclusively to the Public Transportation Assistance Fund, which supports mass transit, limiting the potential benefits that many other states with fees, that support tire clean-up or recycling, enjoy.

Currently, most tire related funds have a zero balance, making clean-up money scarce and grant money non-existent. The tire recycling industry in Pennsylvania is strong, and the creative uses for tires are growing. All of the annually generated tires are being consumed, and it is clear that the piles on the ground, while a finite problem, will persist without a commitment of time and investment of money. It is not practical for the industry to clean-up the tire piles on their own, nor would those tires meet their quality needs, which limit their potential uses.

In many cases, when tires are discussed, the focus is on recycling and reuse, environmental benefits, and economic growth. Creative uses for scrap tires have been looked at by The Pennsylvania Department of Transportation (PennDOT) dating back to the 1960s. Additionally, there has been a consolidated effort by the state, since the late 1980's to recycle and purchase recycled rubber products. What is new, however, is the number of uses, the professionalism of the processors and manufacturers, the commitment of the industry to quality, and the technology to process and refine tires. Industry leaders have made significant investments in their businesses and have overcome many obstacles to product use, but this and other factors can keep prices higher than standard materials. The cost factor is difficult to overcome which can further inhibit waste tire use, as is the case with state purchasing. Even in the case of improved performance and longevity, higher costs for future savings is a tough sell.

Many state agencies have sponsored pilot projects using recycled rubber products, but few programs have resulted in any sustained usage. In most cases, cost was the significant factor in their decision to discontinue use, regardless of performance. In the case of PennDOT, it has the ability to use significant amounts of rubber through not only asphalt, but other civil engineering applications as well. However, where rubber has its best performance is often when it is used in lesser amounts. Early testing of rubber modified asphalt, at 10 to 15 percent replacement of the standard materials, had significant problems. However, newer technologies that incorporate less than five percent replacement of standard materials have performed well.

[6] Act 190 of 1996 established the Used Tire Pile Remediation Restricted Account and transferred one million dollars annually to that account from the Recycling Fund, for five years, from fiscal year 1997/98 to 2001/02.

These mixtures with only a small percentage of rubber use few tires and in most cases, no tires from tire piles due to quality specifications.

PennDOT officials continue to show little interest to testing new rubber modified products due, in part, to their past experiences of higher costs and mixed performance, but they have not completely given up on rubber. Through a Memorandum Of Understanding (MOU) with DEP, new rubber modified product testing is done annually, specifications are updated, and evaluations of new projects and materials are made. This is important because many local governments rely on PennDOT's research and specifications. Private contractors performing work for PennDOT can also suggest alternate materials and utilize provisional specifications, but few contractors take advantage of these options. Allowing PennDOT's maintenance district personnel to work with contractors to incorporate materials, like rubber, into their projects has been more productive than dictating from their central office. All that being said, it is unfair to think that PennDOT, or any one department's use of recycled rubber in pilot projects, would have a significant impact on product markets or reducing tire piles. Only sustained use will accomplish those goals. It is also unrealistic for the state to pay a cost prohibitive amount for any recyclable just to feel good about recyclable content purchasing.

Despite all the good things the tire recycling industry has done since 1996 including reducing the number of tires on piles throughout the Commonwealth from 36 million to near 10 million, the developing new tire derived products, and increasing use of new technology that makes the delivery of higher quality products feasible, negative experiences continue to be associated with waste tires. These experiences include: tire fires around the state producing plumes of black smoke and residual runoff; tire piles becoming breeding grounds for mosquitoes which can carry the West Nile Virus; and many of the early tire products, including RA, not performing well or being prohibitively expensive. In many cases, it is those experiences that continue to resonate with many individuals around the state and in government, leading to the continued view that tires are a waste and not a recyclable commodity.

Over the last ten years, the state has made a significant investment of time and money in tire clean-up, regulation, and enforcement. Several significant pieces of legislation have enabled this to take place and helped to establish the current Commonwealth policy towards waste tires. The steps that have been taken include: remediation of existing tire piles; a crackdown on collecting, hauling, and processing tires to prevent the creation of additional piles; funding of various grants from DEP and Department of Community and Economic Development (DCED) to assist qualified businesses expand their processing capacity, invest in refining infrastructure, and enter new markets; and the establishment of government purchase guidelines and incentives for the use of recycled rubber products. In some cases, however, there seems to be a disconnect between executive policy and program management. As uses for tires are promoted and money is appropriated for tire clean-up, progress is still slow to clean-up the tire piles. Despite millions of dollars and dozens of new uses for tires over the last ten years, there are still tires on the ground, markets still have the capacity to expand and grow, and the state has room to expand its use of tire-derived products.

While it is good policy to clean-up tire piles and get them to positive end uses, it is a difficult balance to remediate and regulate tires while promoting their re-use and sustaining the markets that support this industry. Tires not bound for recycling or reuse pose a risk, so getting annually generated tires in the hands of licensed users is just as important as tire clean-up. Strengthening Pennsylvania's landfill laws, which currently ban whole tires, to ban all tires has been discussed as competition for tires is stretched to the limit. Existing waste tire businesses are operating below capacity because they cannot get enough tires or feedstock, and demand for waste tires will only grow as businesses grow and new companies enter the tire marketplace. Some processors are forced to import tires, and with the limited uses of pile tires, a landfill ban or collection requirement may be the key to future industry growth. Regardless of demand, it is unlikely that the industry will clean-up piles on their own due to the limited uses for these tires and the costs to recover them exceeding their business margins.

The best way to deal with clean and dirty tires[7] is a matter of opinion, just like the funding priority, clean-up plan, and sustainable markets development. One thing that is easy to see are the raw data, specifically on tire clean-up and spending. Compiling numbers of waste tires for annual use is difficult, and tracking tires across the various uses, as well as imports, exports and landfills is equally a challenge. Stockpiled tire numbers are estimates as are clean-up numbers, which are based on truck weight and Passenger Tire Equivalents (PTEs). All these factors combine to make an already complicated issue even more complex.

Setting public policy is a mix of strategy, actions, and priorities to meet a set of goals. Legislative priorities have been divided into short and long terms goals. While reducing the tire piles and growing the tire recycling industries in the state are short-term goals that have been met, there has been no long-term planning. For example, tire piles are a finite problem, but there is no blueprint in place to reach the ultimate goal of cleaning up all remaining tires on the ground. Since tires will continue to enter the recycling stream annually, and policies designed to sustain and grow the markets and recycling infrastructure in Pennsylvania are needed. As funds are stretched tighter and it becomes difficult to raise fees and taxes to support specific projects, businesses and the state will be forced to seek creative ways to solve tire problems.

Despite some inconsistencies in the data between DEP and tire industry groups, some things are clear: markets are performing well and tire piles are not growing. In the court of public opinion, some say piles need to be cleaned-up faster, and some in the industry say they want to enter different market sectors. No one can dispute the devastating environmental impact that tires can have when on the ground, but it is unreasonable to create false markets based on subsidies or for the state to purchase recycled products that are not cost competitive. What will decide this issue is the decision to either make the investment to get tires cleaned-up as fast as possible while not disrupting the markets or to maintain the status quo. While this report is not going to solve all the challenges set forth over decades of dealing with scrap tires, it will provide policy options to make simple, yet focused changes to the current tire clean-up program, marketing efforts, and funding disparity.

[7] Tires on piles throughout the state have been described as everything from legacy, dirty, old, and tires on the ground, while annual generation tires have been called clean, new, and off the car. Regardless of the specific description throughout, they refer to only these two types of tires.

The tire issue is still evolving in Pennsylvania, and what once represented a problem and a waste now represents promise and a commodity. Resolutions to this issue are still moving forward, and while it may not be fast enough for some, progress is being made. Rewriting this path is neither prudent nor wise, but there are issues that need to be resolved to make this progress more efficient and sustained. Tires need to be a constant presence on the radar screen of DEP and the General Assembly in order to prevent the inconsistencies of the past. Based on these conclusions, several policy options/recommendations have been made, to accomplish the goals of eliminating all waste tire piles, creating and expanding upon the uses for and quality of tire derived products, and sustaining market growth to prevent the reemergence of any tire problems in the Commonwealth. A list of policy options/recommendations can be found on page 84.

TIRES, RECYCLING AND THE ENVIRONMENT

While tires are a commodity and tire derived products have many valuable uses, the main reason behind the push for tire recycling and clean-up is due to the potential threats tires pose when left, unchecked, in piles across the state. At their peak, there were approximately 36 million tires on stockpiles throughout the Commonwealth. These tires, either at abandoned sites or commercial establishments, pose a fire hazard, are a visual scar on the land, are highly susceptible to mosquito infestation, and they are a prime breeding ground for West Nile virus. Taken as a whole, they pose serious environmental, health, and safety problems for neighboring communities.[8] To combat these issues the state has passed several key pieces of legislation over the last 20 years, and DEP has overseen the clean-up of 20 million tires. Many industry groups have initiated recycling plans that include tires, which address the commodity along with other reusable products. Despite this success, the state has been held back by its funding sources, due to the fact that its one dollar per tire recycling fee supports mass transit. In most states, that money goes to support tire remediation or market development, putting Pennsylvania at a disadvantage. The state also regulates tires as residual waste, creating a hurdle for those in the tire recycling business that other recyclables are not subject to.

Tire Pile Hazards

Prior to 1996, it was legal to landfill and stockpile tires in Pennsylvania, and many individuals and businesses accumulated 36 million tires. Over that time, the fear of fire was realized on several occasions across the state and around the country. Tire fires at large and small piles are difficult to extinguish, fill the air with dense black smoke and breakdown tires into their components of metals and oils that can contaminate the soil and waterways. The largest and most devastating tire fire in the history of the United States occurred in 1983 at a tire storage facility near Winchester, Virginia, where arson caused 7 million tires to go up in flames. The fire burned for 9 months causing air emissions to pollute a 50 mile area and 800,000 gallons of oil runoff. Listed below are just a few examples of tire fires, both large and small, that have occurred in Pennsylvania. These include:

- A March 1996 fire at the Philadelphia Tire Disposal company that burned more than 300,000 whole and shredded tires and caused serious damage to a section of Interstate 95;[9]
- A 1996 fire at Mahantango Enterprises, Inc. in Juniata County that burned for three days and was battled by about 30 fire companies from 10 counties;[10]

[8] PA DEP, "Update on the Pennsylvania Waste Tire Recycling Program." July 30, 2004, pg. i; Today's Tire Industry, "Scrap Tires and West Nile Virus," July/August 2003, pg. 51.
[9] DEP News Release, "Court Orders All State Tire Recycling to Clean Up Philadelphia Tire Pile," August 20, 2001.
[10] DEP News Release, "DEP Approves Juniata County Tire Recycler's Clean-up Plan," February 29, 2000. Note: Since the fire, Mahantango has operated under a consent order from DEP and is required to clean-up one tire from

- A February 1997 fire at EZ Recycling in Washington, Pennsylvania that burned more that 1.8 million tires over the course of one week and caused the voluntary evacuation of nearby residents;[11]
- In February 2007 a fire broke out in Beaver Falls, Mercer County, at Meyer's Tires and Auto Salvage. In this case the tires were stored indoors, destroying storage sections of the business and approximately 2,000 tires. Firefighters from 21 departments were on scene for 22 hours, and DEP officials and haz-mat crews were on hand to assess any threats to the environment or public;[12] and
- An April 2006 fire in Snyder County involved only 15 tires required the response of 3 fire companies, DEP officials, and the Fish and Boat Commission.[13]

With nearly 10 million tires still in tire piles around the state, the continued threat of fires still exists today. Fortunately, many reputable tire businesses now store tires in such a way as to minimize the potential for a large tire fire by using extensive fire suppression and prevention devices and plans.

In addition to visual scarring and fires, a more recent threat has emerged in the form of the mosquito borne West Nile Virus. West Nile first appeared in Pennsylvania in 2000, and tire piles were immediately recognized as a major problem in the fight to minimize this threat. Anywhere that water is allowed to accumulate provides suitable breeding grounds for mosquitoes and tires hold storm water. DEP created a statewide, multi-agency plan, established aggressive spraying programs, and moved proactively to inform citizens of ways to personally combat this threat.[14] In addition to DEP, counties, industry groups, the United States Environmental Protection Agency (EPA), and United States Centers for Disease Control and Prevention (CDC) also assisted in helping to combat this virus. While eliminating all tire piles will not bring an end to West Nile in the state, that, along with proper storage guidelines, will help.

Recycling, Residual Waste and Related Acts

The push for recycling of all materials began in the 1980's, when the Commonwealth recognized the need to set goals to decrease its waste output. Various pieces of legislation established recyclable materials that would be given priority, required municipalities to establish recycling programs, provided funding for recycling grants and established a tipping fee to support recycling. In this Commonwealth, "recycling stands alone as the most recognizable environmental program…and remains the foundation of Environmental Stewardship."[15]

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the tire pile on-site for every two tires it processes. They are currently in compliance with DEP and are the only facility in the state that has stayed in business while remediating its own on-site legacy tire pile. The company projects that clean-up will be completed in 2008.

[11] DEP New Release, "Governor Proclaims Disaster for Tire Fire," March 5, 1997.

[12] Beaver County Times, "Beaver Falls fire burning itself out," February 20, 2007.

[13] Sunbury Daily Item, "Crews put out Snyder County tire fire," April 27, 2006.

[14] DEP Fact Sheet, "What Tire Pile Owners Should Know About West Nile Virus," May 2005; See also www.westnile.state.pa.us.

[15] DEP, "The Future of Recycling in Pennsylvania: ACT 175 Recycling Plan," July 2004, pg. 6.

These efforts began with the Solid Waste Management Act, Act 97 of 1980. This Act set the duties for DEP to regulate the storage, disposal, collection, transportation, processing, treatment and disposal of solid waste. Solid waste is defined as "any waste, including but not limited to municipal, residual or hazardous wastes…" This is important to tires as they are regulated as residual waste, not as a recyclable which would make them eligible for many programs and grants. This Act gave DEP the authority to not only issue permits and enforce the laws regarding disposal of residual waste, but to also encourage the beneficial re-use of such waste. DEP may issue general permits for beneficial use or processing and may or may not require insurance or bonds for those permits. Under Act 97, no waste may be stored for longer than one year, the facilities shall be monitored and DEP must be notified of all processing activities. Another feature of this Act is the creation of the Environmental Quality Board and its designation as the regulatory body of DEP for carrying out the provisions of this Act. [16] In addition, Act 97 creates the Solid Waste Abatement Fund (SWAF) for the "abatement or elimination of present or potential hazards to human health or to the environment from improper treatment, transportation, storage, processing, or disposal of solid wastes, and for the enforcement of this act." Feeding the fund are bond forfeitures and fines and penalties, including fines for tire related offenses. Money is spent on tire remediation from this fund annually, but this is not required and the amount varies from year to year.[17] The SWAF has a balance for the fiscal year 2006-07 budget of $549 million.[18]

The regulations governing the storage and transportation of residual waste also deal specifically with tires. The baseline that a person or municipality may store before being subject to these regulations is more than 500 tires outdoors or 1,500 tires indoors. After crossing that threshold, whole or processed tires may not be stored on site for longer than a year, operational records must be kept and notice must be filed with DEP. Requirements on storage of tires includes: they may not cover a surface area of greater than 2,500 square feet or 5 acres; be stacked higher than 15 feet; and must have fire breaks of 50 feet for whole tires, 35 feet for shredded tires, and 15 feet for baled tires. In addition, a mosquito propagation control shall be conducted and a preparedness, prevention and contingency plan shall be prepared. Tires must also be stored outside the 100 year floodplain, not within 100 feet of a wetland, and 300 feet from an occupied dwelling. Additionally, surface water runoff should be managed in accordance with the Clean Streams Law.[19] Daily operational records shall be kept and used to compile an annual operational report for the DEP. The report shall include weight and approximate number of whole and processed tires both received and shipped, when they were shipped, the name of the transporter, and the end use for which they were shipped. Regulations also designate that numbers and weights shall be reported in PTEs with one tire equal to 20 pounds.[20] According to industry leaders, the average weight of a new tire is 22 to 24 pounds, with 18 to 20 pounds of rubber, two to three pounds of steel and one to two pounds of fiber. On average, three to four pounds of rubber wears off over the road life of a tire.[21]

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[16] Act 97 of 1980.
[17] Act 97 of 1980.
[18] Governor's Executive Budget 2007-2008, pg. E16.4.
[19] Act 394 of 1937.
[20] PA Code Chapter 299 §299.155 to 299.162.
[21] TireStamp Inc., October 7, 2004, "The Intelligence Behind Your Tires," http://www.tirestamp.com/news04-10-07.htm (February 27, 2007).

Residual waste is by far the most predominant waste produced in the Commonwealth. Annually, 38 million tons of residual waste is generated, compared to nine million tons of municipal waste and 800,000 tons of hazardous waste. Ash generated by residual waste incinerators and coal burning power plants is the single largest source of residual waste at 40 percent of all residual waste. DEP has 400 permitted facilities that process residual waste under their watch.[22] A general permit for the processing or beneficial use of waste costs 2,000 dollars annually, but the beneficial use of industry-wide co-products, including coal ash, food waste, and scrap metal are exempt from permitting. While the goal of working together with businesses to promote waste management and protect human health and the environment is being met, it seems that tires could also be included in this exempt category without adversely affecting any of these goals.[23]

The Municipal Waste Planning, Recycling and Waste Reduction Act, Act 101 of 1988 was a holistic approach to recycling from the bottom up and established waste reduction goals for municipalities, gave them the tools to establish recycling program plans and assessed fees to fund these programs from the state level. The first step was identifying the priority recyclable materials, which are: clear and colored glass; steel and bimetallic cans; high grade office paper; newsprint; corrugated paper; plastics; and leaf waste. It then established a two dollars per ton recycling fee for solid waste disposed of at municipal landfills, which is sunset for 2012, with all monies being deposited into the newly created Recycling Fund. Of that money, 70% is to be expended for grants to municipal recycling programs and 30% may be used for public education and technical assistance.[24] The Recycling Fund has a balance for the State's 2006-07 budget of $61.6 million.[25]

In addition to those requirements, the Act also mandates that municipalities with a population of greater than 5,000 "shall establish a source-separation and collection program for recyclable materials," in a phased in approach, by establishing curbside service or a collection point. Going further, it requires state government to take the lead in recycling. Each state agency is charged with implementing a collection program for recyclable materials. It also requires the review of procurement procedures to encourage the use of goods with recycled content, and requires the Department of General Services (DGS) to set a minimum percentage for recycled content and establish a bidder's preference for recycled content.[26] Additionally, the Act charges PennDOT to consider the use of "any product or material with recycled content that may be beneficially used in lieu of another product" and allows them to award research and demonstration grants for products or materials with recycled content.[27]

This Act has been very successful. In addition to the 457 communities mandated to establish recycling programs, 500 voluntarily established curbside recycling and another 420 have drop-off centers. All state agencies participate in recycling programs and over 3,000

[22] DEP Fact Sheet, Residual Waste, April 1999.
[23] DEP Residual Waste Permitting, http://www.depweb.state.pa.us/landrecwaste/cwp/view.asp?A=1239&Q=462787 (October 4, 2006).
[24] Act 101 of 1988.
[25] Governor's Executive Budget 2007-2008, pg. E16.6.
[26] The Governor's Office Management Directive to State Agencies can be found on page 121 and the DGS Bidding Preference can be found on page 125.
[27] Act 101 of 1988.

commercial drop-off centers provide additional recycling opportunities.[28] The state has even exceeded its recycling goals of 25% by 1997 and 35% by 2003.[29] Recycling is promoted to conserve natural resources, save energy and reduce emissions, as well as has environmental, social and economic benefits that are realized across the state. The most recycled products in today's marketplace are asphalt pavement at 80%, steel at 70%, paper and cardboard at 35%, and compost at 12%, with all other materials below ten percent.[30] In the Commonwealth, the recycling industry employs 64,000 people, with annual sales of $15.5 billion, and contributes over $300 million in tax revenues per year.[31] DEP has focused on minimizing waste tire generation, but the scrap and recycling industry groups have embraced tires and many have made them a part of their formal efforts. [32]

While each state agency has implemented a recycling program, there has been a push to move even further. DEP and the DGS have been working together on several recycling initiatives, including recycled content purchasing and development of a management directive that would make each agency accountable for recycling and buy-recycling efforts. The overall goal is harnessing the Commonwealth's buying power "through concentrated efforts" at recycled content purchasing.[33] The same types of cooperative purchasing efforts have been pursued in the private sector, in part, to get over the hump of market barriers and inefficiencies by improving the conditions for recycling in Pennsylvania through awareness, quality and product development.[34] These mirror the goal of most DEP tire programs.

The original legislation dealing specifically with tires is Act 190 of 1996, the Waste Tire Recycling Act. This Act establishes a framework for dealing with tires which did not exist previously, "to ensure that whole used and waste tires are collected and put to beneficial use or properly disposed of." To accomplish that it: establishes a landfill ban on whole tires; initiates an annual permit for waste tire haulers at a cost of $50 to be deposited into the Used Tire Pile Remediation Restricted Account; requires haulers to maintain records; creates a toll free number within DEP for any person to request information regarding tire clean-up or report suspected violations; creates a priority enforcement list of piles containing 10,000 or more tires; establishes criminal penalties; implements investment tax credits for equipment purchases; requires that the Pennsylvania Departments of Conservation and Natural Resources (DCNR), Corrections (DOC), Environmental Protection, Transportation, General Services, Education (DOE), and the Pennsylvania State System of Higher Education (PASSHE) "give due consideration to the use of

[28] Pennsylvania Residential Recycling Guide, 5/8/2006, http://www.dep.state.pa.us/dep/deputate/airwaste/wm/recycle/Recywrks/recywrks1.htm (December 5, 2006).

[29] DEP, Recycling in Pennsylvania 1995-2002, August 2002; DEP, "The Future of Recycling in Pennsylvania: ACT 175 Recycling Plan," July 2004, pg. 3; DEP Fact Sheet, Recycling Works in Pennsylvania: The Economic Benefits, November 2002; Recycling is Good Business, http://www.dep.state.pa.us/dep/deputate/airwaste/wm/RECYCLE/FACTS/benefits6.htm (December 5, 2006); DEP, Bureau of Land Recycling and Waste Management, Recycling Means Economic and Environmental Benefits for Pennsylvania, March 2004.

[30] Missouri Asphalt Pavement Association, "Asphalt Pavement Recycling facts," http://www.moasphalt.org/facts/environmental/facts.htm (August 24, 2006).

[31] The Pennsylvania Recycling Markets Center, Recycling Fund Advisory Council Update, July 12, 2006.

[32] DEP, Pennsylvania Recycled Products Manufacturers, http://www.dep.state.pa.us/recycle_markets/RecycledProducts.aspx (December 5, 2006); Rubber Manufacturers Association, "Scrap Tire Markets In The United States." November 2006, pg. 13.

[33] DEP, "The Future of Recycling in Pennsylvania: ACT 175 Recycling Plan," July 2004, pg. 18.

[34] DEP, "The Future of Recycling in Pennsylvania: ACT 175 Recycling Plan," July 2004 pgs. 15, 18.

waste tires"; and requires that DEP submit a report to the General Assembly by July 30, 2004 of agency uses, clean-up activities, and implementation of Act 190. Finally, the Act attempted to jump start tire pile remediation and transferred one million dollars annually, for five years, from the Recycling Fund to the Used Tire Pile Remediation Restricted Account.[35]

Act 111 of 2002 amended Act 190 by establishing a waste tire hauler permit, making it unlawful for a non-permitted hauler to transport tires, requiring record keeping and establishing civil penalties. Going further than the priority tire piles of 10,000 or more, it creates a registry of piles from 1,500 to 10,000 tires and establishes waste tire collection program grants for individuals, local governments, businesses, corporations or other organizations with $250,000 a year from the Recycling Fund for an additional five years.[36]

Another Act, Act 7 of 2006, further amends the Waste Tire Recycling Act in several ways. It streamlines the process used to recover unused grant monies issued by the Commonwealth for tire clean-up from the responsible party after remediation has been completed. It also establishes a permit requirement for processing waste tires and prohibits any person from providing waste tires to an unlicensed hauler. Previously, no person could accept tires from an unlicensed hauler, but it made no restrictions on providing tires to unlicensed haulers. This amendment closes another potential loophole. Furthermore, the Act encourages the Environmental Quality Board to adopt regulations that not only encourage the processing and beneficial use of waste tires, but that "allow the Department [DEP] to determine that waste tires, after processing or when beneficially used, no longer constitute a waste."[37]

In addition to the Acts listed above, the purpose of Act 2 of 1995, the Land Recycling and Environmental Remediation Standards Act, was to put in place a mechanism to provide financial assistance to clean-up contaminated property. To accomplish that goal, the Act establishes grants for political subdivisions and local economic development agencies, but also initiates loans that include other eligible persons. This money is paid out of the Industrial Sites Clean-up Fund, which is fed by a $15 million transfer from the Hazardous Sites Clean-up Fund, and administered by DCED.[38] In 2000 this Act was amended to include Performance Based Loans (PBLs) for remediation, including non-hazardous waste and waste tire recycling is specifically mentioned. Under PBLs, DCED shall work with DEP to establish criteria, but the loan may be forgiven.[39]

According to Webster's New Riverside University Dictionary, Recycling is defined as "to recover useful materials from garbage or waste." While tires are not garbage, they have been defined by some as waste, some as scrap, and some as commodity. Regardless, when the life of a tire has ended, it will be recycled or reused just like other commodities in the state with the purpose of conserving virgin materials, energy savings, and waste reduction. Part of DEP's recycling strategy is to reduce the Commonwealth's waste output and that includes the annual generation of tires. While this is not supported by the industry who relies on this commodity and

[35] Act 190 of 1996.
[36] Act 111 of 2002.
[37] Act 7 of 2006.
[38] Act 2 of 1995.
[39] Act 6 of 2000.

currently struggles to get adequate supplies, it is a question of "environmental, health and safety hazards."[40] Tips towards minimizing waste tire generation include proper maintenance and the use of higher mileage tires. In addition to reducing waste output, a focus has been on energy independence and a concentration on alternate energy sources. Tires have been left out of this initiative despite their proven track record as a source of alternate fuel. The Pennsylvania Energy Development Authority is charged with developing energy policy goals, including alternate energy sources, but does not list tires.[41] Waste Futures is an initiative that focuses on "maximizing the use of resource historically discarded or disposed."[42] While the focus is on reduction, recycling and alternate fuels from municipal waste, residual waste is not included in these initiatives and, therefore, tires are left out. Finally, under the Energy and Technology Development Office, there are many alternate fuel incentives, including the Energy Independence Fund, part of the overall Energy Independence Strategy. Despite the office's control of the Starr Tire Pile, there is no defined policy towards tires.

DEP has undertaken a variety of efforts to address markets, and one attempt was the Recycling Markets Center (RMC). The RMC was established in 2005 "to expand and develop more secure and robust markets for recovered (recycled) materials by helping to overcome market barriers and inefficiencies."[43] While focusing on long term, sustainable growth in recyclables, including their focus on construction materials, electronics, glass, metals, organics, paper, plastics, and tires, the RMC also develops material specific strategies to encourage the use of secondary materials.[44] Through their efforts to encourage both economic development and environmental stewardship, the realized benefits to the industry and state include cost reductions, increased sales and job retention and creation, which all contribute to the economy. The RMC is funded through a five-year start-up grant from DEP and long range funding sources will be needed, both public and private, after that time.

The Pennsylvania Technical Assistance Program (PENNTAP) was established in 1965 as a resource to help companies, primarily small businesses, to compete and grow. In partnering with the RMC, PENNTAP uses its expertise to solve specific technical needs or questions geared towards expanding and developing markets and overcoming barriers and inefficiencies. PENNTAP can help with obtaining recycled material feedstock, product development, industry specific programs, grants, technical information, and training and education. Taken together, the programs have had a positive effect on the industry and markets, in areas typically outside DEP's scope as a regulatory enforcement agency.[45]

Another organization that has taken steps towards greater recycling and reuse of tires is the EPA. In 2003, the EPA estimated that over 80 percent of tires went to the market, up from 17% in 1990. In addition, 16.5 million of the annually generated 290 million tires are re-treaded. While both recycling and beneficial reuse continue to grow, the largest single use of tires, by far,

[40] DEP, Bureau of Waste Management, "Minimizing Waste Tire Generation" Fact Sheet, October 2006.
[41] DEP, "Pennsylvania Energy Development Plan," April 2006 draft, available at http://www.depweb.state.pa.us/enintech/lib/enintech/The_Pennsylvania_Energy_Development_Plan1.pdf (August 27, 2007).
[42] DEP, Waste Futures, http://www.depweb.state.pa.us/landrecwaste/cwp/view.asp?A=1238&Q=518605
[43] RMC, http://www.parmc.org.
[44] R.W. Beck, Pennsylvania Recycling Markets Center Study, 5/1/2003, pg. 6.
[45] Pennsylvania Technical Assistance Program, Recycling Markets Assistance, http://www.penntap.psu.edu.

is as fuel.[46] To help expedite and guide these efforts the EPA's *Scrap Tire Clean-up Guidebook* was published to assist state and local governments with best practices.[47] To further the efforts of recycling, the EPA developed the Resource Conservation Challenge (RCC). The RCC is a conservation effort aimed at waste reduction, increased reuse and recycling, and building markets with the overall goal of increasing the national recycling average from 25 percent to 30 percent by 2008.[48]

The Professional Recyclers of Pennsylvania (PROP) is a small organization but has a wide reaching membership and plays a major role in the industry. PROP works for the common good of recycling and involves coordinating and promoting better communication between recycling interests at the state, county and local levels, along with fostering a grassroots network of recyclers. It is also a leader within government and industry on recycling policy issues and has teamed with DEP to produce "Fact Sheets" on a variety of recyclable issues. While tires are not a focus of their efforts, like compost, plastics, glass, or metals, tires fall under the umbrella of their general recyclables programs and are included in their buy recycled approaches and market resources. Due to the strength of the tire industry in the state, as well as its importance as a recyclable, PROP has placed it on the same level as other materials.[49]

The Institute for Scrap Recycling Industries (ISRI) casts its net far and wide, representing 1,200 companies that "process, broker and consume" scrap commodities, including rubber and tire processing by-products. Their mission includes education, advocacy and public awareness, which are important in an industry with so many misconceptions. Waste is defined as "useable or unwanted substances or materials," while scrap is "a marketable commodity." In addition to the beneficial use, the scrap recycling process conserves energy and natural resources.[50]

ISRI has also issued a Tire Recycling Position statement which calls for improved communication and cooperation between manufacturers and recyclers. Their concerns are not unfounded as the national trend of most tires being recyclable mirrors that of Pennsylvania. While new materials are being introduced to increase the life and durability of tires, those same products may also make them harder to recycle. Their Design for Recycling policy "seeks to balance quality control and safety issues with the need for manufacturers to explore opportunities during product design that might help increase the yield of recoverable materials at end of life so as to maximize opportunities for recycling." What is described as end-of-life-management could create tires that are designed for the landfill, which could increase disposal problems that are currently being mitigated, as well as cost the recycling industry significant investment in current equipment and processing technology.[51]

[46] EPA, http://www.epa.gov/epaoswer/non-hw/muncpl/tires/index.htm (May 9, 2006).
[47] US EPA and Illinois EPA, *Scrap Tire Clean-up Guidebook*, January 2006.
[48] EPA, http://www.epa.gov/epaoswer/osw/conserve/basic.htm (May 9, 2006).
[49] PROP, http://www.proprecycles.org.
[50] ISRI, http://www.isri.org.
[51] ISRI, "Scrap Tire Design for Recycling Position Statement," June 2007.

Tire Remediation and Funding

Since 1996, nearly 21 million tires have been remediated; however, 9.1 million remain in approximately 202 piles throughout the state. The majority of those tires, 8.8 million of them, are concentrated in 49 piles of 10,000 or greater, which comprise the priority tire list.[52] Of the 21 million tires remediated, 8 million were cleaned-up through enforcement, which cost the state nothing, and 12.8 million were cleaned-up using various other sources of funding, which cost the state $16.2 million. There are inconsistencies between the numbers published by DEP in the clean-up list and the numbers being advertised by DEP's Bureau of Waste Management in various sources.[53] What is important to take away from these differences is the fact that keeping track of tires is a difficult undertaking and is often based on estimates.[54]

Within DEP there is no published business plan for dealing with tires under Act 190. Under the Municipal Waste Planning, Recycling and Waste Reduction Act, however, the Department is charged with developing a recycling program plan that includes market development, sustainable programs and recommendations to the legislature to assist municipalities with this endeavor.[55]

Over the years, tire clean-up has benefited from a variety of monies, transfers from the Recycling Fund, tire hauler and processor permit fees through the Used Tire Pile Remediation Restricted Account and fines and penalties collected in the SWAF.[56] Total funding peaked at over $4 million in 2000/01 and has declined since then as funding sources have dried up. For a breakdown of funding for tire remediation see table 1 on page 16. Current funding also includes approximately $58,400 from Waste Tire Hauler permits which feed the Used Tire Pile Restricted Account. However, those monies can fluctuate based on the annual number of permittees and violations. An additional $20,000 is paid into the Recycling Fund for Beneficial Use of Residual Waste General Permits issued to tire processors, but no money is required to be spent on tire abatement.[57]

General Fund monies have been appropriated by the General Assembly, to be used for tire clean-up. In Fiscal Year 2006/07, $800,000 was appropriated, with $50,000 spent and $499,975 in remaining commitments, for a remaining balance of $250,024. In FY 2005/06 $2.75 million was appropriated, with $1.024 million spent and $1.725 million in commitments. In FY 2004/05 $6,555,362 was appropriated, $4,955,981 spent, and $1,598,696 in commitments.[58] These numbers, however, are not reflected in table 1, which makes a more detailed explanation difficult.

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[52] DEP numbers from its "Waste Tire Pile Clean-up Status," in table 2 on page 17, and an unpublished clean-up table provided by DEP, Bureau of Waste Management.

[53] See table 1 on page 16. Another DEP source, within the Bureau of Waste Management, lists 26.8 million tires as being remediated and 9.6 million tires remaining in piles, which does not exactly match the chart presented.

[54] As of the publication date of this report, there was no reference to the Dirt and Gravel Roads project on DEP's "Waste Tire Pile Cleanup Status" list, and the Mahantango pile that is listed as remediated on the same list still has tires on the ground.

[55] Act 175 of 2002.

[56] Joint Conservation Committee, Environmental Synopsis, June 2003.

[57] Information provided by DEP, Bureau of Waste Management.

[58] Commonwealth of Pennsylvania, Status of Appropriations – General Fund, March 31, 2007.

TABLE 1

WASTE TIRE CLEAN-UP FUNDS
BY FUNDING TYPE AND FISCAL YEAR
1995/96 – 2006/07

Fiscal Year	Funding Source			
	Act 190 (in $)	General Fund (in $)	Other (in $)	Total (in $)
1995/96	$0	$0	$0	$0
1996/97	0	0	0	0
1997/98	0	120,489	0	120,489
1998/99	467,995	0	0	467,995
1999/00	284,163	507,993	379,957	1,172,113
2000/01	1,417,721	1,700,294	1,366,834	4,484,849
2001/02	999,999	1,840,892	1,182,593	4,023,484
2002/03	0	1,381,529	2,093,886	3,475,415
2003/04	0	0	162,102	162,102
2004/05	0	0	1,000,000	1,000,000
2005/06	0	0	1,105,320	1,105,320
2006/07[1]	0	0	279,585	279,585
Total[2]	3,169,878	5,551,197	7,570,277	16,291,352

1. Only includes known tire clean-ups through February 8, 2007.
2. There was an additional $4,383,804 in funds where the number of tires cleaned up by this money was unknown. Specifically, $2,059,184 Act 190, $2,280,956 General Fund, and $43,664 Other fund money.

SOURCE: PA Department of Environmental Protection, "Waste Tire Pile Clean-up Status," February 8, 2007. Available at http://www.depweb.state.pa.us/landrecwaste/lib/landrecwaste/residual_waste/completedprojects.pdf.

TABLE 2

NUMBER OF WASTE TIRES CLEANED UP
BY FUNDING TYPE AND FISCAL YEAR
1995/96 – 2006/07

	Funding Source				
Fiscal Year	Act 190	General Fund	Other[1]	Total	Enforcement[2]
1995/96	0	0	0	0	329,500
1996/97	0	0	0	0	120,000
1997/98	0	52,766	0	52,766	1,075,800
1998/99	867,325	0	0	867,325	1,989,000
1999/00	194,031	302,387	363,700	860,118	136,800
2000/01	1,175,046	1,295,071	1,312,217	3,782,334	254,200
2001/02	638,829	1,470,805	912,502	3,022,136	791,311
2002/03	0	1,067,214	1,756,568	2,823,782	686,721
2003/04	0	0	103,819	103,819	294,229
2004/05	0	0	1,000,000	1,000,000	998,000
2005/06	0	0	204,848	204,848	1,347,423
2006/07[3]	0	0	99,129	99,129	0
Total	2,875,231	4,188,243	5,752,783	12,816,257	8,022,984

1. Current funding from the Used Tire Remediation (RA) and Solid Waste Abatement Fund.
2. Clean-up by responsible party, or at their expense, with no cost to the Commonwealth.
3. Only includes known tire clean-ups through February 8, 2007.

SOURCE: PA Department of Environmental Protection, "Waste Tire Pile Clean-up Status," February 8, 2007. A complete and updated list of tire pile remediation's can be found at http://www.depweb.state.pa.us/landrecwaste/lib/landrecwaste/residual_waste/completedprojects.pdf.

While funding has been inconsistent in recent years, clean-up projects continue to move forward, DEP has successfully enforced clean-ups by responsible parties, and the piles are not growing. If this trend continues, it is only a matter of time before tire piles are a thing of the past. If the market stays this strong, the piles will most likely be gone for good. In addition, Table 2 shows that nearly 13 million tires remediated by DEP efforts with an additional 8 million remediated through enforcement. As referenced in Table 3, DEP reports a total of 9.1 million tires remaining on piles throughout the state. The peak of these efforts under Act 190 money was from 1998 through 2002. Recent efforts at pile remediation have focused on the largest piles, which have been done through grants, while others were remediated through competitive bids and some have gone to existing uses while others have been used for innovative projects. Details of some recent tire clean-ups are listed below.

TABLE 3

NUMBER OF STOCKPILED TIRES IN PENNSYLVANIA 2007[1]

Stockpile Size	Number of Tires	Number of Tire Sites
10,000 Tires and Greater	8,851,100	49
5,000 to 9,999 Tires	208,200	31
1,500 to 4,999 Tires	103,500	40
Less Than 1,500 Tires	32,675	82
Total	9,195,475	202

1. Includes known tire piles as reported on March 5, 2007.

SOURCE: Statistics provided by PA Department of Environmental Protection, Bureau of Land Recycling and Waste Management, Division of Municipal and Residual Waste, March 5, 2007.

The Wind Gap tire pile, in Wind Gap Boro, Northampton County, initially totaled some 2.5 to 3 million tires and was the second largest pile in the state at one time. Some of the tires are in a flooded quarry, making clean-up difficult. The largest remediation grant came from the SWAF in April 2004, and previous grants were for as much as $800,000. These grants were successful at remediating nearly all of the tires to the point where less than 10,000 tires currently remain.[59]

The Broody tire pile in Edwardsville Boro, Luzerne County was the subject of a $248,000 tire removal grant that began on October 6, 2003 and has since seen clean-up completed. Prior to that, this tire pile had a problematic history. In 1999, Broody Tire Company was ordered by DEP to stop accepting tires and begin removal. In June 2002, DEP ordered Broody Tires to clean-up the approximately 300,000 tires on site, by removing 5,000 per month. Additionally, the owner was required to treat the site for mosquitoes and make piles fire safety compliant. The owner of the tire pile did not comply with that order, and a fire in August 2002 burned half of the tires on site, further complicating the issue. This site has certainly had its highs and lows before remediation was completed.[60]

[59] DEP, Bureau of Waste Management; DEP News Release, "DEP secretary McGinty Announces $1.25 Million for Continued Cleanup of Wind Gap Tire Pile," April 6, 2004.

[60] DEP Update, "DEP Working to Remove Tire Piles in Northeastern Pa," July 26, 2002; DEP News Release, "DEP, Elected Officials Tour Broody Tire Cleanup," October 17, 2003; DEP News Release, "DEP Issues Tire Removal Order to Edwardsville Tire Dealer," June 25, 2002; New Release, Democratic Communications Office, "Yudichak: Waste tire bill goes to governor," February 7, 2006.

The largest tire pile in the Commonwealth is the Starr Tire Pile in Greenwood Township, Columbia County, near Millville. The pile contains an estimated six to ten million tires, which accounts for one quarter of all tires on the ground statewide. Part of the remediation effort included over 130,000 tires removed by the companies who delivered tires to the site, but another 21 refused to co-operate forcing DEP to file a complaint in equity against them in court. The litigation was successful in getting some additional cooperation and tires cleaned up. In addition, the Starrs were levied a $400,000 civil penalty and relinquished operational control of the site to DEP. In 2004 and 2005, DEP implemented the Starr Waste Tire Reuse Grant Program to support new technology and innovative projects to clean-up the stockpile, in part, through a $2 million appropriation.[61]

The first grants from the Starr Waste Tire Reuse Grant Program were issued in May 2005. The largest went to Recycling Environmental Group (REG) from Bloomsburg in the amount of one million dollars to process approximately one million tires into two and four inch chips. Unfortunately, REG only processed 300,000 tires at the Starr property, and dumped the equivalent of 50,000 of those tires on their own property. REG was not only found in violation of storage regulations but also their processing permit. They were ordered to clean-up the tires, their grant was revoked, their bond of $110,000 was forfeited and they were only paid $50,000 for the tires it moved to its facility.[62] A second grant from the program was issued to Carbon Services Corporation from Lehighton, who received $300,000 to remove approximately 2,000 larger, hard-to-dispose-of tires. These tires are not suitable for processing, so they will be filled with concrete and used as reef habitat in the Atlantic Ocean.

In 2006 the Penn State University Center for Dirt and Gravel Road studies was awarded a $700,000 grant for an innovative tire baling project at the Starr Pile. The tires were baled into 2 ½ x 4 ½ x 5 feet blocks using a hydraulic compressor and then wrapped with nine gauge wire. The 5,000 bales, containing approximately 100 tires each, were placed on a nearby dirt road to help fill a so-called entrenched road thereby preventing sediment runoff into streams. After the initial road preparation, the bales were placed five wide, drainage media were added and the bales were filled with fly ash to fill the voids. Shale was then placed as a sub-base followed by the top layer of crushed stone. The only snag was at the beginning, as the original project called for shredded tires to be used as fill material. However, shredder operators balked as the tires had rocks and debris in them, which could have caused mechanical problems and dulled the shredders blades. Costs rose when tire baling became the method of choice. The original costs for baling also went up when the contractor factored in separating the larger tires. Bales were also promoted as an alternative to Gabion Baskets (wire mesh baskets filled with stones) for

[61] DEP News Release, "Rendell Administration Launches Grant Program to Help Clean Up State's Largest Waste Tire Pile," January 26, 2005; DEP News Release, "DEP Using State's Largest Waste Tire Pile to Drive Market Development, Promote Innovation.," July 23, 2004; DEP News Release, "DEP Reaches Agreement with Max and Martha Starr on Waste Tire Pile Cleanup in Columbia County," March 12, 2004; DEP News Release, "DEP Takes Legal Action Against Starr Tire Pile Generators," January 26, 2005.

[62] DEP News Release, "DEP Denies Recycling Environmental Group's Permit Renewal, Forfeits Company's Bond," November 14, 2006; DEP Daily Update, "DEP Orders Recycling Environmental Group to Clean Up Tire Shreds," August 21, 2006; DEP Daily Update, "DEP Continues to Oversee Removal of Tires at Starr Tire Pile in Columbia County," January 17, 2006; DEP Daily Update, "Rendell Administration Awards $1.3 Million to Help Clean Up State's Largest Waste Tire Pile," May 24, 2005.

stream bank stabilization when filled with concrete or anchored. The project was completed in three months.[63]

Current Starr pile clean-up efforts also include a recent clean-up project that was bid out in February 2007, which will use $700,000 out of the Starr Waste Tire Reuse Grant Program to pay for the project. The bids were handled through DEP's Office of Energy and Technology Development, who has operational control of the Starr Pile.[64] These bid specifications differ slightly from what the Bureau of Waste Management uses in bidding out clean-up projects. These differences often cause confusion among potential contractors. Many contractors suggest that DEP should work with clean-up contractors to design more effective bid and pre-bid specifications, including eligibility, clean-up plans, bonding requirements, re-use specifications and processing location that work for all parties involved. Also, they maintain the clean-up efforts should be consolidated under DEP's Bureau of Waste Management to make this process more effective and efficient.[65] Finally, contractors suggest that it would be an improvement not only if there were some consolidation of bidding and standardization of forms, but also if clean-up contracts were not automatically renewed.

Comparing Pennsylvania to the Other 49 States

Pennsylvania is not alone in facing the issues surrounding the generation and use of scrap tires as well as dealing with existing piles. Nationally, approximately 300 million tires are generated annually and an estimated 188 million remain in piles with the majority of those, 84%, concentrated in seven states, including Pennsylvania.[66] The Commonwealth ranks sixth in annual generation and its EPA region ranks seventh out of 10 in terms of tires on piles. This translates to a high demand for tires in the area and well developed markets.[67] While the numbers in Pennsylvania's piles continue to decrease, 42 million continue to be stockpiled annually across the United States.[68] To combat piles and support the use of clean tires, states have taken a divergent approach with a mix of tire fees, regulations and incentives.

Since 1991, Pennsylvania has imposed a one dollar fee on the sale of new tires for highway use. This fee, along with a two dollar per day Vehicle Rental Fee and three percent Vehicle Lease Tax, combined generates $96 million a year to support the Public Transportation

[63] Interview with Kevin Abbey, Director of PSU Center for Dirt and Gravel Road Studies, August 2, 2006; Research Penn State, "Where the Rubber Makes the Road" http://www.rps.psu.edu/pennsylvania/tires.html (February 26, 2007); DEP Daily Update, "Waste Tires Used to rebuild Dirt Road, Benefiting the Environment and Quality of Life," August 1, 2006; S. William Hessert, Jr., *Roads & Bridges*, "Where the Rubber Makes the Road," October 2006.

[64] DEP, Bureau of Office Services, Division of Contracts, Procurement and Bidding, "Specifications for Bid, Starr Tire Pile, Processing, Removal and Transportation of Tires For Reuse/Disposition," "Commonwealth of Pennsylvania, Department of Environmental Protection, Tire Disposition Services, Pre-Bid Site Inspection," February 21, 2007; Interview with David Althoff, Jr., DEP, Office of Energy and Technology Deployment, Division of Energy Policy and Technology Deployment, and Scott M. Pauchnik, DEP, Director of Legislative Affairs.

[65] DEP, Bureau of Waste Management, "Specifications, Waste Tire Processing Project," 2005.

[66] RMA, Scrap Tire Markets in the United States – 2005," November 2006, pg 55.

[67] RMA Scrap Tire Markets, pg. 63.

[68] RMA Scrap Tire Markets, pg. 52.

Assistance Fund.[69] At one time, 43 states imposed some type of fee or tax on tires, most of which support a tire, environmental or recycling fund.[70] These monies are then available for states to tap for remediation, recycling equipment purchases, market development, end user and beneficial use reimbursements, and buy recycled initiatives, etc. This funding disparity is magnified by Pennsylvania's rank in remaining stockpiles, when comparing it to a state with more programs and better funding, yet less tires on the ground. In addition to funding, landfilling of tires is also an important part of finding end uses. Many states ban whole tires but some states continue to allow whole tires, although there are concerns with their buoyancy and their ability to trap air and methane gas. Whole tires cannot be landfilled in Pennsylvania, but they have been approved for use in landfill construction, either in the landfill's cell or in drainage or leachate layers.[71] Shredded tires can also be used as landfill daily cover, but they currently count against their daily cap, which inhibits their use. While landfilling of tires is not considered a highest or best use, it is considered an acceptable use certainly when compared to the alternative of stockpiles.[72]

Currently, 35 states collect tire fees. Many of these fees were initiated with sunset dates, which have expired in a number of states. Of those fees, nine states deposit them into non-tire specific accounts. Five states, including Iowa, Michigan, New Mexico, South Dakota, and West Virginia, generate their "tire fees" through a portion of vehicle registration fees. Twenty-three states ban whole tires from landfills while 43 have placed some form of control over landfilling tires. In addition to landfill regulations, a number of states also regulate storage (47 states), processing (38), hauling (36), generating (14) and disposal (20). In terms of incentives, 20 states provide a buy recycled price preference or initiative, while others utilize purchase preferences, equipment tax credits, low interest loans for using recycled materials use in manufacturing, financial assistance for testing, funding technological research centers, retread rebates and county amnesty days. Direct reimbursements for either remediated tires or specific end uses are employed in only two states to get tires to beneficial uses and keep them off the ground. While Pennsylvania does not lag behind these states in its variety of tire related programs, it does lag behind with its funding mechanism. The focus of DEP, however, is still on minimizing the environmental effects that tires pose, preventing new piles and enforcement of regulations to prevent those piles from re-appearing.

Waste Tire Recycling, Permitting, Grants & Fees in the Other 49 States

Some of the specific programs, incentives and initiatives that other states have undertaken are detailed below.

[69] Pennsylvania Department of Revenue, "The Statistical Supplement for the Pennsylvania Tax Compendium," November 2006 for the Fiscal Year 2005-06, pg. 30. The three fees were not separated by the Dept. of Revenue so it is impossible to determine the taxes derived directly from tire sales; Act 26 of 1991; Act of Mar. 4, 1971 (P.L.6, No.2) §2301(c); Pa. Stat. Ann. Tit. 72, §9301(c).

[70] Some of these fees were sunset and have expired. RMA website, chart breakdown; Today's Tire Industry, "Scrap Tire Laws and Regulations," July/August 2005; See Waste Tire Disposal and Recycling Information by State table on page 131.

[71] DEP, Bureau of Waste Management.

[72] Interview with Mike Giuranna, Solid Waste Specialist, EPA III, February 26, 2007.

Arizona

In Arizona, a tire dealer collects two percent of the purchase price of a tire up to two dollars per tire at the time of purchase.[73] The tire dealer is required to accept the customer's old tires, but there is no requirement for the customer to hand over the old tires.[74] However, the tire dealer shall post a written notice informing customers that it is unlawful to throw away a motor vehicle tire, all used tires should be recycled, the retailer is required to accept scrap tires if any new or recapped tires are purchased there and an additional fee will be charged with any new purchase.[75]

Additionally, a designated waste tire collection site shall not refuse to accept waste tires from a resident of the county who is not a seller of motor vehicle tires and shall not impose a tire tipping fee for up to five waste tires per year.[76] If the waste tires are in excess of five tires per year, the waste tire collection sites may impose a tire tipping fee.

All sites that store more than 100 used tires outside on any day must comply with requirements for pile size and placement restrictions. Any violation of these rules will result in a class 5 felony enforced by the attorney general.[77]

California

The California Integrated Waste Management Board (CIWMB) promotes a Zero Waste California in partnership with local government, industry and the public.[78] This means managing the estimated 88 million tons of waste generated each year by reducing waste whenever possible and promoting the management of all materials to their highest and best use, while protecting public health and safety and the environment. The Board promotes the use of new technologies for the practice of diverting California's resources away from landfills, adopts and enforces stringent operating standards and certifies local enforcement agencies to permit and inspect facilities and take appropriate enforcement actions.

The CIWMB offers a Tire-Derived Product Business Assistance Program to eligible businesses in an effort to improve the operational and cost efficiencies for tire-derived products (TDP).[79] This program provides technical and consultative assistance, reimbursement for specifically identified equipment, and seeks to expand market demand by emphasizing the development of new products from existing businesses and/or the production of an existing product with recycled California tire rubber rather than virgin material.

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[73] A.R.S. § 44-1302 (A).
[74] A.R.S. § 44-1302 (E).
[75] A.R.S. § 44-1302 (J).
[76] A.R.S. § 44-1302 (I).
[77] ADEQ, "Solid Waste Management: Waste Tires, Other Waste Tire Sites," http://www.azdeq.gov/environ/waste/solid/tires.html, last updated August 22, 2005 (November 8, 2006).
[78] CA Environmental Protection Agency, Integrated Waste Management Board, "About the Board," October 29, 2006, http://www.ciwmb.ca.gov/BoardInfo/ (November 29, 2006).
[79] CA Environmental Protection Agency, Integrated Waste Management Board, "Tire Grants, Tire-Derived Product Business Assistance Program," October 13, 2006. http://www.ciwmb.ca.gov/Tires/Grants/TDPBusiness/default.htm (November 30, 2006).

The CIWMB has expended significant resources promoting the use of tire derived aggregate (TDA) in various civil engineering applications.[80] Through two environmental services contracts with Dana Humphrey Consulting Engineering, the CIWMB promoted TDA as an alternative to conventional lightweight fill materials in highway construction projects. These efforts were focused primarily on the California Department of Transportation (Caltrans), but more emphasis will be placed on city and county public works departments in the future. Caltrans identified several potential highway projects in which shredded tires could be used as lightweight fill and will continue to conduct research into the environmental impacts from TDA fills to assist in the development of technical standards for civil engineering applications.

As of January 1, 2007, the recycling fee is $1.50 per new tire purchased.[81] Also, there is no fee to apply for a waste tire hauler registration, but the applicant must purchase a surety bond for the amount of $10,000.[82] The bond applies to every person who transports 10 or more waste tires to legally authorized end-use facilities.[83] Furthermore, tire haulers would have to register with the CIWMB annually, possess manifests during the transport of waste or used tires, and return the completed manifest to the generator of the waste tires (if so requested).

In a typical year, the CIWMB registers more than 800 California waste and used tire haulers and more than 7,000 vehicles which expire annually at the end of each calendar year. The CIWMB sends renewal packages to registered haulers well before the end of the year to ensure haulers can renew their registrations in a timely manner and the licenses of haulers who do not renew by the end of the calendar year are cancelled. Current law allows exemptions from waste tire hauler registration requirements under certain conditions, such as persons hauling nine or fewer tires, persons hauling tires through the state without loading or unloading tires, etc.

The hauler and manifest program went into full scale operation in July 2003. While this new system has provided useful information on waste tire flow (including import and export data) and as a useful enforcement tool to investigate potential violators, the full promise of the system to track waste tires from "cradle to grave" has not been fully realized to date. The voluminous amount of paperwork that was required was cited as a major problem so the CIWMB conducted workshops to gather input from stakeholders on how best to improve the system. Working closely with stakeholders, the CIWMB streamlined and simplified the original process for complying with the manifest program requirements and allowed participants to transmit tire manifests and tire trip log information electronically. As a result, the CIWMB anticipates that the total volume of paperwork will reduce by up to 60 percent and simplify the process for haulers.

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[80] CA Integrated Waste Management Board, "Five-Year Plan for the Waste Tire Recycling Management Program" (3rd Edition Covering Fiscal Years 2005/06 -2009/10) Report to the Legislature, July 1, 2005, Page 16, http://www.ciwmb.ca.gov/Publications/Tires/62005005.pdf (November 29, 2006).

[81] West's Ann. Cal. Pub. Res. Code § 42885 (b)(C).

[82] CA Environmental Protection Agency, Integrated Waste Management Board, "Tire Management: Used and Waste Tire Haulers, Waste Tire Hauler Registration," June 09, 2006, http://www.ciwmb.ca.gov/Tires/Haulers/ (November 30, 2006).

[83] CA Integrated Waste Management Board, "Five-Year Plan for the Waste Tire Recycling Management Program" (3rd Edition Covering Fiscal Years 2005/06 -2009/10) Report to the Legislature, July 1, 2005, pgs. 31-32, http://www.ciwmb.ca.gov/Publications/Tires/62005005.pdf (November 29, 2006).

Under the California Environmental Protection Agency, the CIWMB will actively enforce any discrepancies in the transportation of waste tires to permitted end use facilities.[84] The maximum civil penalties for violations of the waste tire hauling and manifesting requirements are $25,000 per violation per day and the administrative penalties are $5,000 per violation per day.

The CIWMB's tire enforcement staff also investigates sites that pose a threat to the public health, safety or the environment that are referred by local agencies.[85] The central objective is to achieve compliance through oversight and education to the greatest extent possible and to provide accurate information for entry into a statewide database. Following inspections of unpermitted sites, enforcement staff send reports that inform the property owner/operator of the site that any person who stores, stockpiles, accumulates, or discards over 500 waste tires is required to obtain a waste tire facility permit or other authorization from the CIWMB.

The owners/operators in violation of waste tire enforcement statutes or regulations will be issued a notice of violation extension specifying a date by when the violations must be corrected.[86] If the violations are not corrected, several other levels of warnings will follow. Ultimately, operating a waste tire storage facility without a waste tire facility permit is a misdemeanor and is punishable with a fine up to $10,000 per day of the violation and/or up to one year imprisonment in county jail.

Colorado

The Colorado General Assembly passed legislation in 1998 concerning tire recycling and re-use programs.[87] Specifically, the legislation provides incentives for state agencies and local governments to purchase products made from recycled or reused waste tire material to use in their public projects. The Colorado Waste Tire Clean-up and Processing Grant Program for Counties and Municipalities does not require that waste tires be used for a specific purpose, but one of the criterion for the grants does specify that an emphasis will be placed on projects that recycle or reuse waste tires.[88]

Up to thirty percent of the money appropriated to the Department of Local Affairs from the Waste Tire Recycling Development Cash Fund may be expended to provide for partial reimbursement to waste tire processors and end users, up to a maximum of fifty dollars for each

[84] CA Environmental Protection Agency, Integrated Waste Management Board, "Waste Tire Enforcement, CIWMB Authority," November 28, 2006, http://www.ciwmb.ca.gov/Tires/Enforcement/ (November 29, 2006).
[85] CA Environmental Protection Agency, Integrated Waste Management Board, "Waste Tire Enforcement, Inspections," November 28, 2006, http://www.ciwmb.ca.gov/Tires/Enforcement/ (November 29, 2006).
[86] CA Environmental Protection Agency, Integrated Waste Management Board, "Waste Tire Enforcement. Handling Violations," November 28, 2006. http://www.ciwmb.ca.gov/Tires/Enforcement/ (November 29, 2006).
[87] Colorado Department of Local Affairs, Local Government Services, Recycling "Incentives for Purchasing and Using Recycled Waste Tire Products in Public Projects, Background," August 15, 2006, http://www.dola.state.co.us/LGS/FA/WTP/Recycling/wtf-recycling.htm (December 6, 2006).
[88] State of Colorado Department of Local Affairs, Division of Local Government, "Colorado Waste Tire Program Information: Colorado Waste Tire Cleanup and Processing Grant Program for Counties and Municipalities," Revised August 2006. (December 6, 2006). http://www.dola.state.co.us/LGS/FA/WTP/Cleanup/WasteTireCleanupGrantPacket-Aug06.pdf.

ton of raw Colorado waste tires.[89] Subsequently, these reimbursements should assist new waste tire recycling technologies to become economically feasible and to encourage the use of waste tires and reduce the storage of waste tires in Colorado.

The Colorado Department of Public Health and Environment is authorized to inspect business locations, vehicles and equipment which are owned or operated by a waste motor vehicle tire hauler.[90] If any violations are found, the Department can suspend or revoke the tire hauler's certificate of registration.

Colorado has a one dollar fee which is collected by the tire retailer on every waste motor vehicle tire turned in by the customer.[91] Scrap tire facilities are required to submit an annual report on the amount of scrap tires received, processed, disposed of on-site and shipped off-site during the preceding year.[92] Waste motor vehicle tire haulers are required to have a surety bond in the amount of $10,000 and to keep records of where the tire came from, the quantity of tires hauled (by number, weight, or volume), date of transport, and destination of the tires.

Connecticut

For bids submitted to the Commissioner of Administrative Services, there is a 10 percent price preference given to the purchase of goods made with recycled materials or the purchase of recyclable or remanufactured products if it is determined such a preference would promote recycling or remanufacturing.[93] Furthermore, preference shall be given to recycled supplies, materials and equipment produced or manufactured in the state and services originating and provided in the state.

Tires are statutorily defined as a "special waste" as opposed to a municipal solid waste (MSW) because they require special handling.[94] The handling requirements for the storage, disposal or processing (sort, shred, grind, etc.) of waste tires are specified in Connecticut's DEP Solid Waste Management Regulations. Tire-to-energy plants are considered resource recovery facilities and must conform to design, permitting and operation requirements, including storage of tires. Also, facilities that process or burn tires are required to report quarterly on the origin of the waste received, amounts received, amounts recycled and disposed and the destination of all

[89] Colo. Rev. Stat. § 24-32-114 (1)(c) (2003).
[90] Colorado Dept. of Public Health and Environment, Hazardous Materials and Waste Management Division, 6 CCR 1007-2, "Part 1: Regulations Pertaining to Solid Waste Sites and Facilities, Amended by the State Board of Health 11/15/06," http://www.cdphe.state.co.us/regulations/solidwaste/6CCR100702SWRegswith061115amendments.pdf (December 6, 2006).
[91] Colorado Department of Revenue, Taxpayer Service Division, "FYI General 13: Waste Tire Recycling Development Fee" (revised 07/06); General Information. http://www.revenue.state.co.us/fyi/html/sales73.html (last viewed December 4, 2006).
[92] Colorado Dept. of Public Health and Environment, Hazardous Materials and Waste Management Division, 6 CCR 1007-2, "Part 1: Regulations Pertaining to Solid Waste Sites and Facilities," Amended by the State Board of Health 11/15/06, http://www.cdphe.state.co.us/regulations/solidwaste/6CCR100702SWRegswith061115amendments.pdf (December 6, 2006).
[93] Conn. Gen. Stat. § 4a-59 (c).
[94] Connecticut Department of Environmental Protection, "Recycling and Disposal of Scrap Tires, Management of Waste Tires in Connecticut," January 2003, http://www.dep.state.ct.us/wst/recycle/tires.htm (December 4, 2006).

materials leaving the facility. Also, Connecticut no longer permits the landfilling of waste tires, either whole or in pieces.

Connecticut has a beneficial use general permit for the storage and processing of scrap tires.[95] Permits are good for five years and the registration fee is $1,000 for a new storage or processing facility registration and $500 for a renewal of an existing permit. As part of the permitting process, facilities should have an operation and management plan on-site that keeps track of the quantity of scrap tire waste received, processed and stored and the tire derived material produced, stored and shipped off-site. A permitted tire storage or processing facility has various storage capacity limits and regulations which must be followed for unprocessed and processed tires.

Florida

In order to become a waste tire collector in Florida, a waste tire collector registration application and pay a $35.00 per vehicle fee to haul tires.[96] In 1999, the definition of a waste tire site was changed from 1,000 to 1,500 waste tires in one location and facilities that consume processed tires as a fuel or as a material for making a product were no longer required to obtain a permit if the tire material, inventory management practices and storage configuration met certain standards.[97] In addition, a one dollar fee for each new motor vehicle tire sold at retail is collected but customers are not required to turn over their used tires.[98]

Tax exemptions are available for the purchase of recycling equipment for new and expanding businesses, but only after spending $50,000 in sales tax during the year (based on $833,333 in equipment purchases). A competing new business would receive the tax exemption on the first dollars spent, which is a serious disincentive for existing Florida recyclers, particularly when there is a loss of the state grants to local governments. In 1988, an exemption on machinery and equipment was added for recycling businesses that increased consumption of recyclable materials. Companies had to demonstrate that recyclable material consumption was increased by 10 percent and after one full year, they had to provide receipts for taxes paid on equipment that contributed to this increase. Recycling companies did not take advantage of it because the requirements proved to be too cumbersome and the law sunset in 1991.

In 1995, Florida's waste tire management program expanded the allowable uses for waste tire grants-in-aid to counties to include the operation of waste tire recycling and education programs, enforcement and purchase of materials and products made from waste tires collected

[95] Connecticut Department of Environmental Protection, Division of Waste Engineering and Enforcement. "General Permit for the Storage and Processing of Scrap Tires for Beneficial Use," September 30, 2005, http://www.dep.state.ct.us/pao/download/wstedown/scrap_gp.pdf (December 4, 2006).

[96] Florida Department of Environmental Protection, "New Waste Tire Collector Application Instructions," http://www.dep.state.fl.us/waste/quick_topics/publications/shw/tires/NewCollectorInstructions.pdf (December 8, 2006).

[97] Florida Department of Environmental Protection, "Waste Tire in Florida: State of the State," March 15, 2006, Pg. 5, http://www.dep.state.fl.us/waste/quick_topics/publications/shw/tires/SOSfinal2006.pdf.

[98] Florida Department of Environmental Protection, "Florida's Recycling and Litter Program: Current Status and Potential Future Directions", pg. 36. http://www.dep.state.fl.us/waste/quick_topics/publications/shw/recycling/hb9.pdf (December 8, 2006).

and recycled within the state.[99] Small counties (under 100,000 population) were allowed to use these waste tire grants for any solid waste related purpose. However, the Legislature significantly reduced funding levels for waste tire grants from $7.9 million in 2000 to $1.2 million in 2001 and the number of counties eligible to receive these grants was reduced from all 67 counties to 34 small counties. The funding level was restored in 2002 to all 67 counties and increased to $3.4 million. The program was modified again in 2003, dividing $4 million dollars equally among just the 34 small counties to be used for general recycling purposes, including waste tire management. Then in 2004 and 2005, $6.5 million was allocated each year for these consolidated small county grants.

Additionally, the 2000 Legislature provided $1.5 million in matching grants to counties to purchase surfacing products made from Florida waste tires for the improvement of playground safety in Florida parks and schools while also promoting waste tire recycling. Funds were distributed to participating counties on the basis of population and all surfacing products purchased under these grants had to meet applicable national safety and accessibility guidelines and be made from whole waste tires collected and processed in Florida.

Only the direct costs of playground surfacing materials derived from recycled waste tires were reimbursed from grant funds, with a $4,000 minimum grant and 50/50 match of funds required. Through a competitive process, the grants were passed through to other local governments, school boards and non-profit organizations. At the end of the program, 22 counties had spent $343,265 in state matching grant funds and were responsible for the purchase of 3,620,154 pounds of loose fill rubber granules and 37,896 square feet of poured-in-place surfacing containing crumb rubber. Based on average manufacturing yields and surfacing composition, this represents the equivalent of about 310,000 passenger tires.

Indiana

A governmental body, the purchasing agency, or the solicitation must set a price preference and recycled materials' composition which should maximize the use of recycled materials when economically practical.[100] Additionally, state law contains requirements for the purchase of recycled-content products in which certain agencies must prepare specifications for recycled-content products purchased by state agencies; must produce and distribute a recycled-content products guide for use by state and local government purchasing agents; must explain how local governments may purchase recycled-content materials and list recycled-content products available; must host a conference bringing together purchasing agents and recycled product suppliers; must submit quarterly reports including information on the number of contracts, the dollar value of the contracts, and the aggregate percentage of recycled material content by type of product; and must submit a report to the General Assembly before October 1 of each year concerning the effectiveness of the state policies on the purchase of products made from recycled material.

[99] Florida Department of Environmental Protection, "Waste Tire in Florida: State of the State," March 15, 2006, http://www.dep.state.fl.us/waste/quick_topics/publications/shw/tires/SOSfinal2006.pdf.

[100] Recycling Evaluation Committee, Indian Legislative Services Agency, "Issues Relating to Recycling and Solid Waste Management Programs," July 2003, http://www.in.gov/legislative/pdf/recyclingsolidwastewebdoc.pdf (December 11, 2006).

The state's Waste Tire Recycling Grant Program provides funding for new and innovative projects that reuse or recycle waste tires in Indiana.[101] Project funding is available to Indiana businesses, units of local government, schools (including colleges and universities) and 501(c) not-for-profits in the following areas:

- The research and development of waste tire material in a high value-added product;
- Waste tires utilized in an approved civil engineering beneficial reuse project (including planning and design projects);
- Waste tires utilized in an approved recreational beneficial reuse project;
- To promote consumer information, tire industry best management practices and regulatory compliance through education and outreach; and
- There is a 25 cent fee for each new motor vehicle tire sold, but customers are not required to turn over their used tires.[102] Most individuals must first obtain a certificate of registration to operate a waste tire storage facility or waste tire processing facility.[103] There are exceptions for a facility that recycles or reuses waste tires and operates under a valid solid waste processing facility permit; a site at which waste tires are stored under an approved recycling program; altered tires that have been chopped, shredded or processed such that the height, length, and width of the tire product are two (2) inches or less; transformed, new or remanufactured tires; or a site with less than one thousand (1,000) waste tires present, where either the site is operated by a person who supplies tires to an approved recycling program or the site is used for the retail sale of tires.

A waste tire storage or processing facility must submit an application for registration which may ask for a description of the operation activities, proposed storage or processing methods, estimates of closure costs and documented financial assurance. The processing facility must obtain the proper registration before beginning any waste tire operation; ensure wastewater is properly discharged, which may require a permit; maintain site as to not cause a public nuisance; drain and properly store all tires; keep daily tire records; and submit an annual report.

The application fee for a new certificate of registration and the annual fee for a waste tire storage facility are five hundred dollars. The application fee for a renewal or new certificate of registration for a waste tire processing facility is two hundred dollars, but there is no annual fee for waste tire processing facilities. All waste tire certificates of registration expire five years after issuance and then must be renewed ninety days prior to the expiration date.

Anyone wishing to transport waste tires must also register and waste tire storage and processing facilities are not allowed to accept waste tires unless the transporter is registered. An application and $25 fee are required for registration. Registered transporters must dispose of any

[101] Indiana Department of Environmental Management, Waste Tire Recycling Grant Program, November 14, 2006, http://www.in.gov/idem/resources/grants_loans/wastetire/index.html#top (December 11, 2006).
[102] Indiana Department of Environmental Management, FY 2005 Waste Tire Management Program Report, March 2006, pg. 2, http://www.in.gov/idem/catalog/documents/oppta/wastetire_report2005.pdf (December 11, 2006).
[103] Indiana Department of Environmental Management, "Registering a Waste Tire Collection, Storage, or Disposal Operation," June 8, 2006. http://www.in.gov/idem/permits/guide/waste/wastetires.html (December 11, 2006).

tires that are in their possession by appropriate means and prepare and carry a waste tire manifest form for all shipments of waste tires.

Indiana's Compliance and Technical Assistance Program (CTAP) is a small business assistance program which provides confidential, environmental assistance to Indiana businesses.[104] CTAP provides confidential telephone assistance to answer environmental questions regarding air, water, and waste regulations, pollution prevention, and recycling. Within the CTAP, there is a sub-sector called Indiana's Waste Tire Management Program which has the goal to develop and advance the management of waste tires in Indiana.[105] Strategies are developed to recognize waste tires as a marketable resource rather than a waste stream for disposal. Financial and technical assistance is provided for source reduction, re-use, recycling and proper management of waste tires.

Maine

Maine has a one dollar fee collected for each new tire sold, but there is no monetary benefit or requirement that consumers turn in their used tires.[106] In 1998, the state began to remove tires from a large tire dump in Meddybemps, Maine where 300,000 tires were processed into tire shreds for use as sub-base road fill. Another 900,000 tires were processed into tire shreds for use as drainage material in landfills and a remaining 500,000 tires were expected to be processed into boiler fuel or beneficially re-used in the near future.[107]

Maine's DEP has worked to reduce illegal dumping by formally tracking scrap tires from their point of generation (town transfer station, tire dealer, etc.) to their eventual disposal. Also, Maine's DEP, along with the Attorney General's Office and the court system, worked to shut down the remaining stockpiles and to prevent those stockpiles from growing any larger.[108]

Maryland

The state has a percentage price preference for products made from recycled materials. Recycled material is defined as material recovered from or otherwise destined for the waste stream and includes post consumer material, industrial scrap material, compost and obsolete inventories.[109] The five percent price preference is the percent by which a responsive bid from a responsible bidder whose product contains recycled materials may exceed the lowest responsive bid submitted by a responsible bidder whose products do not contain recycled materials.

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[104] IDEM, Compliance and Technical Assistance Program (CTAP), October 5, 2006, http://www.in.gov/idem/compliance/ctap/index.html (December 11, 2006).

[105] IDEM, CTAP & Indiana's Waste Tire Management Program, October 13, 2006, http://www.in.gov/idem/compliance/ctap/sectors/wastetire/index.html (December 11, 2006).

[106] Me. Rev. Stat. Ann. tit. 36, § 4832 (1).

[107] Maine Department of Environmental Protection, Bureau of Remediation & Waste Management, "Where Rubber Hits the Road," http://www.maine.gov/dep/rwm/solidwaste/tire_cl.htm (December 14, 2006).

[108] Maine Department of Environmental Protection, Bureau of Remediation & Waste Management, Information Sheet "Answers to Commonly Asked Questions About Scrap Tires," October 1996, http://www.maine.gov/dep/rwm/publications/is-tires.htm (December 14, 2006).

[109] Maryland Department of General Services, "Acceptable Recycled Products (laws & regulations)," http://dgsweb.dgs.state.md.us/procure/Recycled-Laws.htm (December 12, 2006).

Maryland's Department of Environment was awarded a grant through the EPA to raise awareness regarding the health and environmental dangers attributed to illegal dumping and stockpiling of scrap tires and solid wastes.[110] The grant work consisted of television commercials highlighting the risks of scrap tire dumps serving as a breeding ground for rats, creating a good living condition for mosquitoes that can spread disease and posing a potential fire hazard. Also included in the grant work was an overview of the alternative uses for scrap tires and information on how citizens can properly dispose of and recycle their scrap tires.

Maryland has a recycling advocate, called the Maryland Environmental Service (MES), which protects and enhances the state's air, land and water resources.[111] The agency is a self-supporting, not-for-profit public corporation that works with both governmental and private sector clients to find innovative solutions to some of the most complex environmental challenges. This public purpose and private resources combination allows the agency to combine the public sector's commitment to environmental protection with the private sector's efficiencies, flexibility and responsiveness. Projects range in cost from $1,000 to $6.7 million and are related to water and wastewater treatment, solid waste management, composting and organic products marketing, recycling and marketing of recovered materials, dredged material management and recycling, hazardous materials clean-up and engineering, monitoring and inspection services.

The MES operates a tire recycling facility in Baltimore which can grind more than 8,000 tires per day and produce crumb rubber in sizes ranging from 5 to 40 mesh (.5 mm to 4 mm). In addition, a landscape grade material is produced at 3/8" to 5/8" (9 mm to 15 mm).[112]

In Maryland, a scrap tire processing facility is considered to be storing scrap tires if they accumulate more than 15,000 cubic feet (approximately 5,550 passenger scrap tires or 1,100 truck tires) of non-containerized scrap tires on site at any one time.[113] There are additional requirements for facilities that store scrap tires.

In 2005, over 700 scrap tire site inspections/investigations were performed and approximately 98 percent of the inspected facilities were in significant compliance.[114] During the same time, Maryland's Scrap Tire Program successfully completed the clean- up of 43 illegal scrap tire stockpiles, consisting of approximately 199,000 scrap tires.[115] Most stockpile

[110] Maryland Department of the Environment, "Maryland's Scrap Tire Program: Annual Report for Fiscal Year 2005," November 1, 2005, pg. 9-10, http://www.mde.state.md.us/assets/document/FY2005_Report.pdf (last viewed December 12, 2006).
[111] Maryland Environmental Service (MES), "About MES: Who We Are," http://www.menv.com/whoweare.shtml (last viewed December 12, 2006).
[112] MES, "Tire Recycling Facility," http://www.menv.com/tirerecycling.shtml (December 12, 2006).
[113] Maryland Department of the Environment, "Primary Scrap Tire Collection Facility License Application.," July 1, 2005, http://www.mde.state.md.us/assets/document/permit/Form_LIC005_Primary_Collection_Facility_License_Application.pdf (December 12, 2006).
[114] Maryland Department of the Environment, "Maryland's Scrap Tire Program: Annual Report for Fiscal Year 2005," November 1, 2005, pg. iii, http://www.mde.state.md.us/assets/document/FY2005_Report.pdf (December 12, 2006).
[115] Maryland Department of the Environment, "Maryland's Scrap Tire Program: Annual Report for Fiscal Year 2005," November 1, 2005, pg. 2, http://www.mde.state.md.us/assets/document/FY2005_Report.pdf (December 12, 2006).

abatements used an administrative approach to pay for the clean-up rather than using money from the State Used Tire Clean-up and Recycling Fund.

New Jersey

In 2006, there was an executive order to increase energy efficiency and use more recycled products within state government.[116] State agencies were required to purchase recycled products such RMA, playground surfaces, running tracks and mats provided that they are available at a price no more than 15 percent above the price arrived at through competitive bid. In connection with such purchases, consideration needs to be given to recycled products containing the highest percentage of post-consumer waste material. Also, in purchasing any non-paper finished products or supplies, the Director of the Division of Purchase and Property may make contracts available for those products or supplies made from recycled material whenever the Director determines that such items meet performance standards at a reasonable price.[117] Reasonable is defined as a price no more than 15 percent above the price of items which are manufactured or produced from raw materials.

Slicing, shredding, chipping, crumbing or other activities may be approved as methods of processing tires.[118] However, at no time shall incineration, landfilling, abandonment or other disposal of tires, in whole or in part, occur at a recycling center. In addition, the owner or operator of a tire recycling center shall take all steps necessary to ensure that no mosquito colony formation or development is allowed to occur on the recycling center site and a fire control plan for the recycling center shall be filed with and approved prior to operation of a recycling center for tires, tree stumps, tree parts or wood waste.

New Jersey's Department of Environmental Protection has a Local Tire Management Program which provides grants to counties and municipalities for proper clean-up of abandoned tire piles within their respective jurisdictions.[119] The Department may enter any property, facility, premises or site for the purpose of conducting inspections to determine if tires may be illegally accumulated. All sums expended from the Tire Management and Clean-up Fund can be recovered from the site owner or the person responsible for the illegal accumulation of tires, unless the amount involved is too small or the likelihood of recovery is too uncertain. Finally, the Department may impose a lien on the real property on which the waste tire site is located equal to the estimated cost to bring the tire site into compliance, including any attorney's fees and court costs. An owner can file a cash or surety bond in the amount of the estimated cost of bringing the tire site into compliance with Department rules.

New Jersey has $1.50 collected for each new tire sold, but there is no monetary benefit or requirement that consumers turn in their used tires. The state has the sum of $200,000 allocated to the Statewide Mandatory Source Separation and Recycling Program Fund. The fund is

[116] State of New Jersey, Office of the Governor, "Governor Corzine Signs Executive Order to Increase Energy Efficiency in State Government" April 22, 2006, http://www.state.nj.us/governor/news/news/approved /20060422.html (December 13, 2006).
[117] N.J. Rev. Stat. § 13:1E-99.27 (5).
[118] N.J. Recycling Regulations (N.J.A.C.7:26A-3.8) http://www.state.nj.us/dep/dshw/resource/recyreg03.pdf (last viewed December 13, 2006).
[119] N.J. Rev. Stat. § 13:1E-225 (4)(a)-(d).

dedicated to studies of markets for recyclable materials and of local, national and international distribution networks for recyclable materials.[120] These funds are distributed as grants to qualified colleges and universities in the state or contracts to private firms which can demonstrate the administrative and technical capability to undertake studies of this nature. Studies shall focus on a particular recyclable material, including, but not limited to, automobile tires, paper and plastic beverage containers. In contracting for these studies, consideration shall be accorded to alternative pricing structures and marketing strategies to determine whether the competitive disposition and marketing of recyclable materials may be achieved through means other than traditional price structures, commodity sales, and transactions.

New York

In late 2004, New York developed a Waste Tire Stockpile Abatement Plan which details a partnership among state agencies, to utilize all tires in noncompliant waste tire stockpiles in civil engineering highway projects over the next six years.[121] In 2005, the state made significant progress in waste tire stockpile abatement activities, processing and/or reusing approximately 4.7 million waste tires (47,000 tons).

Transporters of tires must fill out a permit application containing analysis, plans, reports, fees, insurance certificates or other data that the Department of Environmental Conservation may require.[122] All state agencies are required to purchase recycled products made from secondary materials, other than paper products, unless the purchasing agency determines that no recycled product is available. No recycled product is adequate for the purpose intended or that the cost of the recycled product is not competitive. State agencies should also purchase recycled products displaying the New York state recycling emblem, if permitted by law.

The owner or operator of a noncompliant waste tire stockpile shall cooperate with any and all remedial measures necessary for the abatement of noncompliant waste tire stockpiles with funds from the Waste Tire Management and Recycling Fund.[123] The Department of Economic Development assists private market development with new technologies for waste tire reuse and recycling with an emphasis on high-value end use in order to further create and enhance sustainable markets.[124] Through the preparation of fact sheets and public workshops, the Department of Economic Development also provides industrial and consumer education on other benefits of recycled waste tire products.[125]

[120] N.J. Rev. Stat. § 13:1E-99.38 (a).
[121] R.W. Beck, prepared for the New York State Department of Economic Development, "Final Report: Analysis of New York Scrap Tire Markets," 2006, http://www.nylovesbiz.com/pdf/polution_prevention_recycle/tires_update 2006.pdf (December 20, 2006).
[122] N.Y. Dept. of Environmental Conservation Rules and Regulations, 6 NYCRR Part 364, § 364.3 (a) (3).
[123] N.Y. Envtl. Conserv. § 27-1907 (2).
[124] N.Y. Envtl. Conserv. § 27-1909.
[125] N.Y. Envtl. Conserv. § 27-1909.

North Carolina

North Carolina charges a two percent tax on new tires less than 20 inches in diameter and a one percent tax on new tires at least 20 inches in diameter.[126] Tire retailers are directed not to give tires back to car owners unless requested so the tires are less likely to be wrongfully disposed.[127] Each county within North Carolina is responsible for providing at least one site for scrap tire disposal for that county, either directly or through a contract.[128] That scrap tire disposal site may not charge a disposal fee if tires are delivered with an accompanying certificate that indicates the tires originated within North Carolina and were not new tires disposed of by a manufacturer because they do not meet the manufacturer's salable tire standards.

Proceeds of the scrap tire disposal tax are distributed directly to counties, the Scrap Tire Disposal Account and the Waste Management Trust Fund.[129] Counties receive 68 percent of the tax and it is allocated based on each counties population. The Waste Management Trust Fund receives five percent of the net proceeds and utilizes it for recycling grants for counties. The Scrap Tire Disposal Account receives 27 percent of the net proceeds and these funds are allocated for grants to counties that do not receive adequate funding for scrap tire management, recycling grants to stimulate markets and nuisance tire site clean-up. In 1997, legislation allowed for up to forty percent of the revenue in the Scrap Tire Disposal Account to be used for processed material market development grants which encourage the use of processed scrap tire materials.

Tire retailers are only allowed to store 500 scrap tires on their site at any one time.[130] Only scrap tire haulers can transport scrap tires to collection sites if they obtain a hauler's permit, with the exception of tire retailers who haul only their scrap tires generated in the normal course of business. Permits for scrap tire collectors, collection centers or scrap tire disposal sites may not have a fee greater than $250 annually.

A tire collection site determined to be a nuisance by North Carolina's Department of Environment and Natural Resources is responsible for the tires to be processed or removed within 90 days.[131] Failure by the person responsible for the nuisance to take the requested action within 90 days can result in the Department entering the property where the tire collection site is located and confiscating the scrap tires or arranging to have the scrap tires processed or removed. The person responsible for the nuisance shall be liable for the actual costs incurred by the Department for its nuisance abatement activities and administrative and legal expenses related to

[126] N.C. Gen. Stat. § 105-187.16.
[127] N.C. Department of Environment, Health, and Natural Resources, N.C. Office of Waste Reduction and Division of Solid Waste Management, "Waste Reduction Fact Sheet: Used Tires," http://www.p2pays.org/ref/01/00016.htm (December 21, 2006).
[128] N.C. Gen. Stat. § 130A-309.58 (e), http://www.ncga.state.nc.us/enactedlegislation/statutes/html/bychapter/chapter_130a.html (January 8, 2007).
[129] N.C. Department of Environment and Natural Resources, "Scrap Tire Management Special Report," Oct. 1, 2000, pg. 3, http://wastenot.enr.state.nc.us/swhome/tirrpt.pdf (January 9, 2007).
[130] N.C. Department of Environment, Health, and Natural Resources, N.C. Office of Waste Reduction and Division of Solid Waste Management, "Waste Reduction Fact Sheet: Used Tires," http://www.p2pays.org/ref/01/00016.htm (December 21, 2006).
[131] N.C. Gen. Stat. § 130A-309.60 (a) (b), http://www.ncga.state.nc.us/enactedlegislation/statutes/html/bychapter/chapter_130a.html (January 8, 2007).

the abatement. The Department may also ask the Attorney General to initiate a civil action to recover these costs from the person responsible for the nuisance. Any nonpayment of the actual costs incurred by the Department may result in the imposition of a lien on the owner's real property on which the tire collection site is located.

Ohio

The Division of Recycling & Litter Prevention awards grants to establish or expand private manufacturing facilities that utilize scrap tire material, develop civil engineering projects or foster market development research.[132] Scrap Tire Grant funding is available to design and establish projects to strengthen markets for scrap tire material collected in Ohio. Projects that impact the largest market area and have the potential to substantially expand the current scrap tire market will receive increased consideration. Applicants may represent multiple cooperating enterprises which include a municipal corporation, county, township, state college or university, solid waste management district or authority, park districts or a board of education or joint vocational school district.

Grant awards are based upon comprehensiveness and quality of the grant proposal, the amount and type of scrap tires utilized, the amount of funds requested and amount of match funds committed to the project, the amount of regional and local funds available to promote the project and the applicant's history of program implementation and expenditure of grant funds. The Division may reduce or eliminate the dollar amount of the request if any part cannot be satisfactorily justified.

The Scrap Tire Grant provides financial assistance in three different project categories. The first category includes projects that include scrap tire or rubber-based material demonstrated for use in civil engineering applications, such as bridge abutments, paving, construction backfill for publicly owned and operated buildings and new construction of running tracks or athletic fields. The second category consists of projects that include facilities that use crumb rubber to manufacture value-added products, tire derived fuel feed systems for industrial boilers, cement or lime kilns, and scrap tire processing equipment, including shredders or conveying systems. The third category containing projects that include test burns of tire-derived fuel (TDF) or laboratory tests of products made from tire derived materials.

Ohio's Division of Solid and Infectious Waste Management manages the state-funded scrap tire abatement program.[133] When Ohio uses state funds to clean-up a scrap tire site, it attempts to recover those costs from either the property owner or the facility operator. In addition, local governments and solid waste management districts manage scrap tire clean-ups with local funding similar to other solid waste dump clean-ups. Through local funding and enforcement efforts, more than nine million scrap tires from more than 100 sites have been

[132] Ohio Department of Natural Resources, Division of Recycling & Litter Prevention, "2007 Scrap Tire Grant Application Handbook," pg. 1, http://www.dnr.state.oh.us/recycling06/grants/pdf/07%20STG%20Application.pdf (last viewed January 29, 2007).

[133] Ohio Environmental Protection Agency, Ohio EPA's Scrap Tire Abatement Program, http://www.epa.state.oh.us/dsiwm/document/general/scrap_tire_abate.pdf (January 11, 2007).

removed and more than 25 million tires from the 13 scrap tire sites have been removed with state funding.

Registration for a scrap tire transporter is $300 a year, but transporters of scrap tires that are being used exclusively for TDF or Tire Derived Chips are not required to register.[134]

South Carolina

A tire fee is paid at the sale of new tires, but the only incentive for consumers to turn in used tires when they purchase new tires is that it is illegal to put tires in landfills.[135] Programs are authorized within the state to establish incentive programs to encourage individuals to return their used tire to waste tire recycling or processing facilities. Counties are prohibited from imposing an additional fee on waste tires generated within the county, but a county may impose an additional fee on some oversized waste tires.[136] A county fee may also be charged on waste tires generated outside of South Carolina by requiring fleets to provide documentation for proof of purchase on in-state tires.

Many waste tire sites and processing facilities need to be permitted, with the exception of a tire retailing business where less than 1,000 waste tires are kept on the business premises. Sites that need to be permitted include: a tire retreading business where less than 2,500 waste tires are kept on the business premises or a tire retreading facility that is owned or operated by a company that manufactures tires in South Carolina, the tires manufacturer's parent company or its subsidiaries; a business that, in the ordinary course of business, removes tires from motor vehicles if less than 1,000 of these tires are kept on the business premises; a permitted solid waste facility with less than 2,500 waste tires temporarily stored on the business premises; or a person using waste tires for agricultural purposes.[137]

The Waste Tire Grant Program is funded by 50 cents of the two dollar fee placed on new tires.[138] The program provides grants to counties or local governments and can only be used for the collection or recycling of waste tires. It is awarded annually and counties, cities, towns or regions within South Carolina are eligible. The Automobile Dismantler Tire Grant Program is also funded from the two dollar tire fee, but grants from the program can be awarded to county governments only. These grants are also awarded annually and are used to manage waste tires that have been accepted free from verified automobile dismantlers located within the county.

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[134] Ohio Environmental Protection Agency, "Standards and Requirement for Scrap Tire Transporters: Fact Sheet" March 2002, http://www.epa.state.oh.us/dsiwm/document/guidance/gd_640.pdf (January 11, 2007).
[135] S.C. Code. Ann. § 44-96-170 (L).
[136] S.C. Code. Ann. § 44-96-170 (E).
[137] S.C. Code. Ann. § 44-96-170 (J)(K).
[138] South Carolina Department of Health and Environmental Control, Office of Solid Waste Reduction and Recycling, "S.C. Recycling Grants," November 14, 2006, http://www.scdhec.gov/recycle/html/grants.html#The%20Waste% 20Tire%20Grant%20Program (January 31, 2007).

Tennessee

Tennessee provides reimbursement for civil engineering projects which have a beneficial end use of waste tires generated within the state.[139] The Division of Community Assistance determines which civil engineering applications qualify.

Tennessee defines a beneficial end use of scrap tires in civil engineering applications as the use of tires to serve as a replacement for another material. After a tire is processed it loses its identity as a solid waste and becomes a value-added product that is used to an environmental or engineering advantage. In addition, a beneficial end use shall not result in unacceptable damage to the environment or public health and safety and shall not simply be a disposal method.

All civil engineering applications using tire chips or shreds shall have the bead wire removed, be less than one percent (by weight) free of metal fragments which are not at least partially encased in rubber and should generally be unattached to one another by wires. Tire chips or shreds shall also be free of all flammable contaminants, including wood fragments, wood chips and any other fibrous organic matter or the remains of tires that have been subjected to a fire.

Within certain guidelines, approved applications include landfill construction and closure; construction of paved roads, bridge approaches, and levees; and in the construction of subsurface sewage disposal systems and ground water/surface water diversion systems for subgrade building foundations.

Virginia

Through its End User Reimbursement Program, the Virginia Department of Environmental Quality (DEQ) provides a financial rebate to those who use Virginia tire material in their products or processes.[140] The program makes direct payments to beneficial end users of Virginia-generated waste tire material at a current rate of $22.50 per ton of tire material (equivalent to 22.5 cents per tire) or $100 per ton (one dollar per tire) if it is from a certified tire pile.

The Virginia Waste Management Board established that the eligible uses for the rebate include civil engineering applications which utilize waste tire material as a substitute for soil, sand, or aggregate in construction projects. In addition, burning waste tire materials for energy recovery, pyrolysis of waste tires and products made from waste tire materials such as rubberized asphalt, mats, recreational surfaces, drainage systems and building materials are eligible end uses.

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[139] Tennessee Department of Environment and Conservation, Solid and Hazardous Waste Management, "Beneficial End Use of Waste Tires" http://www.state.tn.us/environment/swm/tires/tireuse.shtml (April 5, 2007).

[140] Virginia Department of Environmental Quality, "Waste Tire End User Reimbursement Program" http://www.deq.state.va.us/wastetires/progsummary1.html (April 11, 2007).

Since the program began in 1994, the DEQ has paid 1,077 applications from eligible end users for a total reimbursement of $19,721,155. The applications totaled 743,761 tons, and when converted to PTEs represent the recycling and beneficial use of 74,376,100 passenger tires. About 15 percent of the tires came from 163 certified tire piles. Civil engineering has been the most common end use at 63 percent of the total material with 29 percent of the material being utilized for TDF and eight percent for recycled products.

PENNSYLVANIA TIRE RECYCLING AND STATE GOVERNMENT

While state government agencies have been evaluating tires as far back as the 1960's, in the case of PennDOT, there was no consolidated effort or statutory requirement to do so until recently. A provision in Act 101 of 1988 requires state agencies to implement recyclable materials collection programs and to review their procurement procedures to encourage the use of recycled content goods. That Act also requires DGS to establish a minimum percentage for recycled content purchasing and a bidder's preference for goods with recycled content and PennDOT to consider the use of products or materials with recycled content over standard products. Act 190 of 1996 went further by requiring that various state agencies, including DCNR, DOC, DEP, PennDOT, DGS, DOE, and the PASSHE consider the use of waste tires and further requires DEP to submit a report to the General Assembly by July 30, 2004 of agency uses, clean-up activities and implementation of Act 190.

Department of Conservation and Natural Resources

DCNR is an agency that the 2004 DEP report described as having "the potential for significant use [of tires]." At that time DCNR had used tires in playground material, walking trails and erosion control. The DEP report also went on to describe other potential uses of tires from boat dock bumpers to rubberized lumber. When DCNR was recently surveyed about waste tire uses, examples were quoted as: "rubber chips as playground bedding at Evansburg State Park; rubber mulch for landscape bedding material at Gifford Pinchot State Park; rubber tires for fish habitat structures at Lackawanna State Park; and rubber tires for shoreline erosion protection at Shawnee State Park."[141] Some of these projects have been in place as much as five years and, thus far, have performed well. However, in some cases, the projects were not cost effective due to handling and transportation costs, as well as higher product costs, when compared to standard materials.[142]

In addition to those uses of waste tires, as tire bales were considered for a stabilization project along the Delaware Canal State Park. In that case, concerns regarding submerged tire bales could not be addressed and standard aggregate materials could be obtained locally at a significantly lower cost. In addition, DCNR also attempted to develop the use of tire bales for retaining structures and tire shreds for backfill on bridge abutments, but neither of the projects got off the ground.[143] The Department will continue to evaluate waste tire uses on a case by case basis.

[141] Interview with Eugene Comoss, Director, Bureau of Facility Design and Construction, DCNR, January 9, 2007.
[142] Interview with Eugene Comoss, January 9, 2007; DEP, "Update on Pennsylvania Waste Tire Recycling Program," July 30, 2004, pgs. 2-3.
[143] Interview with Eugene Comoss, August 2, 2006 & January 9, 2007.

Department of Corrections

DOC most promising prospect for the use of recycled tires is in the form of Tire Derived Fuel (TDF) as a supplemental fuel at their 27 correctional facilities. Additional uses could include walking surfaces, parking lots and athletic fields, as described in DEP's 2004 report. According to DOC, rubberized asphalt has not been looked at as they procure these services through DGS and they have not been instructed to make that a part of their bids. The use of rubber mulch was considered but rejected for "in compound" uses as it could be used by inmates as a fire accelerant. Finally, a TDF test burn took place in 1998 at SCI-Rockview, but the test was unsuccessful. At this time, DOC is not pursuing any further waste tire uses.[144]

Department of Education

The limitations on uses for DOE, which were outlined in the July 2004 DEP report, continue to be challenges for the Department. Most construction and purchasing decisions that could potentially incorporate recycled tire products, are handled at the school district level. While DOE does review most plans and specifications for school construction and repairs, they lack statutory authority to impose specific purchasing guidelines. Other than encouraging school districts to buy recycled tire products, there is little that can be done, at present, to affect school district use of recycled tire products. With that said, there are still many uses that would benefit schools, including athletic surfaces, playground materials and flooring. The goals would be increased safety, and increased life over standard materials.[145]

Pennsylvania State System of Higher Education

PASSHE faces the same problems that DOE does in that it has no direct purchasing power over the individual state universities. Most of the decisions regarding facility design and construction are made by university trustees but the system can expand its pre-qualified vendors list and continue to encourage the use of recycled tire products at its 14 institutions. Uses range from athletic surfaces and landscaping mulch to walkways and parking ties. To date, five universities have installed athletic fields containing rubberized sports turf, including California, Bloomsburg, West Chester, Kutztown and Shippensburg.[146]

Department of General Services

DGS, as the chief procurement officer for the Commonwealth, has the potential to affect the use of large amounts of recycled content supplies and materials, including recycled tire

[144] Interview with John Peslis, Legislative Specialist, DOC, January 17, 2007; DEP, "Update on Pennsylvania Waste Tire Recycling Program," July 30, 2004, pg. 3.
[145] Interview with Sarah Pearce, Legislative Liaison, DOE, January 17, 2007; DEP, "Update on Pennsylvania Waste Tire Recycling Program," pg. 3. Joint Conservation Committee, Stenographic report of hearing re: Scrap Tires, August 10, 2004, pg. 53.
[146] Interview with Kenn Marshall, Media Relations, SSHE, January 23, 2007; DEP, "Update on Pennsylvania Waste Tire Recycling Program," pg. 4.

products. In addition to procuring goods, they also coordinate recycling services at state agencies. To that extent, DGS already has made available documents such as, "Bidding Preference For Products With Recycled Post-consumer Material," and a Management Directive titled "Purchase of Recycled Content Products by State Agencies." These documents present an opportunity to procure a wide range of products from rubberized asphalt, parking ties, traffic cones, traffic delineators and rubber flooring. One of the major areas is in the purchase and recycling of tires from the Commonwealth's fleet of some 17,000 vehicles. In 2005, 31,000 tires were purchased, and numerous others, especially in PennDOT, were retreaded. The state also has three contractors that pick-up state waste tires and recycles them and one contract to recap tires. The waste tires, however, cannot be directed specifically to Pennsylvania recyclers. DGS plans to continue all recycling activities that are currently in place and will continue to advocate for recycling efforts by state agencies and recycled content purchasing.[147]

Department of Transportation

For the last 30 years, PennDOT has been a consistent focus of efforts aimed at increasing state agencies' use of recycled tire products. Most notably, the use of rubberized asphalt has been the focus of this push to embrace recycled rubber, and this major use is explored in more detail later in this report. However, there are numerous other products that PennDOT has used and evaluated over the years, some of which consume large amounts of tires and some of which have made their way into PennDOT's specifications, known as Publication 408. They also appear in Bulletin 15 of Approved Construction Materials which lists manufacturers of approved products for use in construction contracts. The materials approved for use in road construction, that contain recycled tire rubber, include: traffic delineation drum ballasts; high-type rubberized railroad grade crossing materials; pre-molded rubberized expansion joint-filler materials; noise barriers; manhole/inlet grade adjustment rings; guide rail offset blocks; and rubberized asphalt crack sealant. Also allowed is one percent crumb rubber by total weight of mix in bituminous concrete base course and a crumb rubber modifier is allowed experimentally in asphalt concrete. All of these products are subject to testing, as are all new products. Currently, crack sealant is the most utilized product, with the Department using the equivalent of nearly 50,000 tires annually.[148] The New Product Evaluation Process, by which products are tested and approved by PennDOT, is detailed in a chart on page 42.

[147] Interview with John Paul Jones, Legislative Liaison, DGS, December 28, 2006; DEP, "Update on Pennsylvania Waste Tire Recycling Program," pg. 4.

[148] DEP, "Update on Pennsylvania Waste Tire Recycling Program," pg. 4. PennDOT, PTI, Transportation Materials Partnership, "Vol. I: Summary Recommendations for use of Recycled Materials in Highway Construction," April 1999.

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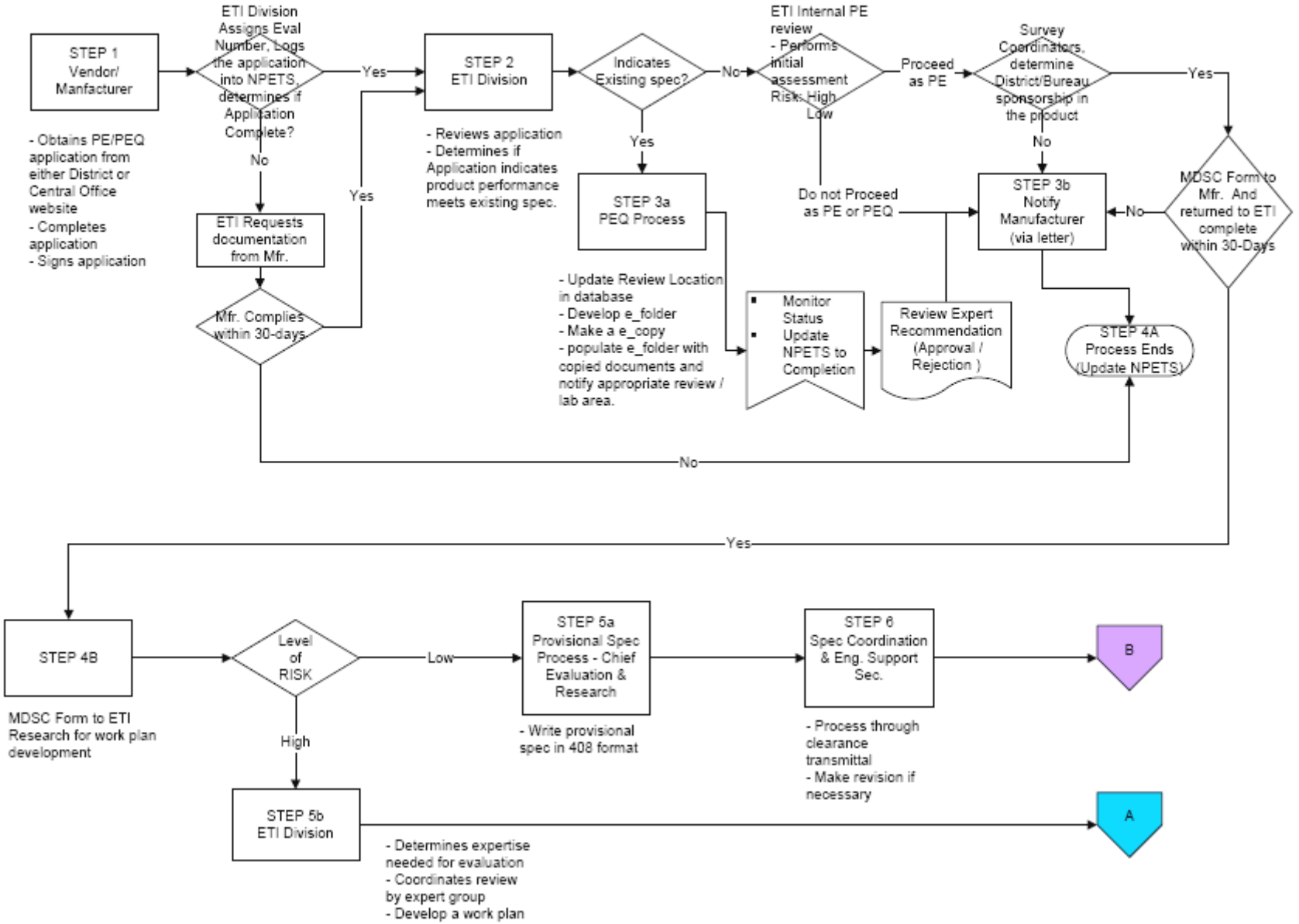
New Product Evaluation Process



One use of waste tires that PennDOT has tested is the Stress Absorbing Membrane Interlayer (SAMI). The SAMI was tested as far back as 1989 for use between existing pavement and overlay material, with the goal of reduced cracking. Three tests took place that year, one on Route 322 in Center County and two on Route 22 in Cambria and Indiana Counties. The tests contained 33% recycled rubber, but due to increased cost of the materials and insignificantly increased service life, the use of SAMI was deemed "uneconomical and discouraged."[149] Road sub-grade materials have also been used, with rubber chips mixed with standard crushed stone with the goal to improve drainage but there are currently no published reports on the testing.

Another use for waste tires that PennDOT has used are sound walls. These sound walls are constructed with a fiberglass shell and crumb rubber filler have been tested and approved for use by the Department, but have seen limited use. Two such walls were installed as demonstration projects, one on the Interstate 78 Bridge over Veracruz Road in Lehigh County and the other along the southbound lane of Interstate 81 in Dauphin County, used over 7,000 tires each. Additionally, a second type of sound wall, the Dewbrook sound wall, an absorptive noise barrier, has been used in three projects, which used 25,000 tires each. That wall is made from a proprietary product of crumb rubber with tire fibers mixed together, which goes into a component on the outside of the wall.

Another recent project PennDOT has completed was the new Tarrtown Bridge project near Kittanning, Armstrong County, which placed tire shreds as embankment fill to stabilize a bridge abutment. The fill application, which was completed by A&L Construction of Belle Vernon, PA, involved two embankments and used upwards of 750,000 tires placed in lightweight geotextile material along with a layer of clay with drains. The project used tires from two municipal tire clean-ups and even involved amnesty days sponsored by PennDOT to collect additional tires. This was a major project in 2003 and continues to be evaluated, but thus far, has performed well.[150]

Despite all the uses PennDOT has specifications for, and performed testing on, some have still viewed the Department as not doing enough to use recycled rubber. Part of this attitude comes from the bad experiences in the past; concerns with safety and performance under Pennsylvania's grueling winter climate, and fear of a potential fire hazard from using tire products. Cost will continue to be a key factor, but the Department's overall lukewarm approach consistently gives the appearance of indifference when it comes to recycled tires, particularly when compared to their testing of other recyclable materials.[151]

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[149] PennDOT Research Project No. 79-02, "Discarded Tires in Highway Construction," April 1989. PennDOT, PTI, Transportation Materials Partnership, "Vol. II: Integrating recycled and Co-Product Materials Into Pennsylvania Construction Specifications," April 1999, pg. 53.

[150] Biannual MOU Status Report, From Ken Thornton, PennDOT, To Lawrence Holly, DEP, January 18, 2007; PennDOT, PTI, Agreement No. 359530, "Vol. II: Integrating Recycled and Co-Product Materials into Pennsylvania Construction Specifications," April 1999; Chief Engineer's News, "Tarrtown Bridge Project Tire Shred Embankment Project," http://www.dot.state.pa.us/Internet/Bureaus/pdChiefEng.nsf/infoTarrtownBridge Project?OpenForm (March 30, 2007); Recycling Fund Advisory Committee Meeting, Meeting Minutes, November 14, 2002; Joint Conservation Committee, Stenographic report of hearing re: Scrap Tires, August 10, 2004, pgs. 49-50; Recycling Today, "Pennsylvania DEP Works with Counties to Eliminate Tire Piles," September 8, 2004, http://www.recyclingtoday.com/news/news.asp?ID=6354 (November 2, 2006).

[151] Meeting with Materials and Testing Division, Highway Administration, PennDOT August 22, 2006.

For the last decade, DEP has worked with PennDOT through an annual Memorandum of Understanding (MOU) which allows DEP to provide funding for various recycled content highway and civil engineering applications, project evaluations, and development of specifications. The focus of the MOU is on Act 101 materials and residual wastes, and project proposals are submitted for DEP review and approval. PennDOT then submits a biannual status report to DEP. The program is coordinated between DEP's Bureau of Waste Management, Division of Waste Minimization and Planning and PennDOT's Strategic Environmental Management Program under Highway Administration.

In fiscal year 2006/2007, DEP provided $400,000 of Recycling Fund monies for four demonstration projects and four research, testing and evaluation efforts. The demonstration projects included $100,000 for use of tire shreds as "lightweight backfill for retaining walls and slope stabilization" at the Tarrtown Bridge project in Armstrong County. In addition, $70,000 was given to support a rubberized asphalt seal coat pavement on Route 194 in York County, that will use more than 17,000 tires. On the research side, $25,000 went to finalize "Provisional Specification and User Guidelines for the use of waste tires as an embankment fill material." The evaluation of geotechnical information from the Tarrtown Bridge project cost $80,000, and the evaluation of an SMA-Crumb Rubber project on Route 15 in Lycoming County and Interstate 86 in Erie County cost $25,000. While tires are not the sole focus of the MOU, they accounted for $300,000 of the $400,000 available, which is encouraging as future MOU's will undoubtedly continue to include numerous tire projects.[152] However, since PennDOT uses the MOUs to fund the vast majority of its recycled rubber research, it is unclear if PennDOT would continue to research new ways of using recycled rubber if the MOU were ever discontinued.

National experts have described Pennsylvania as having "some of the oldest highways in the nation," and, therefore, should continue to explore any products to improve them. In addition to age, the state "has nearly the most lane miles of any other state that must deal with severe winters. Pavements are susceptible to cracking and expanding due to the temperature and weather changes (freeze/thaw cycles) in the state. Also, the salt used during snow/icy conditions decreases the life of a pavement compared to a southern state."[153] Even the state's Secretary of Transportation, Allen Biehler, described the situation bluntly. "We have a big system, nearly 40,000 miles, the nation's fifth largest." "You have to go through Pennsylvania to get to anywhere else in the Northeast. So we have lots of potential critics."[154]

Turnpike Commission

The Pennsylvania Turnpike Commission, though not required to consider the use of recycled tires, has evaluated several uses. As far back as April 1990, the Commission evaluated RMA with plans to incorporate this into its binder and wearing course mixture over a 1,600 foot

[152] Memorandum of Understanding Between The Pennsylvania Departments of Environmental Protection and Transportation, FY 2006/2007, November 16.2006; Biannual MOU Status Report, From Ken Thornton, PennDOT, To Lawrence Holly, DEP, January 18, 2007.

[153] American Society of Civil Engineers, "2006 Report Card for Pennsylvania's Infrastructure," http://www.pareportcard.org.

[154] Overdrive, "Rougher than a corncob," December 2006, http://www.etrucker.com/apps/news/article.asp?id=56766 (December 1, 2006).

stretch of its eastbound climbing lane in Bedford and Fulton Counties. The binder with asphalt rubber was incorporated into the mix at 5.2% of total weight, and the wearing course with asphalt rubber bituminous concrete mix design at 6.4% of total weight. The project was completed on June 10, 1991 by Stabler Construction Company of Harrisburg. The asphalt rubber was provided by Able Bituminous Contractors Inc. of River Side, Rhode Island. Over 200 tons of binder and wearing course were placed with rubber added, and there were only minor issues associated with its placement. These issues included extended mixing times, longer cooling time after placement before the material could be rolled and eye irritation experienced by the paving crew.[155]

The purpose of these experimental asphalt mixtures by the Commission was to increase rut resistance over the standard materials. Including the RMA and control section, which contained standard materials, a total of six different materials were placed over a two mile stretch. Of the materials used, the RMA section was the most expensive by far, with a total cost of $117 more than the control section wearing course and $118 more than the control section binder. In relationship to the other alternate materials, which all cost more than the standard mixes, the rubber was $76 more expensive for binder and $87 more expensive than its nearest competitor. The materials were reevaluated in November of 1992, and it was reported that all the materials "appear to be doing well." Of the materials that were tested, only one fared worse than the rubber in rut resistance. There were also concerns about recycling/reclaiming modified asphalt and its ability to be reused. Based on the increased cost and poor initial performance, no additional rubber modified asphalt projects have been done by the Turnpike Commission.[156]

Overall, the Commission does little research and experimentation, as its specifications are actually tighter than PennDOT's. Since it only maintains one road, with a high volume density and high truck traffic, it normally evaluates only well-tested and proven technologies to find what works best on the Turnpike. Of the new technologies in paving, it does not use Stone Matrix Asphalt (SMA) but has used a modified Superpave material. Overall, it has gone to a larger aggregate size to prolong the life of its roads and uses a four-inch overlay over the concrete base to further extend the repair cycle. Its evaluation of the SMA concluded that the standard materials performed just as well, are cheaper and had fewer placement issues than RMA. While the Commission's concerns echo those of many other agencies, this testing was done at a time when the technology and mixture designs were still in their infancy.[157]

In addition to this RMA test section, the Turnpike Commission also used rubber mulch at the Mid-County Interchange, Exit 20 on the Northeast Extension, in Montgomery County. The red-colored mulch, provided by Emmanuel Tire Company, was placed in May 2006 and will be evaluated over a five-year period. Initial results were favorable, but the increased up-front cost for the prospect of life cycle savings may prove prohibitive. The Commission typically purchases 20 cubit yards of bark mulch to cover the interchange, at a total cost of $395. To cover the same

[155] PA Turnpike, Job Mix Formula Report, "ID-2 A Binder with Asphalt Rubber and ID-3 "E" Wearing Course with Asphalt Rubber Bituminous Concrete Mix designs…" Stabler Construction Company, May 16, 1991.
[156] Pennsylvania Turnpike Commission Transmittal and Memorandum, "Evaluation of Asphalt Additives…," Eugene Mattson, September 16, 1991.
[157] Interview with Eugene Mattson, Materials Management Supervisor, Pennsylvania Turnpike Commission, October 19, 2006; Pa. Turnpike, Breezewood Interchange, "Project Report Summary," November 1992.

area took only 6 ½ cubic yards of the rubber mulch, but the cost of that was $650 per cubic yard, for a total cost of $4,225. The up front costs are ten times more expensive, which may be offset by future savings, but since the evaluation cycle is not yet complete, that data is inconclusive. The Commission may utilize rubber mulch on a gradual basis, but no decision has been made for future use.[158]

Department of Community and Economic Development

In addition to these agencies that have used or evaluated using waste tires, DCED also has a key role in waste tires. DCED's role is as administrator of the PBL program, which has benefited many waste tire companies. The beneficiaries of these loans are detailed in a chart on page 47. The money was made available in Act 2 of 1995 through a one time transfer of $15 million from the Hazardous Sites Clean-up Fund, in Act 4 of 1995 through an annual transfer, of $2 million from the same fund to the Industrial Sites Environmental Assessments Fund, which makes the loans. This money is not focused on tires, but is available for use in Brownfield sites and non-hazardous waste or debris.[159] The grants and loans are evaluated on a case by case basis, and allocations are made by DCED as monies are available. Thus far, the program has been successful, and it is a win-win for the Commonwealth and industry; if the goals are met, it becomes a grant and if not, it is repaid.[160]

[158] Interview with Jim Kaiser, Landscape Engineer Supervisor, Pennsylvania Turnpike Commission, November 20, 2006.
[159] Act 2 of 1995 and Act 4 of 1995, as amended.
[160] Interview with Scott Dunkelberger, Chief Operating Officer, Center for Business Financing, Department of Community and Economic Development, November 2, 2006.

PERFORMANCE BASED LOANS - WASTE TIRE PERFORMANCE MEASURES

BUS NAME	COUNTY	CLDATE	TERM	ACT2REM	OBJECTIVES	CONDITIONS	END USE PRODUCTS	STATUS
Recycling Technologies International (aka Dodge-Regupol, Inc.)	Adams	04/14/00	7 yrs	$3,200,000	Process 750,000 passenger tire equivalents (PTE's) per year. One PTE equals 20 pounds of shredded tire material.	Reduced by $.50 per PTE processed by the Borrower. If the Borrower has not processed at least 6,000,000 PTE's, the Borrower shall repay the outstanding balance of the Loan, reduced as set forth above, over a seven (7) year remaining term at an interest of two percent (2%).	commercially saleable product or otherwise reused and not disposed of as a waste material or used as fuel	As of 06/19/06, $1,941,864 has been forgiven.
Riefen Rubber Co., Inc.	Lancaster	12/12/00	4 yrs / 3 yrs	$1,000,000	process not less than an average of 4,160,000 pounds of recycled rubber crumb per year	Reduced by $.06 per pound of recycled rubber crumb. If the Borrower has not processed at least 16,640,000 pounds of recycled rubber crumb and manufactured 1,040,000 pavers, the Borrower shall repay the outstanding balance of the Loan, reduced as set forth above, over a seven (7) year remaining term at an interest of two percent (2%)	commercially saleable pavers / ball field surfacing material	As of 04/21/06, $302,985 has been forgiven.
The Recycling Environmental Group, Inc.	Columbia	05/30/02	7 yrs	$1,000,000	process not less than an average of 4,365,850 pounds of recycled rubber crumb per year	Reduced by $.032 per pound of recycled rubber crumb processed by the Borrower over the original term of the loan. If at the end of the term of the loan, the Borrower has not processed at least 30,560,950 pounds of recycled rubber crumb over a seven (7) year remaining term at an interest of two percent (2%).	mats, interlocking tiles, water drainage products, parking lot bumpers, shoe soles, equestrian ground, and stall covers and dock bumpers	Performance measures started 03/01/06.

BUS NAME	COUNTY	CLDATE	TERM	ACT2REM	OBJECTIVES	CONDITIONS	END USE PRODUCTS	STATUS
Emanuel Tire of Pennsylvania, Inc.	Montgomery	07/30/03	7 yrs	$1,000,000	process not less than an average of 8,580,000 pounds of scrap tires per year	Reduced by $.0166 per pound of scrap tires. If the Borrower has not processed at least 60,060,000 pounds of scrap tires, the Borrower shall repay the outstanding balance of the Loan, reduced as set forth above, over a seven (7) year remaining term at an interest of two percent (2%).	commercially saleable items	Performance measures started 01/01/05. As of 07/20/06, $41,843 has been forgiven.
National Sales and Supply, LLC	Bucks	12/15/05	3 yrs	$200,000	process not less than 2,000,000 pounds of recycled rubber crumb per year	Reduced by $.033 per pound of recycled rubber crumb. If at the end of the Original Term of the loan, the Borrower has not processed at least 6,000,000 pounds of recycled rubber crumb into a variety of end-use products, the Borrower shall repay the outstanding balance of the Loan, reduced as set forth above, over a five (5) year remaining term at an interest of two percent (2%)	commercially saleable items	Loan closed 04/13/06.

SOURCE: Chart provided by the Department of Community and Economic Development, Center for Business Financing, November 7, 2006.

Joint Legislative Air and Water Pollution Control and Conservation Committee

The Joint Conservation Committee, as it is commonly known, is a legislative service agency whose mission is to conduct continuing studies of air and water pollution laws and their enforcement and recommend needed changes to the General Assembly. The bipartisan committee consists of 18 members of the state House and Senate and conducts studies, holds hearings and makes recommendations to the General Assembly. The role of this committee is important and unique because it can hold hearings and investigate issues that are not in legislative form, which is often a crucial first step, or in some cases a follow-up step, to keep the issues in front of the legislators. Since the passage of Act 190, several hearings have been held on waste tires in the Commonwealth which have addressed a variety of issues, including state government use of recycled waste tires.

Three hearings were held as a follow-up to Act 190, the first of which took place on April 10, 2003. The purpose of this hearing was to further ways to improve recycling markets in Pennsylvania. Participants included industry and trade group representatives and discussion focused on specific areas of market growth and decline, as well as the Commonwealth's success in waste tire pile remediation. The Joint Conservation Committee noted that any success was tempered by the lack of a continued use of recycled tires by state agencies and the promise of uses that other states have embraced while pilot projects in Pennsylvania have failed to lead to any sustained use. It was agreed that several issues needed to be addressed in statutes and regulations, including: the length of on site storage for whole or shredded tires bound for certain uses; the increased use in civil engineering applications that could be furthered for highway use, landfill construction and on site septic systems; waving of disposal fees to encourage local tire drop offs; classifying tires as recyclables and not residual waste; concentrating on flexible markets to stimulate market growth; and dedicating a source of funds for market development.[161]

The second hearing was held on November 24, 2003 when the Committee heard from three presenters representing PennDOT, DEP, and DGS. The focus at this hearing the focus was on the lack of cooperation and coordination between state agencies on the potential markets for waste tires. The outcome of the meeting was less than positive, with the Committee stating, "Pennsylvania's agencies are not speaking with one voice and our Commonwealth had not maximized opportunities." Specifically on rubberized asphalt, it noted that "despite avowals of cooperation, PennDOT and DEP seem to be miles apart on the potential uses of rubber from recycled tires in asphalt paving projects."[162] While PennDOT has continued to be lukewarm toward the use of rubber and rubberized asphalt, DEP's enthusiasm toward that use has cooled as well citing more specific highway applications and civil engineering uses that have been proven in Pennsylvania. DGS offers contracts for tire retreading, crack and joint sealing, flooring products and playground material.[163] The Committee concluded that "the recycling and reuse of waste tires in Pennsylvania continues to be a work in progress."[164]

[161] Joint Conservation Committee, *Environmental Synopsis*, June 2003, pg. 1 & 8; Joint Conservation Committee, Stenographic report of discussion re: Scrap Tires, April 10, 2003; DEP, Bureau of Waste Management.
[162] Joint Conservation Committee, *Environmental Synopsis*, December 2003, pg. 1.
[163] Joint Conservation Committee, Stenographic report of hearing re: Scrap Tires, November 24, 2003.
[164] Joint Conservation Committee, *Environmental Synopsis*, December 2003, pg. 8.

The Joint Conservation Committee's final hearing was held on August 10, 2004 and featured presenters from state agencies and industry experts. Topics ranged from general discussion on market development, tire remediation and regulatory, statutory and other industry barriers, to discussion of specific PennDOT uses of waste tires. The latter dominated the discussion throughout, but no conclusions were reached and the committee members expressed frustration at the lack of state agencies embracing tire-derived products.[165]

Overall Potential for Growth of Recycled Tire Products in Pennsylvania

While the lack of consideration of such products is of concern, agencies should not be forced to overlook cost factors, or performance, just for the sake of purchasing recyclable products. According to a 2003 EPA report, markets exist for 80% of the 290 million waste tires generated in the United States every year, but according to DEP, Pennsylvania should reflect nearly 100% of the tires to market since no piles are growing, demand is high and markets continue to grow. In addition, the pilot projects undertaken by state agencies are a good first step, but fall short of having a substantial impact on the markets or business-sustained growth in the state. Cost should definitely be a factor, and performance specifications can be high, but if a product falls short it is important to work with the company to improve the product and give it a chance to succeed. Sustained markets are the key to the industry's success, and while the state should not be the only answer to helping control this commodity, they will continue to be a key stakeholder in terms of both regulation and use.

Pennsylvania currently has 1,168 permitted waste tire haulers, eight waste tire processors operating under the residual waste processing/beneficial re-use general permit, one with a site specific processing permit, one operating under a consent order and three cement kilns operating with an air quality permit. These represent a diverse collection of industry and business engaged in the entire gamut of waste tire management, from the collection and transporting stage, to the processing, refining, and end use.[166] It is important to remember that while those businesses operating in the state process mainly Pennsylvania tires, the markets are regional and fluid, and tires from neighboring states are also processed in the Commonwealth, just as some Pennsylvania tires are processed out of state.

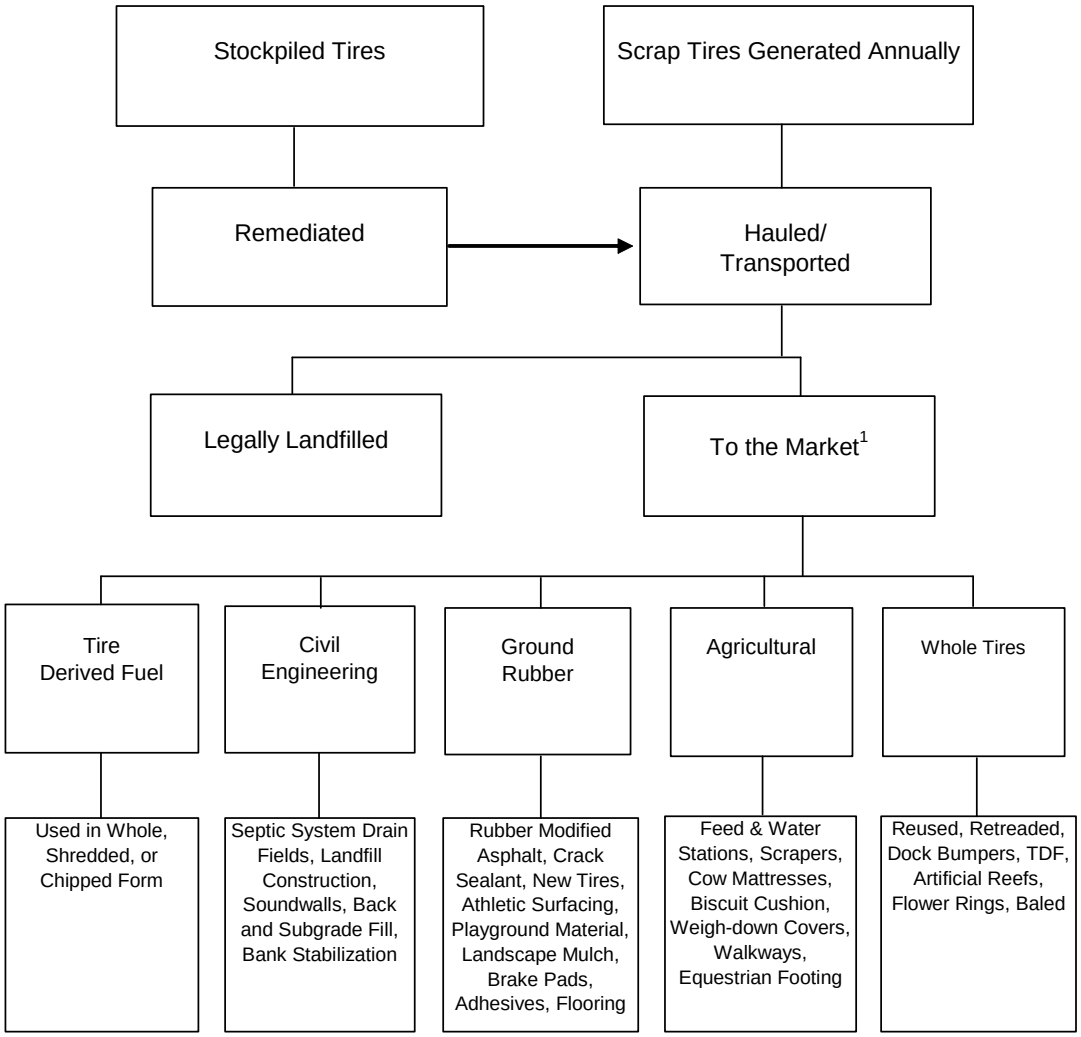
While markets exist for over 80% of waste tires, there is no single use that will solve all the problems that surround this commodity. As long as tires are on the road, outlets will be needed to consume those tires when they come off the vehicles and enter the secondary markets for reuse and recycling. Michael Blumenthal, Senior Technical Director of the Rubber Manufacturers Association puts it bluntly. "The number of scrap tires generally increases every year, and it increases for a couple of reasons. As our population grows, so does the number of people behind the wheel of an automobile, a truck or an SUV. It is just an increasing use of the

[165] Joint Conservation Committee, Stenographic report of hearing re: Scrap Tires, August 10, 2004.

[166] The information listed on these Pennsylvania businesses should not be interpreted as an endorsement of their companies, nor should the exclusion of a business be interpreted as disapproval. It is also important to note that not all businesses fall under the permitting regulations of DEP, as those who refine tires, or manufacture a tire derived product but do not handle whole tires, are not required to obtain either a hauler or processing permit; More detailed information on permits, and permitted businesses is available at DEP's Waste Tire Program website available at http://www.depweb.state.pa.us.

product."[167] Combine that with the fact that today's tires are designed to last longer and are, theoretically, harder to process. The following flow chart displays the steps a waste tire takes from coming off the car to the end use markets.

FIGURE 1
THE FLOW OF SCRAP TIRES TO END USE MARKETS



1. Tire types such as passenger, truck, industrial, off-road, bias ply, etc., can not all be utilized to create the same products.

[167] TireStamp Inc., "The Intelligence Behind Your Tires," http://www.tirestamp.com/news04-10-07.htm (February 27, 2007).

RUBBERIZED ASPHALT

This section of the report describes RA using many terms common in the construction and paving industries. While these terms may not be familiar to many readers, using this language allows for the most accurate presentation of the various projects that incorporate crumb rubber into asphalt. Another layer of disconnect may occur due to the various Commonwealth agencies and other states using different terms to describe similar mixtures of RA. One example of this is the term rubberized asphalt, which is the generic term for regular asphalt paving that incorporates crumb rubber. Specifications can differ regarding mix design and highway application, including the percentage of asphalt, the percentage of the crumb rubber added, where the rubber is incorporated (into the binder, liquid asphalt or aggregate), the thickness that it is placed on the roadway, the size of the aggregate and crumb rubber used (mesh size), and the type of friction or wearing course, to name a few. The information is presented as it was described in the various reports and sources, and no alterations have been made to standardize terms. A more detailed description of many general terms can be found in the Tire Related Definition Section of this report.

"Pennsylvania has been evaluating the use of Asphalt-Rubber since the early 1960's. There have been numerous projects placed and evaluated without one major success." This bold and blunt statement was made in a 1989 PennDOT report on the use of discarded tires in highway construction.[168] Since that time, there have been dozens of studies on RA and other uses for waste tires in transportation related projects. The results represent a mixed bag of success and failure, years of trial and error, continued testing, evaluation and pilot projects, but as of yet, there is little sustained usage of these TDPs. This is reflected in a 2004 DEP report on tires, completed in response to Act 190, which states that of all the hot-mix asphalt with crumb rubber "(t)he results have ranged from fair to satisfactory, with poor performance noted in open-graded asphalt surface course, due primarily to Pennsylvania's significant use of anti-skid material, which fills the voids in the mix and causes severe freeze thaw damage." They also cite a 60 percent increase in costs associated with those materials. Despite these drawbacks, DEP also cite advances in technology that will continue to be evaluated to balance environmental, engineering and economic concerns.[169] PennDOT acknowledged these concerns but noted they are unlikely to conduct any research beyond the MOU with DEP.

Adding crumb rubber modifier (CRM) to asphalt cement prior to incorporating the binder was first accomplished in the early 1960's, what is now known as the "wet process." In the late 1970's the first "dry process" use of rubber was seen, where the crumb is added to the mixture separately. Current interest in RA has been heightened due to its potential for using recycled tires. "The major barrier to the widespread use of rubber modified asphalt concrete has been the increase in cost of using the material compared with the conventional asphalt concrete." [170] This

[168] PennDOT Research Project No. 79-02, "Discarded Tires in Highway Construction," April 1989, pg. 7.
[169] DEP, "Update on Pennsylvania Waste Tire Recycling Program," July 30, 2004, pg. 4.
[170] Takallou, H.B. "Advances in Technology of Asphalt Paving Materials Containing Used Tire Rubber," Transportation Research Record 1339, pgs. 23, 28.

sentiment is reflected nationally as well as in Pennsylvania, even though RMA use have been more successful in other states.

Since the late 1980's, there was a push from many sectors to deal with environmental problems caused by waste tires, which had gone unchecked and unregulated around the country. At that time, the potential for tires as an alternative use in civil engineering projects became a major focus of research and development. Even then, however, it was noted regarding RA, that "there are a number of possible applications, but not all applications are appropriate in every State," and "[i]t is probable that some areas of the country will not benefit from this technology." In addition, a concern at that time was cost, which has continued to persist. In fact, a report noted that "the total increase in the cost of the paving material must be balanced by an equal or better increase in the performance."[171] Initial studies have opined that "the greatest deterrents from the use of Crumb Rubber Modifier (CRM) in asphalt is the high initial cost and variable performance that seems to be associated with climate and selection of proper application, mix design, and construction."[172]

Cost and performance has always been the focus of criticism and some of the stigma still exists over poor initial testing results. There is a concern by some that there is very little done to correct potential problems when initial RA pilot projects do not return the desired results. While an unsuccessful pilot project may indicate that a particular technology will not work in a particular circumstance, small alterations in the project design may be beneficial in other situations. However, many times, these alterations are not performed and the project is simply listed as a failure.

While a half-dozen or so rubber modified products have made their way into specifications through Publication 408, PennDOT prefers to allow these uses as options and does not insist on them in most bids. Many of the materials in special provisions are, admittedly, rarely used. "The special provisions leave it to the district to insert it rather than have it as a general provision in the main body of the specification."[173] Progress has been made over the years on this issue, both in Department research and advancements in technology and design of products. While some engineers at PennDOT are encouraging the use of rubber modified products, obstacles still exist and challenges need to be overcome. Performance and public safety will always be the number one concern of any new product but cost and stigma are the main problems associated with many rubberized products that have performed well, including those incorporated into Publication 408.

Despite all the negative press PennDOT receives on the subject of using waste tires, they were featured in a 1999 report, done by the Pennsylvania Transportation Institute. In that report, PennDOT outlines its commitment to seek "reliable" methods to reuse high quality materials to not only improve quality but increase life cycle costs of projects. The three criteria that all

[171] US DOT, FHWA, "State of Practice-Design and Construction of Asphalt Paving Materials with Crumb Rubber Modifier," pgs. 1, 2, 22.
[172] US DOT, FHWA and US EPA, "Engineering and Environmental Aspects of Recycled Materials for Highway Construction, June 1993, pg. 163.
[173] PennDOT, PTI, Transportation Materials Partnership, "Vol. I: Summary Recommendations for use of Recycled Materials in Highway Construction," April 1999, pg. 1.

projects must meet are economic, engineering, and environmental, along with a cost/benefit ratio between engineering and economic to determine performance standards with the use of tax dollars.[174] PennDOT is keenly aware of the need to "help solve the problem of tire disposal," but at the same time does not want to sacrifice performance, costs, or "cause other environmental problems" as a result. They also recognize that "one of the keys to a successful waste tire reduction program is for all parties involved to fully cooperate."[175]

The key with using any recycled material in a practical or feasible manner is it must yield an environmental, engineering or economic benefit without compromising the roadway integrity or safety requirements. When discussing highway uses, many think of RMA as a way to improve rut resistance, improve durability and increase the life of the road while at the same time making the ride quieter, reducing costs for maintenance, rendering sound barriers unnecessary and is environmentally friendly. Testing done in other states, both north and south, are difficult to compare to Pennsylvania because the state has "one of the most environmentally torturing climates that you will ever have for any pavements."[176] Another account states that "Pennsylvania's latitude places it in the zone of maximum daily and annual freeze-thaw cycles."[177] Due to this fact, many technologies like open graded friction courses (OGFCs), which have been used successfully in southern states, are difficult to use in Pennsylvania. The same open and gap graded friction courses that make the road quiet also collect anti-skid material and salt, which can have a counteractive affect on the highway. PennDOT also noted that OGFCs without crumb rubber also experienced the same problems in Pennsylvania, but a new technology in open-graded hot mix asphalt (HMA) courses may make this more feasible in Pennsylvania. The type of application and mixture also play a key factor. For example, when rubber is added to the mixture, at what percentage it replaces a standard material, and how long it is blended, can impact the project's ultimate success. Mistakes occurring at the design level as well as at the plant and in the field can all affect the outcome. So attaching the blame to PennDOT when RA projects fail is not always valid. In addition to environmental and economic concerns, the infrastructure of the waste tire recycling industry was also listed as an area to address in a 1999 PennDOT report. The quantity of the materials at any one site is often inefficient, and relatively few material suppliers exist for some commodities. However, industry infrastructure and material quality have improved a great deal since the 1999 report.

Much of the negative stigma relating to RA dates to the experiments associated with the failed federal Intermodal Surface Transportation Efficiency Act (ISTEA) legislation of 1991. This act of Congress mandated the use of crumb rubber in asphalt concrete to help establish a market for waste tires. ISTEA required the incorporation of recycled rubber into asphalt starting at five percent replacement for all projects in 1994, increasing to 20 percent by 1997. It also contained penalties for states that were unable to certify the annual usage requirements. States struggled to implement this technology and experienced many failed pilot projects, and ISTEA was finally repealed in 1995. ISTEA was further amended to require research tests to develop

[174] PennDOT, PTI, Transportation Materials Partnership, "Vol. II: Integrating Recycled and Co-Product Materials Into Pennsylvania Construction Specifications," April 1999, pg. 1.
[175] PennDOT, PTI, Transportation Materials Partnership, "Vol. II: Integrating Recycled and Co-Product Materials Into Pennsylvania Construction Specifications," April 1999, pg. 56.
[176] Joint Conservation Committee, Stenographic report of hearing re: Scrap Tires, August 10, 2004, pg. 26.
[177] PennDOT, "Evaluation of the Tyrsolv Crumb Rubber Modifier – Final Report," March 2005, pg. 1.

specifications for the use of CRM asphalt to conform with Superpave performance specifications. The Federal Highway Administration (FHWA) position is against the use of RA as a means to noise mitigation but allows the use of RA where it is cost effective and properly engineered as a waste tire mitigation program.[178] Many of these failed attempts to use CRM under pressure from ISTEA has continued to make PennDOT somewhat hesitant to incorporate rubber into concrete and asphalt mixes. Some engineers are warming to this technology, but others remain steadfast in their resistance, citing past failures, increased fire hazards, environmental concerns and increased costs. All of these combine to make rubber a lightly used commodity in PennDOT projects and specifications.

PennDOT's arguments for not using rubberized products have failed to convince some experts that many of the associated problems cannot be overcome. It is difficult to hear of the lack of interest in any technology that may improve a highway system whose performance rankings are constantly near the bottom. It should be noted, however, that funding is everything when it comes to road construction in Pennsylvania and, with the current maintenance backlog and funding debate, it is difficult to advocate increased up-front costs for future savings, no matter how compelling the argument.

At their testimony before the Joint Conservation Committee in 2004, PennDOT noted a "significant" cost above their standard mixes and what they termed as a lack of "ready technology," as the main factors holding RA back. They did note, however, that rut resistance performed "fairly decent" in tests, but also noted some durability issues involving raveling and cracking for the wet process mixes. They did mention a new, untested technology involving adding chemically treated crumb. PennDOT is still open to incorporate rubber into some currently used applications and have even suggested its evaluation for use on rails to trails projects. It was also noted by DEP that a single on-lot septic system, using shredded tires as drainage media, uses 2,000 tires while one mile of highway of Hot-Mix Asphalt (HMA), with one percent rubber, laid in a two inch overlay, only uses 700 tires. The bottom line is that there is no one use that is going to solve all the tire problems.[179]

Using Rubberized Asphalt

One of the earliest RA projects involved devulcanized, reclaimed ground rubber called Ramflex. It was placed in 1968 on a 2.7-mile stretch of Egypt Road in Montgomery County. The rubber was added after the aggregate but before the asphalt. The rubber modified binder course was used under a CRM wearing surface and under part of the control section's wearing surface. An evaluation noted that the rubber increased costs by 12 percent but increased service

[178] USDOT, FHWA, Office of Pavement Technology, "Crumb Rubber Modifier," http://www.fhwa.dot.gov/pavement/asphalt/crmbrubr.cfm (February 26, 2007); Rubber Pavements Association reports, "Current Uses of Rubberized Asphalt," http://www.rubberpavements.org/library/sacramento_noise_study/current.html (February 26, 2007); Intermodal Surface Transportation Efficiency Act of 1991, Sec. 1308. "Use of Recycled Paving Material," January 24, 2002.

[179] Joint Conservation Committee, Stenographic report of hearing re: Scrap Tires, August 10, 2004, pg. 19, 29, 36. NOTE: While tire chips have been approved by DEP as an alternate coarse aggregate for on-lot septic systems, the two-inch minus chip size is somewhat restrictive for processors as it competes with TDF, which is a higher value use.

life by 26 percent. It was "concluded that rubber modified bituminous concrete wearing surfaces should be used in conjunction with an increase in the asphalt content by 3%."[180] This successful test showed initial positive results in RMA but there appear to be few official studies or further uses explored in detail before the 1990's.

RMA was tested on State Route 819 in Fayette County in 1991. This is considered the first well documented test, and was laid with the wet process where the pre-blended crumb rubber was added into liquid asphalt binder at 6.2 percent of the total mixture. Then the RMA liquid was added to the aggregate. It was evaluated in 1998 and compared to the test strip of standard materials. Significant cracking and raveling after three years was noted in the RMA section, which was sealed, even though the normal pavement cycle is 8 to 12 years. The cost of the RMA was also 60 percent higher than the standard mix. The conclusion was that the asphalt binder became to stiff and resulted in both fatigue and low temperature cracking. Therefore, the use of rubber in similar projects was not recommended.[181]

Currently, the use of rubber, at one percent of the total mixture, is permitted to be included in bituminous concrete base course which is incorporated using the dry process. Few asphalt producers use this base course with rubber due to increased cost, averaging an increase of 15 percent, which puts them at a disadvantage in a competitive low bid system for projects. Testing on this technology began in 1991 as a result of the ISTEA legislation, and one project was completed in 1998 on a 3.4-mile section of State Route 248 in Northampton County, where a 4-inch base course modified with one percent of the fine aggregate with crumb rubber was placed on the road's shoulder. While this particular project resulted in a savings of $43,000, and used 125,000 tires, PennDOT reports that, in the past, incorporating crumb rubber into HMA has increased costs without an associated increase in performance.[182]

The Tyreplex Corporation from Maryland developed and patented a proprietary system for producing devulcanized rubber from scrap tires, which directly competes with virgin rubber and synthetic compounds.[183] In September 1995, what is now known as the Tyrsolv CRM binder, a mixed treated crumb rubber into HMA using the wet process, was tested on State Route 41 in Chester County. The dense grade bituminous wearing course was modified with six percent Trysolv CRM by weight of the asphalt binder. The increased cost was only seven percent over the standard materials. This project encountered problems during production due to non-uniform handling of the product that was not fully incorporated into the HMA mixture. When placed in a storage tank, the rubber in the binder separated and floated to the top, but the problem was

[180] PennDOT, PTI, Transportation Materials Partnership, "Vol. I: Summary Recommendations for use of Recycled Materials in Highway Construction," April 1999, pg. 11.

[181] Joint Conservation Committee, Stenographic report of hearing re: Scrap Tires, November 23, 2003, pg. 9-10; PennDOT, PTI, Transportation Materials Partnership, "Vol. II: Integrating recycled and Co-Product Materials Into Pennsylvania Construction Specifications," April 1999, pg. 53-4; PennDOT, Bureau of Construction and Materials, "Evaluation of Crumb Rubber-Modified Asphaltic Concrete, September 1998.

[182] DEP, "Update on Pennsylvania Waste Tire Recycling Program," July 30, 2004, pg. 4; PennDOT, PTI, Transportation Materials Partnership, "Vol. II: Integrating recycled and Co-Product Materials Into Pennsylvania Construction Specifications," April 1999, pg. 53.

[183] Recycling Forum-Composite Materials, "Second Annual Recycling Investment Forum," 1999, http://composite.about.com/library/PR/1999/blnerc1.htm (January 18, 2007); Joint State Government Commission, Meeting with PennDOT Materials and Testing Division, August 22, 2006.

corrected by using agitated tanks. Each Tyrsolv project was part of a five-year evaluation, including rut and visual inspections. However, the State Route 41 project could not be evaluated as it was unknown how much Tyrsolv CRM was incorporated into the mixture.[184]

A second test was made in June 1998 on Interstate 70 near Town Hill in Fulton County, with 23 percent higher costs. In this case, the CRM mixture was consisted of a Superpave HMA design with a 12.5mm wearing course, modified with nine percent Tyrsolv CRM by weight of the asphalt binder, placed using the wet process. A control section was also placed. The hope was to improve rut resistance and initial tests revealed no stripping, high resistance to low temperature cracking, acceptable resistance to moisture damage, adequate resistance to thermal cracking and somewhat improved fatigue resistance. The project initially placed well with the only problem being mechanical, as the asphalt binder pump failed. Rut performance was as good as the Superpave control section, but the SMA placed at that time out performed both mixes. Transverse and longitudinal cracking noticed in 2001 was sealed with RA joint sealant.[185]

Also in June 1998, a test was done on I-81 in Schuylkill County, at a higher cost over traditional asphalt of 13 percent. This experimental Superpave HMA Design mix was placed with a 19mm wearing course, one using nine percent Tyrsolv CRM and the second with Mahantango, a coarse "generic" CRM, added at 13 percent. Both were added using the dry process. Some of these mixtures were found to be difficult to compact, and initial results showed poor resistance to rutting. A detailed evaluation in 2005 showed that "(a)lthough Tyrsolv costs more, and did not outperform control mixes, it did perform satisfactory. PENNDOT may consider the use of Tyrsolv providing an approach can be developed to make it cost competitive with conventional sources of asphalt."[186] The nine percent mixture showed the best rut resistance but did not perform as well as the control section. The 13 percent mixture showed failure after the first winter and continued to deteriorate each succeeding winter. PennDOT approved Tyrsolv for provisional use in July 2006 and has developed a provisional specification at nine percent crumb rubber by weight as an alternative to Superpave mixes. It was further noted that the wet process required a portable blending machine, which added $24,000 to the cost and that numerous other waste tire applications consume larger amounts of tires than RMA.[187]

Another proprietary RA application is the Vestenamer Reactive Modifier, a Polyoctenamer rubber from the Degussa Company. Prior to roadway applications this was tested in PennDOT's lab at five percent and ten percent crumb rubber added to Superpave PG binder, which involves combining HMA with chemically treated crumb rubber, designed to bond the

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[184] Joint Conservation Committee, Stenographic report of hearing re: Scrap Tires, November 23, 2003, pg. 10-11; PennDOT, PTI, Transportation Materials Partnership, "Vol. II: Integrating recycled and Co-Product Materials Into Pennsylvania Construction Specifications," April 1999, pg. 54; PennDOT, "Evaluation of the Tyrsolv Crumb Rubber Modifier – Final Report," March 2005, pg. 8, 19.

[185] Joint Conservation Committee, Stenographic report of hearing re: Scrap Tires, November 23, 2003, pg. 10-11; PennDOT, PTI, Transportation Materials Partnership, "Vol. II: Integrating recycled and Co-Product Materials Into Pennsylvania Construction Specifications," April 1999, pg. 54; PennDOT, "Evaluation of the Tyrsolv Crumb Rubber Modifier – Final Report," March 2005, pg. 9-10, 19-20.

[186] PennDOT, "Evaluation of the Tyrsolv Crumb Rubber Modifier – Final Report," March 2005, pg. vi.

[187] Joint Conservation Committee, Stenographic report of hearing re: Scrap Tires, November 23, 2003, pg. 10-11; Gary Hartman, Chief of Evaluations and Research Section, PennDOT, "Waste Tire Crumb Rubber in Hot Mix-Asphalt;" PennDOT, "Evaluation of the Tyrsolv Crumb Rubber Modifier – Final Report," March 2005, pg. 13-4, 22.

crumb rubber to the asphalt. The testing showed a reduction in binder stiffness and increase in viscosity, greater rut resistance and more resistant to low temperature cracking. The five percent mixture also resulted in less fatigue cracking.[188] This proprietary product was placed at 1½ inch wearing course on Tasker and Pine streets in Philadelphia in October 2005, with a projected 20-year life, along with increased rut resistance and cost savings. PennDOT is continuing to work with the city to evaluate this test. It was noted that the material was more fluid than conventional Superpave, was easier to work with, and did not have to be vibratory rolled. The product, however, cost 20 percent more than standard materials.[189]

Eastern Industries put down a 1½ inch wearing course SMA job in 2004 on a 1,000 foot stretch of Route 147 in Northumberland County, under a design agreement with PennDOT. SMA contains coarse aggregate to provide a rigid framework to withstand heavy loads, and a rich stabilizer to hold the aggregates together for improved durability, rut, crack and skid resistance. The 4.75mm SMA had crumb rubber added at 0.6% as a replacement for the fiber pellets normally used as stabilizer to prevent the asphalt from migrating away from the aggregate or drain-down and maintain a high asphalt film thickness. The SMA was applied in an open or gap graded mix, with the goal to increase the life, withstand extreme freeze thaw tortures, rut resistance, skid resistance and reduce the risk of surface bleeding. This type of application can also be used to seal and protect a fatigued pavement as an alternative to micro-surfacing. In this case, using the rubber decreased costs over the standard materials and performed better as the control strip, which used cellulose fibers and experienced some flushing. This is most likely due to the fact that the cellulose absorbs more of the asphalt than the rubber mixture. The crumb rubber for this project was supplied by Mahantango Enterprises, just as they did for the CRM project Eastern performed on I-81.[190]

A second SMA-crumb rubber project was placed along Interstate 86 near Greenfield, Erie County in 2005 by the Russell Standard Corporation. The crumb rubber stabilizer was added to the liquid asphalt binder at ½ percent using the wet process, prior to incorporating it into the mix. The material was placed as a ½ inch, 12.5mm wearing course over a seven-mile stretch. The paving job was actually bid using cellulose fibers as the binder, but PennDOT approved the substitution of crumb rubber binder. They found that the rubber actually outperformed the cellulose fibers, as it did not break down as fast and, therefore, reported that this product performed satisfactorily. At comparable cost only 41 cents more per ton to the standard cellulose fibers, the crumb rubber binder successfully prevented the drain-down of the liquid asphalt. The crumb rubber for the project was also supplied by Mahantango Enterprises. The contractors remain disappointed that PennDOT has not yet written the crumb rubber binder into the specifications for SMA. SMA mixes incorporating crumb rubber are being reviewed for

[188] PTI, "Evaluation of Vestenamer Reactive Modifier in Crumb Rubber Asphalt," November 2003, pgs. 1-4.

[189] Joint Conservation Committee, Stenographic report of hearing re: Scrap Tires, November 23, 2003, pg. 13; Wright, Robert M., Chief Engineer, Streets Department, City of Philadelphia, letter to PennDOT, February 8, 2006; Gary Hartman, Chief of Evaluations and Research Section, PennDOT, "Waste Tire Crumb Rubber in Hot Mix-Asphalt."

[190] Joint Conservation Committee, Stenographic report of hearing re: Scrap Tires, August 10, 2004, pg. 26-7; Gary Hartman, Chief of Evaluations and Research Section, PennDOT, "Waste Tire Crumb Rubber in Hot Mix-Asphalt;" Interview with Greg Brouse, Quality Control Manager, Easter Industries, Inc., August 3, 2006; Greg Brouse, "(Sweet Stuff about Asphalt Pavement) Funnel Cakes and Film Thickness," *Paving the Way*, April/May/June 2006, pg. 8.

incorporation into PennDOT Publication 408, which could make it easier for the Department and contractors to facilitate its incorporation.[191]

A third SMA-crumb rubber project was laid on United States Route 15 near Trout Run, Lycoming County in late 2006. SMA modified crumb rubber was placed in a thin wearing course of ¾ inches thick overlay, over a 2.5 mile section of highway.[192] The CRM additive was incorporated in the asphalt as a stabilizer at 0.62 percent and was provided 98 percent free of impurities, including iron, fiber and cord. To this point, the project has performed satisfactorily.[193] This same material was placed over a 1,100 foot section, also in ¾ inch thick, 4.75mm stone chips, in May 2006 on Lower Powys Road in Hepburn Township, Lycoming County. This experimental mix was designed to improve the endurance of the roadway and improve rutting resistance. DEP underwrote this effort, funding 73 percent of the $186,000 project. Both projects are still being evaluated.[194]

When PennDOT evaluations of RA exhibit the actual increased costs over standard materials or poor performance over the alternate materials during an evaluation period, it is clear that more testing is needed to find economically competitive projects that perform well. Leadership at the top will be necessary to move the use of RA forward within the Department, but the continued interest in rubber by their engineers will ultimately provide the most compelling evidence. Private contractors are willing to not only experiment with these products but look to find success stories. This, along with PennDOT district personnel who are willing to bid and allow substitutions of alternate materials, will aid in the promotion and use of rubber modified products.

Rubber Modified Asphalt and Major Markets in the Other 49 States

Alabama

Rubber-Modified Asphalt:[195] Alabama is home to the National Center for Asphalt Technology (NCAT) and their test track for evaluating different asphalt mixes. Several rubber-modified surfaces have been tested over the years.

Major Markets:[196] There are currently two cement kilns using tires as supplemental fuel. Also, two monofills are permitted and operating.

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[191] Biannual MOU Status Report, From Ken Thornton, PennDOT, To Lawrence Holly, DEP, January 18, 2007; Gary Hartman, Chief of Evaluations and Research Section, PennDOT, "Waste Tire Crumb Rubber in Hot Mix-Asphalt;" Interview with Gary Black, Russell Standard Corporation, December 15, 2006.

[192] Biannual MOU Status Report, From Ken Thornton, PennDOT, To Lawrence Holly, DEP, January 18, 2007.

[193] PennDOT, "Proposal Report-Project 75456: Item 9409-0001-Stone Matrix Asphalt HMA Wearing Course," March 22, 2006; Gary Hartman, Chief of Evaluations and Research Section, PennDOT, "Waste Tire Crumb Rubber in Hot Mix-Asphalt."

[194] DEP Daily Update, "PennDOT to Test Experimental Blacktop Mix in Lycoming County," May 31, 2006.

[195] The National Center for Asphalt Technology, http://www.ncat.us/ (June 19, 2006).

[196] Major Market descriptions for all of the states are from the following source: Rubber Manufacturers Association, "Scrap Tires State Issues" http://www.rma.org/scrap_tires/state_issues/ (June 19, 2006).

Alaska

Rubber-Modified Asphalt:[197] The Alaska Department of Transportation was the first in the United States to try RA, but no current testing is contemplated. However, there is a test being funded to investigate the use of shredded tires as an insulation material, principally for roadbeds.

In the past, Alaska compared several types of CRM asphalt mixtures to several conventional mixtures.[198] Tests showed an improved thermal cracking resistance for the CRM mixes, especially when the wet process was used. However, the conventional mixes resisted permanent deformation better than the CRM mixes in both the lab and the field tests.

Major Markets: Some tires are used as fuel in a refuse derived fuel plant, as dock bumpers, and as liners of a landfill.

Arizona

Rubber-Modified Asphalt:[199] The city of Phoenix pioneered the use of RA in the mid 1960s, using a "chip seal" for city streets. In 1989, the city began using an asphalt rubber hot mix to add a one-inch overlay to their streets. During the 1990s, more than 200 miles of streets were resurfaced with 450,000 tons of RA. The city also reported that one stretch of RA performed without maintenance for 14 years and had an estimated life span of up to 18 years.

In addition to Phoenix, Arizona is considered a pioneer in the use of RA. The Arizona Department of Transportation (ADOT) has utilized more than 4.2 million tons of RA on their highways since 1988 with an estimated cost of some $225 million. Using the wet process, ADOT mixes crumb rubber particles, typically 18 percent to 22 percent by weight, with asphalt cement.[200] Once the material is mixed together, the asphalt rubber binder is held in a reaction vessel for 60 minutes at 325 to 350 degrees Fahrenheit. The reaction vessel must have agitation inside to keep the undissolved rubber particles in suspension before pumping.

ADOT has recently experimented with some terminal blended RA in friction courses. This process involves the introduction of a fine grind crumb rubber at an asphalt supply terminal where the rubber component is completely dissolved into the liquid and then it is shipped and handled in a fashion similar to conventional binders. Dry processes were experimented with in the 80s and 90s, but they were discontinued due to inconsistent material quality and poor performance.

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[197] Rubber Manufacturers Association, "Alaska Scrap Tire Briefing Sheet" http://www.rma.org/scrap_tires/state_issues/alaska.cfm (June 19, 2006).

[198] S. Saboundjian and L. Raad, Transportation Research Board Abstract: "Performance of Rubber Asphalt Mixes in Alaska" http://pubsindex.trb.org/document/view/default.asp?lbid=577401 (September 11, 2006).

[199] Arizona Department of Transportation, "What is Rubberized Asphalt?" http://www.azdot.gov/highways/eeg/quietroads/what_is_rubberized_asphalt.asp (June 27, 2006).

[200] E-mail from Ali Zareh, P.E., Senior Pavement Design/Development Engineer, Arizona Department of Transportation (November 27, 2006, 5:16 p.m. EDT).

Some limiting factors for rubber in asphalt are the costs associated with the manufacturing of the binder related to the mobilization of the blending equipment. Since the blending unit is required, it is a fixed cost to the contractor. Therefore, smaller projects result in higher unit costs and an opportunity cost for the blender operator. In addition, the material is typically placed in very thin layers, 1.5 to 2 inches, and thickens or stiffens quickly as it cools. It has to be placed when surface temperatures are greater than 65 degrees Fahrenheit so the paving season is generally limited from March 1st to October 31st throughout most of the state.

Arizona began a Quiet Pavements initiative after visitors and nearby residents started noticing a quieter freeway which had been paved, in 2002, with an asphalt rubber thin-lift open graded friction course (OGFC).[201] Public reaction prompted ADOT to start the three-year, $34-million, project to surface about 115 miles of Phoenix-area freeways with this particular rubberized asphalt. The program targets nosier freeways throughout the city.

Major Markets: There is a ground rubber facility with a capacity of five million tires annually. The wet process for rubber-modified asphalt was developed in Arizona and it continues to be a major user of rubber-modified asphalt.

Arkansas

Rubber-Modified Asphalt:[202] Arkansas tested several mix types with RA blends ranging from 5 to 15 percent. It was discovered that crumb rubber incorporated into HMA concrete provided increased rutting resistance. However, the RMA mixes did not show enhanced resilient properties when tested at 25 degrees Celsius.

Major Markets: One cement plant uses TDF as a supplemental fuel while two monofills are currently operating. Also, playground cover, rubber mulch, aggregate for septic systems and shreds for landfill leachate systems are being produced.

California

Rubber-Modified Asphalt: Caltrans began experimenting with asphalt rubber chip seals in 1975 and results were generally favorable.[203] In 1978, the first dry process RMA pavement was constructed, consisting of one percent ground rubber. Then in 1980, an early version of the wet-process asphalt rubber binder and dense-graded aggregate was utilized. All of the early projects performed relatively well.

By 1995, over 100 Caltrans Rubberized Asphalt Concrete (RAC) projects had been constructed and there were more than 400 asphalt rubber projects if asphalt rubber chip seals

[201] *Better Roads*, "Asphalt Rubber Makes a Quiet Comeback," May 2004 http://www.betterroads.com/articles/may04d.htm (June 27, 2006).
[202] G. V. Gowda, K. D. Hall and R. P. Elliot, Transportation Research Board Abstract: "Arkansas Experience with Crumb Rubber Modified Mixes Using Marshall and Strategic Highway Research Program Level I Design Methods" http://pubsindex.trb.org/document/view/default.asp?lbid=467982 (June 19, 2006).
[203] California Department of Transportation (Caltrans), Materials Engineering and Testing Services, Office of Flexible Pavement Materials, "Asphalt Rubber Usage Guide," January 2003 http://www.dot.ca.gov/hq/esc/Translab/pubs/Caltrans_Asphalt_Rubber_Usage_Guide.pdf (September 11, 2006).

were counted. However, some problems included cases of premature distress, but many of the contractors involved in those projects had little if any experience working with the RAC mixtures and the problems observed were clearly construction related. Recently, modified binder projects have been done with both dense-graded and gap-graded mixtures placed over a range of structural sections. These projects were reviewed by a joint Caltrans-Industry group and most were rated as good.

Based on 2003 Caltrans data, the weighted average cost for the conventional asphalt concrete mixes was $52.43 per ton and the weighted average cost for the RAC mixes was $60.80 per ton, a 16 percent higher initial cost for RAC mixes.[204] However, Caltrans found that the life cycles costs for most of the applications were cost effective over 70 percent of the time. In particular, projects with three days of paving or less and projects with less than 2,250 tons of RAC are likely to have significantly higher unit costs than larger projects and may not be cost-effective.

Caltrans currently uses RAC in ½ inch and ¾ inch maximum aggregate size.[205] The binder for this material is made on site using the wet process and must be at least seven percent binder by weight of dry aggregate. Caltrans uses RAC as a rehabilitation strategy with its primary use to correct roadways with cracking but not cracking due to structural section failure or base failure. For cost reasons, Caltrans frequently uses a RAC thickness of approximately half the thickness of regular asphalt concrete and limits the maximum thickness to approximately three inches. These applications are very durable and perform as well as, if not better than, dense graded asphalt concrete. However, RAC can not be used in new construction without a supporting dense graded (un-rubberized) layer below, it is quite temperature sensitive during placement and causes some difficulty in placement if temperatures can not be obtained.

Caltrans uses RAC frequently for its performance, but they are also mandated to use up to 30 percent. An OGFC has proven to be very durable and performs well in reducing splash and spray, increasing friction and reducing skidding accidents. In addition, Caltrans is partnering with the FHWA in quiet pavement research so more resources will be focused on determining just how rubber content may impact tire/pavement and traffic noise levels. In general, open-graded asphalt concretes (both rubber and non-rubber) tend to be the quietest pavements.

Also, California is home to the Rubberized Asphalt Concrete Technology Center (RACTC) which promotes the use of crumb rubber from scrap tires in roadway rehabilitation projects through education, training and consultation services to local agencies within California.[206]

Major Markets: Three cement kilns currently use tires as supplemental fuel and there is an industrial boiler in the state. Several ground rubber producers market ground rubber for

[204] Caltrans, Materials Engineering and Testing Services, Office of Flexible Pavement Materials, "Use of Scrap Tire Rubber, State of the Technology and Best Practices," February 8, 2005 http://www.dot.ca.gov/hq/esc/Translab/fpmlab/T021_3a%20Use%20of%20Scrap%20Tire%20(02-08-05)%20CAL310.pdf (August 16, 2006).
[205] E-mail from Phil Stolarski, Materials Engineering and Testing Services, Caltrans (December 20, 2006, 11:44 p.m. EDT).
[206] California Integrated Waste Management Board, "Tire Management" http://www.ciwmb.ca.gov/tires/ (September 11, 2006).

product manufacturing and RA. There is substantial use of RA based on the CalTrans specifications. Also, there are a number of civil engineering uses, including rubber-modified concrete, lightweight fill, playgrounds, and traffic control equipment.

Colorado

Rubber-Modified Asphalt:[207] Colorado's Department of Transportation (CDOT) is studying and testing the effectiveness of RA. CDOT determined that the cost of rubber materials and placement was more than four dollars a square yard per inch of thickness, in turn, making asphalt rubber 50 percent more than the cost of regular Superpave HMA. Also, placement temperatures must be 65 degrees and above. Since traffic congestion requires most construction in urban areas, such as Denver and Colorado Springs, to be conducted at night, this temperature requirement makes night paving in Colorado virtually impossible. Additionally, CDOT warns that asphalt rubber has not been proven to ensure a safe riding surface for Colorado's extreme winters and variable temperatures resulting in numerous freeze-thaw cycles.

Major Markets: One cement kiln currently uses TDF as a supplemental fuel. A ground rubber producer markets patented soil amendment products and several brokers supply ground rubber for use in roadway crack sealant products. Also, there are uses such as alternate daily cover for landfills, soil reclamation projects and baled tires for construction material and ranches. In addition, approval is anticipated for the use of shredded tires in septic systems.

Connecticut

Rubber-Modified Asphalt:[208] The Connecticut Department of Transportation, with the FHWA, has expended considerable research and funds in recent years on RA. However, results have not provided a sound reason to use it, especially since their tires-to-energy facility already does a more than adequate job of controlling annual scrap tires generated within the state. Currently, rubber is only being utilized for some specialized applications, such as polymerized chip seal on low volume roads. In August 2005, a Quiet Pavement Task Force was created and is considering evidence in Arizona that an OGFC containing rubber can reduce noise.

Major Markets: Connecticut is the site of the largest dedicated tires-to-energy facility in the United States, Exeter Energy in Sterling, which takes tires from throughout the northeast. The state also makes some use of retreaded tires for its fleets.

Delaware

Rubber-Modified Asphalt:[209] Delaware's Department of Transportation includes a section in its Specifications for Road and Bridge Construction Manual on material for resealing joints

[207] Colorado Department of Transportation, "Highway Traffic Noise: Effect of Pavement Types" http://www.dot.state.co.us/environmental/CulturalResources/Noise/PavementBrochureFinal.pdf (June 20, 2006).
[208] Donald Larson, Connecticut Department of Transportation, "Historical Perspective on Use of Rubber and Recycled Rubber in Asphalt Pavements," Webcast, March 29, 2005 http://www.ct.gov/dot/cwp/view.asp?a=1617&Q=273484 (June 20, 2006).
[209] Delaware Department of Transportation, "Specifications for Road and Bridge Construction, August 2001" http://www.deldot.gov/static/pubs_forms/manuals/standard_specifications/toc.shtml (June 21, 2006).

and cracks. This material is specified to consist of a blend of asphalt cement and two percent (by weight of mixture) recycled crumb rubber. There are also bids being accepted for a RA paving project.

Major Markets: One facility produces ground rubber and landscape material and another facility is producing civil engineering material.

Florida

Rubber-Modified Asphalt:[210] Interlayer, friction course and crack sealants used in roadway construction and maintenance consume about 810,000 tires annually. Florida was the only state that specified RMA for friction course pavement on all state-maintained roads, but polymers have begun to displace crumb rubber in some instances. However, FDOT has initiated a detailed research program that could reverse this decline and increase crumb rubber usage through substitution of polymer/crumb rubber blends. If successful, the blends may actually increase total crumb usage by broadening applicability to structural courses as well as the friction course.

FDOT primarily uses three types of RMA.[211] One is a five percent blend (by weight of asphalt cement) of 40 or 80 mesh ground tire rubber with a PG 67-22 asphalt binder (wet process). This binder is used for a dense-graded HMA friction course. The benefit of this type is that the rubber stiffens the binder and makes the pavement more rut resistant. Secondly, a 12 percent blend of 40 or 80 mesh ground tire rubber with a PG 67-22 asphalt binder is used for open-graded HMA friction courses. The benefit of this type is that the rubber stiffens the binder, allowing more binder to the mix to improve durability, while at the same time minimizing construction-related drain-down. Finally, a 20 percent blend of 20, 40 or 80 mesh ground tire rubber with a PG 64-22 asphalt binder is used for an asphalt rubber membrane interlayer which is used to prevent reflective cracks.

FDOT places approximately 1,000,000 tons of HMA containing rubber each year which is about 25 percent of all of the HMA placed. These mixes get better performance, at a reasonable cost, while consuming waste tires which is beneficial to Florida's environment.

Major Markets: Ground rubber producers in the state sell playground and sports surfaces, soil amendments and mulch and molded rubber products. The Florida Department of Transportation (FDOT) specifies RMA in high speed state roads. Also, crumb rubber from 15,000 tons of tires is used annually for various state projects. TDF is utilized in power plants, cement kilns, waste to energy plants and some out-of-state energy users. Tire chips for drainage at landfills and septic tank drainfield applications are some additional uses.

[210] Florida Department of Environmental Protection, Division of Waste Management, Bureau of Solid & Hazardous Waste, "Waste Tires in Florida, State of the State," March 15, 2006 http://www.dep.state.fl.us/waste/quick_topics/publications/shw/tires/SOSfinal2006.pdf (August 7, 2006).

[211] E-mail from James A. Musselman, P.E., State Bituminous Engineer, Florida Department of Transportation (November 21, 2006, 5:20 p.m. EDT).

Georgia

Rubber-Modified Asphalt:[212] In 1991, the Georgia Department of Transportation (GDOT) began evaluating the production and placement of crumb rubber HMA using the wet process. A test section south of Atlanta indicated that the crumb rubber mixture became very brittle over time and compared with the control mix, did not reduce rutting, and was more than twice as expensive to place.

In addition, several rubberized joint and crack seal mixes are outlined in GDOT's standard specifications for pavements. GDOT has successfully used a hot-pour crack sealer product containing crumb rubber, Section 407: Asphalt-Rubber Joint and Crack Seal, for many years.[213] With new technology and new products in RA, GDOT is currently researching into a way to improve the quality of RA including, but not limited to, durability, mix workability and rut resistance.

Major Markets: One cement kiln uses TDF as a supplemental fuel. Three processors produce ground rubber and tire chips are allowed and being used as back fill for septic system leach fields.

Hawaii

Rubber-Modified Asphalt:[214] There was a recommendation, as part of a recent Hawaii Energy Policy Project, for counties to specify RA for road paving to help reduce oil demand.

Major Markets: A local power plant currently uses TDF as a supplemental fuel and permitted tire processors transport tire shreds out-of-state for use as crumb rubber. Also, tires are either baled and shipped for processing or cut locally and landfilled.

Idaho

Rubber-Modified Asphalt:[215] During an Idaho Improvement Task Force meeting, of the Idaho Transportation Department, there was a recommendation to use the RA that Phoenix is using on sections of their interstate highway to reduce sound. They also noted that that the reduction in sound is tremendous.

Major Markets: No information available.

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[212] D. R. Brown, D. Jared, C. Jones and D. Watson, Transportation Research Board Abstract: "Georgia's Experience with Crumb Rubber in Hot-mix Asphalt" http://pubsindex.trb.org/document/view/ default.asp?lbid=577400 (July 18, 2006).

[213] E-mail from Peter Wu, P.E., The Office of Materials & Research, Georgia Department of Transportation (November 22, 2006, 9:00 a.m. EDT).

[214] University of Hawaii at Manoa, Hawaii Energy Policy Forum, "Opportunities for Improving Access to Energy Efficiency" http://www.hawaiienergypolicy.hawaii.edu/summit/efficiency3pg.pdf (July 19, 2006).

[215] Idaho Transportation Department, "Idaho 16 Improvement Study/Comments," July 28, 2003 http://itd.idaho.gov/Projects/d3/P023170/docs/4th%20task%20force%20meeting%20summary_v2.doc (July 21, 2006).

Illinois

Rubber-Modified Asphalt:[216] Since 1991, the Illinois Department of Transportation (IDOT) has completed eleven crumb rubber paving projects throughout the state. The methods used included both the wet and dry process with various quantities of crumb rubber added. IDOT found that the mixes with the CRM averaged 30 percent higher in cost than a conventional mix, with a particular wet process mix being 101 percent higher. They found the wet process to be more resilient to reflective cracking than the dry process. However, none of the CRM mixes dramatically outperformed the control sections. In order for CRM to be economically viable, IDOT believes CRM needs to be mass-produced locally. However, due to modest performance results, it is not practical for local industry to make the high initial investment.

Major Markets: There is one major electric generating facility which uses TDF as supplemental fuel while four industrial facilities and two cement kilns also use TDF. Ground rubber is being produced and the state uses scrap rubber in civil engineering applications.

Indiana

Rubber-Modified Asphalt:[217] The Indiana Department of Environmental Management listed tire grant demonstration projects approved in fiscal year 2005. They include research on design and construction at Purdue University for a road base utilizing processed tire materials to reduce freeze and thaw damage. Another grant was for evaluating a newly developed polymer and tire rubber modified asphalt pavement on road overlay projects.

Major Markets: Two cement kilns and one electric generating facility have tested TDF as a supplemental fuel. The largest ground rubber producer in the United States is located in Indiana.

Iowa

Rubber-Modified Asphalt:[218] The Iowa Department of Natural Resources Environmental Protection Commission recently approved an application from a private company for financial assistance to purchase a scrap tire granulating system. The granulated material should be sold to synthetic turf, injection molding, pressure molding and rubberized asphalt industries within the state.

Major Markets: One cement kiln currently uses TDF as a supplemental fuel while the state of Iowa uses scrap rubber for certain civil engineering applications.

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[216] Tessa H. Volle, Illinois Department of Transportation, "Performance of Rubberized Asphalt Pavements in Illinois," December 2000 http://www.dot.state.il.us/materials/research/pdf/136.pdf (July 21, 2006).

[217] Indiana Department of Environmental Management, "FY 2005 Waste Tire Management Program Report," March 2006 http://www.in.gov/idem/catalog/documents/oppta/wastetire_report2005.pdf (July 25, 2006).

[218] Iowa Department of Natural Resources Environmental Protection Commission, "Contract - Solid Waste Alternatives Program – Recommendations" July 2005 http://www.iowadnr.gov/epc/05sep/5.pdf (August 7, 2006).

Kansas

Rubber-Modified Asphalt:[219] During the early 1990s, the Kansas Department of Transportation constructed eight rubber hot bituminous mix projects throughout the state's highway system. Half were constructed using the dry process and half using the wet. Initial results showed that rubber did inhibit the development of cracks in the higher-density mixes while the gap-graded mixes show the greatest potential in reducing the amount of cracking

Major Markets: One cement kiln uses whole tires as supplemental fuel. Also, there is a ground rubber producer operating in state, but most of the tires in western Kansas go to monofills.

Kentucky

Rubber-Modified Asphalt:[220] Kentucky's Environmental and Public Protection Cabinet has a waste tire grant program to develop local markets for waste tires by supporting projects that recycle tires. Road asphalt applications are accepted because crumb rubber has been shown to improve wet weather traction and visibility, as well as reduce road noise.

Major Markets: One power plant currently uses TDF while one cement kiln has tested TDF as a supplemental fuel.

Louisiana

Rubber-Modified Asphalt:[221] The state has recently tested the use of recycled rubber in asphalt pavement using a powdered rubber modifier (PRM). Control and PRM sections were constructed at the Louisiana Pavement Research Facility and tested with accelerated loading. The results showed the use of PRM increased the cost of the binder only 10 percent while increasing its structural coefficient 12.5 percent.

Major Markets: Two pulp mills have conducted tests of TDF and tire processors receive rebates of 85 cents per 20 pounds of shredded tires if material is used as raw material, product or fuel.

Maine

Rubber-Modified Asphalt:[222] Since 1975, the state has tested several types of RA blends. Most projects had no significant difference in performance between the test and control sections while the cost for the RA blends could be as high as three times more than the conventional

[219] G. A. Fager, Transportation Research Board Abstract: "Use of Rubber in Asphalt Pavements: Kansas Experience" http://pubsindex.trb.org/document/view/default.asp?lbid=413791 (July 26, 2006).
[220] Environmental and Public Protection Cabinet, "Cabinet announces grants to recycle used tires," July 8, 2004 http://www.kentucky.gov/Newsroom/environment/7-8crumbrubber.htm (July 27, 2006).
[221] Louisiana Transportation Research Center, "Comparative Performance of Rubber Modified Hot Mix Asphalt Under ALF Loading," July 2004 http://www.ltrc.lsu.edu/pdf/techsumm374.pdf (August 7, 2006).
[222] Mary Sikora, Today's Tire Industry, "Making Better Roads," March/April 2005 http://www.tireindustry.org/features/better_roads.asp (August 7, 2006).

asphalt mix. However, the state has routinely used rubberized crack sealants as part of its road maintenance program, including overlays, chip seals, stress absorbing interlayers and crack sealants.

Major Markets: Three pulp and paper mills use TDF as a supplemental fuel while the University of Maine and the Maine Department of Transportation are actively using shredded tires in state projects.

Maryland

Rubber-Modified Asphalt: In 2004, Maryland planned to conduct a project to install a RA product on a county owned parking lot, in lieu of traditional materials.[223] The project was intended to be a physical demonstration of how to work with and install RA for public agencies and contractors. The state hopes the sample will show increased flexibility/durability and decreased slumping, reflective cracking, and noise.

Presently, the Maryland State Highway Administration (SHA) is not using rubber in HMA.[224] Previous attempts to use RA required major and expensive HMA plant modifications so industry did not consider it cost effective. Maryland SHA remains open to the use of rubber in HMA as long as mix quality is not compromised. Also, impact of the rubber on the quality of the liquid asphalt properties is still being studied.

Major Markets: Three cement kilns and one cogeneration facility use tires as a supplemental fuel. Also, tires are used in artificial reef construction and some shredded tires are used as playground cover. One TDF processor supplies some out of state facilities.

Massachusetts

Rubber-Modified Asphalt:[225] The Massachusetts Highway Department reports the use of a rubberized asphalt sealer and a rubberized SAMI. Combined, these projects account for a rubber content of about 40 to 50 tons annually.

Major Markets: There is one processor which manufactures commercial fishing and other industrial equipment from scrap tires.

Michigan

Rubber-Modified Asphalt:[226] Michigan is credited with one of the more influential studies which tested RA for hazardous fuel emissions. In 1993, the Michigan Department of

[223] Maryland Department of the Environment, "Scrap Tire Projects," August 27, 2004 http://www.mde.state.md.us/assets/document/recycling/scraptire/Scrap_Tire_Projects_8_05.pdf (August 8, 2006).
[224] E-mail from Gregory W. Moore, Division Chief, Asphalt Technology Division, Office of Materials Technology, Maryland State Highway Administration (December 4, 2006, 2:22 p.m. EDT).
[225] Massachusetts Highway Department, "Recycling & Pollution Prevention Report, Calendar Year 2000" http://www.mhd.state.ma.us//downloads/recycle/publications/2001report.htm (August 8, 2006).
[226] Douglas D. Carlson and Han Zhu, Ph.D., International Rubber Forum, Veracruz, Mexico, "Asphalt-Rubber, An Anchor to Crumb Rubber Markets," October 7, 1999 http://www.p2pays.org/ref/26/25145.pdf (August 10, 2006).

Natural Resources compared a control mix containing 100 percent virgin aggregates and asphalt cement to a mix containing virgin aggregates and RA binder manufactured using the wet process. While all the results were in accepted ranges, the conventional mix materials actually had higher emissions in certain categories than those with rubber.

Major Markets: Currently a power company, cement kiln, and three industrial boilers are using TDF. There is a manufacturer which produces fence posts and mail box posts. Also, two ground rubber producers are active while the auto industry is testing parts containing ground rubber.

Minnesota

Rubber-Modified Asphalt:[227] Minnesota has tested several RA mixes over the years in order to find ways to improve the cold temperature performance of their asphalt concrete pavements. While some results were considered interesting, the formulations used provided little or no perceived benefits to the roadway at much higher costs. The only primary benefit appeared to be waste tire utilization.

Major Markets: Most of Minnesota's scrap tires are processed into TDF. Tires have also been used in civil engineering applications and as light weight fill material.

Mississippi

Rubber-Modified Asphalt:[228] Several public entities were awarded money to stimulate additional waste tire end use development in the state, including RA road construction. Currently, one of the in-state end users accepting a substantial amount of processed waste tire material is PolyVulc, Inc. of Vicksburg, Mississippi. They accept crumb rubber for the production of certain rubberized products, including asphalt.

Major Markets: A large ground rubber producer and two pulp and paper mills are located in the state.

Missouri

Rubber-Modified Asphalt:[229] The Missouri Department of Transportation (MoDot) has done some pilot projects regarding RMA in the past. However, due to changes that have been made in RA since the original projects, MoDOT is revising their specifications. RA is now allowed to be part of the bids for construction of roads in Missouri without having to be

[227] Curtis M. Turgeon, Minnesota Department of Transportation, Office of Materials and Research, "An Evaluation of Dense Graded Asphalt-Rubber Concrete in Minnesota" http://mnroad.dot.state.mn.us/research/MnROAD_Project/MnRoadReports/MnRoadOnlineReports/92-01.pdf (August 9, 2006).

[228] Mississippi Department of Environmental Quality, Solid Waste Mgmt. Branch, "State of Mississippi, Issue Paper to Support the Draft Recommendation for Achieving Statewide Recycling of Waste Tires" http://deq.state.ms.us/MDEQ.nsf/pdf/SW_IssuePaperRecyleWasteTire/$File/IssuePaperRecycleWasteTire.pdf?OpenElement (August 9, 2006).

[229] Missouri Solid Waste Advisory Board, Meeting Summary: "Solid Waste District Planners Meeting," March 1, 2006 http://www.dnr.mo.gov/env/swmp/swab/swab0306.htm (August 10, 2006).

approved on a case by case basis. Also, there are plans for a RA forum with major contractors being invited to discuss this issue.

Major Markets: Several companies are currently testing or using TDF. Also, the state Department of Transportation is testing the use of processed tires as fill material.

Montana

Rubber-Modified Asphalt:[230] The Montana Department of Transportation has experimented with RA surfaces using both the wet and dry process. Facilities that produce the material are distant from Montana and that has contributed to a higher cost. Montana continues to follow developments in RA to determine whether the benefits of using the material in pavements will eventually exceed the extra cost.

Major Markets: Tires are currently being accepted at landfills for varying fees.

Nebraska

Rubber-Modified Asphalt:[231] The Nebraska Department of Roads receives grants from the Nebraska Department of Environmental Quality (NDEQ) for their work with RA. Nearly 90,000 tires were recycled for RA projects over a three year period. Projects ranged from a three-inch, gap-graded, crumb rubber modified asphalt (CRMA) overlay to crumb rubber in a spray application used for chip seal. The CRMA projects will be evaluated over time and compared to conventional strategy performance expectations. Also, a life-cycle cost analysis will be performed in order to make cost comparisons between the various applications.

Nebraska has used Crumb Rubber Modified Binder (CRMB) in asphalt for interstates, low volume roads, with gap graded mixes, and also on an OGFC mix.[232] The wet process was utilized in all of these applications and the performance from all of them has been very good. The gap graded mixes are very rut resistant and the oldest project, which has been in place for five years, has thus far exceeded expectations.

Nebraska does not use CRMA as often as they would like because of cost and contractor availability. Asphalt made with CRMB has a higher up front cost than regular asphalt and only one contractor has invested in a reactor for the wet process. Grant funds from the NDEQ have been used to offset the costs of all the CRMB projects.

Major Markets: Tires are currently ground, baled and stored, and being used as TDF. Also, the Nebraska Department of Transportation is using some RMA.

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[230] Montana Legislative Environmental Policy Office, "Status of and Alternatives for the Management of Waste Tires in Montana," October 1998 http://leg.mt.gov/content/publications/lepo/98tire.pdf (August 11, 2006).
[231] Nebraska Department of Roads, "2003 Report" http://www.dor.state.ne.us/docs/ar2003.pdf (August 14, 2006).
[232] E-mail from Moe Jamshidi, Materials and Research Engineer, Nebraska Department of Roads (November 22, 2006, 2:17 p.m. EDT).

Nevada

Rubber-Modified Asphalt:[233] The Nevada Department of Transportation (NDOT) constructed several CRMA projects during the 1990s and measured their characteristics after a few years. The performance of these projects showed mixed results with some of the common problems including poor temperature susceptibility, poor moisture sensitivity and poor permanent deformation resistance.

Major Markets: There are presently no active scrap tire markets in Nevada and all tires are being landfilled.

New Hampshire

Rubber-Modified Asphalt:[234] The New Hampshire Department of Transportation has used recycled tire rubber in HMA concrete and stress absorbing interlayers, but is not doing so currently.

Major Markets: The majority of the scrap tires are taken to other New England states for use or disposal.

New Jersey

Rubber-Modified Asphalt:[235] The New Jersey Department of Transportation (NJDOT) placed several RA projects from 1984 through 1994. The projects included both the wet and dry process, ranged in rubber by weight of 2 to 18 percent, and were used with gap, dense, and OGFC. Many performed at least as well as the control mixes on the projects, but the initial costs for the rubber modified mixes were quite high, often more than double the control mix. Without a commensurate improvement in performance, the higher cost could not be justified.

The OGFC mixes showed the most promise as they performed better than the unmodified OGFC mixes. However, the usage of OGFC is limited due to its potential problems, such as clogging and winter maintenance.[236] A 12.5mm Superpave mix is used on many roadways in New Jersey and is most commonly found as the surface course. Therefore, crumb rubber was tested in a 12.5mm Superpave mix to maximize potential usage. The results from the mixture design portion concluded that the maximum particle size should not be greater than a #30 mesh, in order to provide consistent compactibility. The performance tests concluded that the mix performed well and had excellent rut resistance while also providing excellent low temperature cracking resistance. Based on these results, a cost analysis has been planned as the next step.

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[233] Nevada Department of Transportation, "Characterization of CRM Binders and Mixtures Used in Nevada" http://www.wrsc.unr.edu/characteristicsOfCRMBinders&MixturesUsedinNevada.pdf (August 14, 2006).

[234] Caltrans, "Use of Scrap Tire Rubber, State of the Technology and Best Practices."

[235] E-mail from Eileen Sheehy, Manager, Bureau of Materials, New Jersey Department of Transportation (November 22, 2006, 1:49 p.m. EDT).

[236] Rutgers University, Center for Advanced Infrastructure and Transportation (CAIT), Rutgers Asphalt/Pavement Laboratory (RAPL), "Evaluation of Crumb Rubber in Hot Mix Asphalt," July 2004 http://cait.rutgers.edu/finalreports/BAYRU9247.pdf#search=%22asphalt%20rubber%20modified%20njdot%22 (August 17, 2006).

Major Markets: Scrap tires are being used as artificial reefs and the NJDOT is considering the use in civil engineering applications. Also, ground rubber is produced in the state, but many tires are being sent to Pennsylvania.

New Mexico

Rubber-Modified Asphalt:[237] Two experimental projects were performed in New Mexico regarding RA in the mid 1980s. One project performed well in cold weather conditions, but the structural strength failed and was deemed unsuccessful in hot weather. The second project showed early excessive cracking in the overlay within the first year of its construction. The average unit price for these projects were $47.70 a ton for RA, compared to conventional at $36. The result is about a 33% higher cost for asphalt materials containing rubber.

New Mexico plans to keep up with this issue of RA, examining work in other states on hot applied chips seals, micro surfacing, gradation, open graded course mixes and dense graded HMA.

Major Markets: Most scrap tires are still taken to landfills. There is one scrap tire processor operating with grants from the Tire Recycling Fund. Eleven regional tire recycling centers collect and bale scrap tires for fencing, barrier walls, building foundations, flow control, erosion control, dams, ramp foundations, landscaping and underpinning for golf courses.

New York

Rubber-Modified Asphalt:[238] In New York, two experimental hot mix overlay projects using granulated rubber in the dry process were installed during 1989 and were compared to a conventional top course paving mixture. The overlays were 37.5 mm (1-1/2 in) thick and placed over existing Portland cement concrete pavements with one, two, or three percent granulated rubber aggregate. After three years, the New York State Department of Transportation did not consider the results economical or successful.

Also in 1994, New York used the wet process on a few projects where the fine crumb rubber was added to the liquid asphalt as a modifier and had better success, but found this process costly.[239] Currently, a performance grade binder modified with a chemically extracted tire rubber is being considered in two or three pilot projects.

Major Markets: Processed tires are used in civil engineering applications, as a supplemental fuel, and NuCorp Steel is using tires as a charge material.

[237] New Mexico State Transportation Commission, "Minutes of the regular meeting of the New Mexico State Transportation Commission," January 20, 2005 http://nmshtd.state.nm.us/upload/images/Transportation_Commission/January%2020%202005%20Reg%20-%20Santa%20Fe.pdf (August 21, 2006).
[238] FHWA, "User Guidelines for Waste and Byproduct Material in Pavement Construction."
[239] Caltrans, "Use of Scrap Tire Rubber, State of the Technology and Best Practices."

North Carolina

Rubber-Modified Asphalt:[240] In the past, North Carolina has explored the design and performance of two types of rubberized pavements: ground rubber mixed with an asphalt binder at elevated temperatures (wet process) and rubber mixed with a gap-graded aggregate before the addition of asphalt cement (dry process). The wet process mixtures contained 11 percent ground tire rubber by weight of the binder while the dry process mixtures incorporated 2 percent ground tire rubber by weight of the aggregate.

Both mixtures were tested with respect to resilient modulus, creep and fatigue to obtain input parameters for a computerized performance prediction model which estimated that the new rubberized pavement systems would have shorter service lives compared to a new conventional pavement system. However, tests did show when the wet process mixture was used to overlay a distressed conventional system, it performed as well as an equal thickness of a conventional overlay.

Major Markets: The North Carolina Department of Transportation has used over 2,000,000 scrap tires in a variety of civil engineering applications. Also, there are tire recycling companies, monofills and TDF being utilized throughout the state.

North Dakota

Rubber-Modified Asphalt:[241] North Dakota does not currently use crumb rubber in HMA.

Major Markets: The majority of the state's scrap tires are landfilled. However, some are processed and sent to coal-fired utilities in South Dakota for TDF or used for engineering purposes, such as landfill drainage layers.

Ohio

Rubber-Modified Asphalt:[242] Ohio tested several RMA projects in the early 1990s. Five wet and two dry processes were examined with a resilient modulus test, fatigue cracking test, low-temperature thermal cracking resistance test, water sensitivity test, creep test and Georgia Wheel test. While the RMA projects particularly the wet process tested better than some of the unmodified asphalt concrete mixes, they were found less economical in terms of the equivalent uniform annual cost.

Major Markets: Several facilities are either testing, considering, or already permitted to burn TDF. Also, some solid waste landfills are planning to use tire chips as the drainage layer for their leachate collection system.

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[240] G. A. Malpass and N. P. Khosla, Transportation Research Board Abstract: "Use of Ground Tire Rubber in Asphalt Concrete Pavements -- A Design and Performance Evaluation" http://pubsindex.trb.org/document/view/default.asp?lbid=453141 (August 25, 2006).

[241] Caltrans, "Use of Scrap Tire Rubber, State of the Technology and Best Practices."

[242] Ohio Research Institute for Transportation & the Environment, "Material Properties for Implementation of Mechanistic-Empirical (M-E) Pavement Design Procedures," February 2004 http://www.dot.state.oh.us/research/2004/Pavements/14767-FR.pdf (August 28, 2006).

Oklahoma

Rubber-Modified Asphalt:[243] The Oklahoma Department of Transportation used crumb rubber in a HMA pavement in 1995. CRM was blown into a drum mixer along with an asphalt cement binder which kept the rubber particles fluffy as they mixed with the asphalt binder and aggregate at 315°F. The CRM mix had a 30 percent higher cost than the standard mix and major and intermediate bleeding was observed when the project was inspected five months after construction.

Major Markets: Municipal landfills use waste tire chips as drainage layers while residential septic systems installers use waste chips in absorption. Also, there are currently three cement kilns using tires as a TDF.

Oregon

Rubber-Modified Asphalt:[244] Between 1985 and 1994 the Oregon Department of Transportation constructed 17 sections (13 paving projects) which incorporated ground tire rubber into HMA concrete. The sections that performed the worst were those constructed with tire rubber using the dry process. The open graded mixes constructed using the wet process performed well, but had a 12 percent higher cost than the control sections.

Major Markets: Ground rubber is being used by two companies and there is some use of TDF in cement kilns, but many tires are landfilled.

Rhode Island

Rubber-Modified Asphalt:[245] The Rhode Island Department of Transportation (RIDOT) uses a relatively inexpensive RA liquid to seal open joints and cracks. It has been very successful in preventing water from penetrating into the pavement subsurfaces.

The Department uses the following three types of pavement seals.[246] First, a Crack Seal of modified asphalt binder containing a crumb rubber content of not less than five percent by weight of neat asphalt cement. In this seal, the maximum size of the crumb rubber is 80 mesh. Next, a rubberized asphalt chip seal of granulated rubber which is vulcanized rubber obtained from the ambient temperature processing of scrap pneumatic tires. The size of the granulated rubber in this seal is about 16 mesh, maximum. Finally, a paver placed elastomeric surface treatment of modified asphalt binder containing a crumb rubber content of not less than seven percent by weight of asphalt cement. This is placed as a one-inch thick gap-graded hot mix with a five percent rubber-modified asphalt cement to greatly improve flexibility resulting in a more

[243] Auburn University, A Publication of the National Center for Asphalt Technology, "Asphalt Technology News," Fall 1995 http://www.eng.auburn.edu/center/ncat/newsl/newsfall_95.pdf (August 30, 2006).
[244] Oregon Department of Transportation, "Crumb Rubber Modified Asphalt Concrete in Oregon," March 2002 http://www.oregon.gov/ODOT/TD/TP_RES/docs/Reports/CrumbRubbModAsph_Final.pdf (September 12, 2006).
[245] Rhode Island Department of Transportation, "Progress Report," 2004-2005 http://www.dot.state.ri.us/news/annreprts/2005annualrpt.pdf (September 12, 2006).
[246] E-mail from Frank Corrao III, P.E., Deputy Chief Engineer, Transportation Development, Rhode Island Department of Transportation (December 19, 2006, 12:37 p.m. EDT).

crack resistant pavement. This is a wet process asphalt mix and has a maximum size crumb rubber of 80 mesh.

Major Markets: Most scrap tires are transported to either the Exeter Energy facility in Connecticut or to one of the pulp and paper mills in Maine.

South Carolina

Rubber-Modified Asphalt:[247] The state is home to the Asphalt Rubber Technology Service, which is a partnership between South Carolina's Department of Health and Environmental Control, Clemson University and the City of Clemson. Their primary purpose is to promote, design, and test the use of recycled scrap tires in RA and other civil infrastructure applications. Ongoing research includes a performance grading guideline for different types, sizes, and amounts of crumb rubber used to modify asphalt binders.

The South Carolina Department of Transportation has only been dealing with RA on a limited basis.[248] Particularly, a 40 mesh rubber, wet process with ten percent by weight of binder for Surface and 20 percent by weight of binder for surface course and Stress Absorbing Membrane Interlayer. So far, the few projects that have been done show the test sections are holding up just as well as the control sections. Typically, resistance is due to cost and uncertainty by contractors as to what may happen within the HMA plants.

Major Markets: Scrap tires are being used as TDF. Also, civil engineering applications are allowed for things such as septic fields.

South Dakota

Rubber-Modified Asphalt:[249] South Dakota's Department of Transportation has a materials manual for the purpose of standardizing their procedures, materials, and workmanship incorporated in state construction projects. One section pertains to the compatibility of hot poured RA sealer with asphalt concrete.

Major Markets: Two power plants are using TDF.

[247] Clemson University, "Asphalt Rubber Technology Service" http://www.ces.clemson.edu/arts/index.html (September 12, 2006).
[248] E-mail from Chad W. Hawkins, P.E., Asphalt Materials Engineer, South Carolina Department of Transportation (November 22, 2006, 11:04 a.m. EDT).
[249] South Dakota Department of Transportation, "Materials & Surfacing" http://www.sddot.com/pe/materials/materials_manual_300.asp (September 12, 2006).

Tennessee

Rubber-Modified Asphalt:[250] The Tennessee Department of Transportation placed three projects utilizing crumb rubber in 1993 and two more projects in 1998. The 1998 projects were a gap-graded CRM binder mix and a CRM OGFC. The mixes consisted of approximately 20 percent crumb rubber by weight and equaled over 80,000 tires. Later studies revealed that reflective cracking was present and evidence of possible future reflective cracking was noticeable after a rainfall. The CRM asphalts averaged 1.5 to 2.1 times the cost of some of the traditional mixes.

Major Markets: Some companies use TDF while others use scrap tires for both the British Thermal Unit (BTU) value and the scrap steel. There is a chip processing facility near Nashville and there are even some limited applications for use in landfill construction, septic systems, and modified asphalt projects.

Texas

Rubber-Modified Asphalt:[251] In 2006, the Texas Department of Transportation's (TxDOT) roadway contracts stipulated over 15,000 tons of rubber be used in various paving and roadway products. These items included chip seal, crack sealer, asphalt pavement, rubber products and tire bales. TxDOT specified about 4,200 tons of rubber in HMA pavements, which is about 32 percent more than 2005. The mixes ranged from five to 15 percent rubber to increase pavement life.

In addition, TxDOT recently expanded their specifications for CRMA to include two relatively new HMA applications, Permeable Friction Course (PFC) and SMA.

Besides simply consuming waste tires, TxDOT uses tire rubber primarily for performance reasons and to provide additional safety or sound reduction compared to other types of pavement.[252] Rubber makes the asphalt stickier so it holds the aggregate better and its elasticity helps seal the surface or subsurface layer better to resist moisture penetration, resist cracking, the saving long term maintenance and replacement costs and helps a PFC overlay stick to its underlying layer. This is particularly important if laid on a hydraulic concrete pavement.

Major Markets: Tires are utilized by cement kilns, some civil engineering projects, and some are still being landfilled.

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[250] Tennessee Department of Transportation, Division of Materials and Tests, "Evaluation of Rubberized Hot Mix Asphalt for Use on Tennessee Roadways, Interim Report" http://www.tdot.state.tn.us/Chief_Engineer/assistant_engineer_operations/materials/reseval/EvalRubberizedHotMixAsphalt.pdf (September 13, 2006).

[251] Texas Department of Transportation, "Using Scrap Tire and Crumb Rubber," January 2006 ftp://ftp.dot.state.tx.us/pub/txdot-info/gsd/pdf/tirerpt7.pdf (September 14, 2006).

[252] E-mail from W. Woody Raine, P.E., Recycling Manager, Texas Department of Transportation (November 29, 2006, 11:35 a.m. EDT).

Utah

Rubber-Modified Asphalt:[253] The Utah Department of Transportation considered the use of RA but found several limitations. Construction temperatures were required to be in the range of 70 to 100 degrees Fahrenheit for proper construction which would limit the paving season in Utah to late spring and early fall. Also, there were not enough asphalt rubber dense graded or asphalt rubber friction course layers placed in comparable freeze thaw settings that could be reviewed. Finally, the benefits gained by adding rubber did not support the expected costs.

Major Markets: Two cement companies use TDF.

Vermont

Rubber-Modified Asphalt:[254] Two state highway projects were placed using asphalt rubber hot mix (ARHM) between 1991 and 1995. Approximately 17,800 scrap tires were used in a wet process application in one project and a terminal blend was placed on a section of road in the second project. The Vermont Department of Roads official's reported that the ARHM performance was comparable to the standard mix. However, the cost of ARHM was higher than the standard mix in both cases.

In 2005, an asphalt rubber chip seal using 10 percent crumb rubber was placed on a local road in Manchester, Vermont. The initial results were positive and plans were already underway to resurface an additional section with a 20 percent rubber binder chip seal the following summer.

Major Markets: Tire chips are used in septic systems, road subbases and as slope stabilization. However, about half of the State's scrap tires are used as TDF in Maine.

Virginia

Rubber-Modified Asphalt:[255] Four test sections using ARHM were placed in Virginia during the early 1990s. Crumb rubber was incorporated into several types of conventional mixes, including dense-graded and gap-graded surface mixes. The asphalt rubber mixes performed as well as the conventional mixes over the short term, but the asphalt rubber mixes cost 64 to 102 percent more.

Major Markets: Several facilities are considering or already using TDF. Scrap tires are being used as daily landfill cover, in landfill construction applications and in septic drainage fields.

[253] Utah Department of Transportation, "Technical Bulletin MT-03.06," October 21, 2003, (September 14, 2006).
[254] Mary Sikora, "Making Better Roads."
[255] G. W. Maupin, Transportation Research Board Abstract: "Hot Mix Asphalt Rubber Applications in Virginia" http://pubsindex.trb.org/document/view/default.asp?lbid=467981 (September 14, 2006).

Washington

Rubber-Modified Asphalt:[256] The Washington State Department of Transportation experimented with several types of RA projects dating back to 1977. Projects involving the wet process performed much better than any involving the dry process. However, even the successful projects did not justify the added expense of construction.

In 2002, it was reported that there was virtually no RA pavement market in Washington, but the potential use of crumb rubber in pavement was very large and undeveloped.[257] It was estimated that if this market were to be developed, it could support a more robust and competitive tire recycling industry. Furthermore, the use of scrap tire rubber in a three-inch layer of new RMA concrete could consume about 10,000 tires in a mile of two-lane road.

Recently, trial mixes of some rubberized OGFC have been placed.[258] It is too soon for results, but the initial noise reduction, the durability of the noise reduction and the performance of the pavement will all be tested.

Major Markets: There is one active cement kiln, but most tires are being transported to Oregon to be landfilled.

West Virginia

Rubber-Modified Asphalt: West Virginia does not utilize RA.[259] However, the West Virginia Environmental Council reported that the barriers to RA are political and institutional, not technical.[260] Therefore, the use of recycled tires in the construction and maintenance of roads and highways should be considered.

In 1993, waste tire rubber in HMA was used on one project.[261] It consisted of the dry process with two percent rubber by weight and a #16-screen nominal maximum size. There were no real problems with mix production or placement, but the strong rubber fumes caused complaints from both plant and field crews. The rubber was added to a patching-and-leveling mix and was overlaid with a standard surface course so the direct evaluation of the mix is impossible. However, the performance of the overall pavement was considered typical when compared to normal HMA. In addition to environmental and air quality concerns, high cost was also an issue in using waste tires in hot-mix asphalt.

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[256] FHWA, "User Guidelines for Waste and Byproduct Material in Pavement Construction."
[257] Washington State Department of Ecology, "SHB 2308 Scrap Tire Report," December 2002 http://www.ecy.wa.gov/ pubs/0207029.pdf (September 15, 2006).
[258] E-mail from Thomas E. Baker, State Materials Engineer, Washington State Department of Transportation (December 8, 2006, 3:07 p.m. EDT).
[259] Caltrans, "Use of Scrap Tire Rubber, State of the Technology and Best Practices."
[260] West Virginia Environmental Council, "Tire Burning Fact Sheet," Dec. 13, 1998 http://www.wvecouncil.org/ issues/tires.html (September 15, 2006).
[261] E-mail from Larry Barker, Asphalt Section Leader, West Virginia Division of Highways (December 8, 2006, 3:06 p.m. EDT).

Major Markets: Some facilities have applied for a permit or are considering the use of TDF.

Wisconsin

Rubber-Modified Asphalt:[262] The Wisconsin Department of Transportation initiated two separate research studies in the early 1990s. The first was to evaluate the effectiveness of a RA binder mix used as an overlay and/or a stress absorbing interlayer. The crumb rubber did not enhance or impede the overall performance of the pavement compared to the control section. The second project tested the recyclability of reclaimed asphaltic pavement (RAP) containing tire rubber. The RAP mix containing tire rubber was successfully recycled and posed no threat to the health of the workers or to the environment. However, because performances were similar to standard HMA pavements with higher costs, the CRM HMA pavements were not proven to be cost-effective.

Major Markets: Several facilities are currently using TDF.

Wyoming

Rubber-Modified Asphalt:[263] The state is home to the Western Research Institute (WRI) which studies performance and develops practical tests to help ensure that roads are built with materials that will perform reliably over time. Their work included performance properties of crumb RMA that were found to be highly dependent on asphalt composition. Actual road tests are imperative to prove the utility of new predictive WRI laboratory test methods and Wyoming roads are used to represent the cold–dry and hot–wet climates.

Major Markets: The State Department of Transportation used scrap tires in a past civil engineering application but currently tires are being landfilled.

[262] Wisconsin Department of Transportation, Division of Transportation Infrastructure Development, "Tire Rubber in Hot Mix Asphalt Pavements," May 2004 http://www.dot.state.wi.us/library/research/docs/finalreports/tau-finalreports/tirerubber.pdf (September 15, 2006).

[263] Western Research Institute, "Asphalt Research Experience" http://www.westernresearch.org/content/technology_areas/asphalt_materials/experience.shtml (September 15, 2006).

CONCLUSION

In the past, tires presented environmental, safety and public health problems for the Commonwealth, but thanks in part to the leadership of a handful of legislators and government officials, coupled with the talent and foresight of industry leaders, that problem has been turned into an opportunity. No longer are the tires going on piles or to commercial establishments able to stockpile or "dump" tires without fear of enforcement: used tires are contributing to the economy of the state and being converted into products for use in the average home. Tires are producing positives and, just like any other recyclable in the state, benefiting the environment in the process. State Government can and should have a stake in this, both in using recyclable products and in promoting market stability. Since state monies have been meager of late, the industry has shown it can survive, so incentives for specific tire uses are not the answer. Regulating tires as a recyclable and establishing a consistent means of funding for the remaining tire pile clean-up and market support are the keys to continued success and growth of the tire industry. These key components will affect the elimination of any future environmental problems associated with this commodity.

Evidence of the continued importance of tires as a valuable commodity for recycling and reuse is seen in the invariably evolving nature of the business. New uses and technologies are constantly being explored, major investments are being pursued and the sector is growing and increasing the demand for whole tires and feedstock. The General Assembly also is aware of the tire issue and legislation has been introduced to deal with every aspect of tire recycling and reuse in each session since 1995. Keeping this issue on the radar screen of the legislative leaders will also be important for the continued growth and success of the industry.

In addition to the aforementioned amendments to Act 190 and other tire related laws, bills continue to be introduced to deal with different aspects of this issue. The major legislative push came in 1995, with the introduction of House Bill 1929 that became Act 190. Some proposals simply asked for an investigation of the waste tire issue,[264] others amended Act 101 of 1988 to deal with tire haulers and processors.[265] One piece of legislation went farther than Act 190, asking for registration of generators, transporters and processors and implemented a manifest system.[266] Another proposal required PennDOT to undertake a RMA demonstration project but, like the others listed above, it did not pass the General Assembly.[267]

The content of recent legislation has varied wildly. One bill sought to prohibit tire recycling facilities in certain areas,[268] while others dealt with funding. One bill added a one

[264] House Bill 1338, Session of 1999, Printer's Number 1557; House Bill 574, Session of 1997, Printer's Number 639; House Bill 616, Session of 1995, Printer's Number 682.
[265] House Bill 1351, Session of 1995, Printer's Number 1567.
[266] Senate Bill 1117, Session of 1995, Printer's Number 1299; House Bill 969, Session of 1999, Printer's Number 2709; House Bill 2578, Session of 1998, Printer's Number 3532.
[267] Senate Bill 406, Session of 1995, Printer's Number 421.
[268] Senate Bill 33, Session of 2003, Printer's Number 25.

dollar surcharge on the purchase of new tires to directly benefit tire programs.[269] Another bill increased the tire fee to two dollars but kept the money going to the Public Transportation Assistance Fund,[270] and one simply required the tire fee be listed as a separate line item on the purchaser's bill.[271] It is clear to see that this topic is not far from the minds of many in the legislature, both House and Senate.

Many companies that use or process waste tires have pursued expanding their operations in Pennsylvania while others are looking to move into the state. Global Resources Corporation is planning to invest $70 million in a tire recycling facility in Fairless Hills, near Philadelphia. The company made its announcement in early May 2007 and immediately began the permitting process with DEP, which will involve air quality permits and a residual waste/beneficial use processing permit. In addition to the monetary investment, the facility will employ 250 people and process 36,000 pounds, or 1,800 tires per hour. When fully operational, the plant will "break down each tire into 7.5 pounds of carbon black,…2 pounds of steel, 1.2 gallons of diesel, and 50 cubic feet of natural gas." While DEP generally supports alternate energy projects, they still need to issue the necessary permits. The Rubber Manufacturers Association was more skeptical of the success of the project, stating it has "very serious doubts about whether this type of technology can be economically viable." [272] Only time and the market will tell, but it is clear that the industry is moving forward with new technologies and uses for waste tires.

In March 2007, Erie Renewable LLC announced its planned tire-to-energy plant on the former International Paper property. The proposed $94 million facility, the first of its kind in the state, recently filed for air-quality permits to operate. Once the permits are issued building will commence, currently scheduled to begin in 2008 and open in 2009. When fully operational, the plant will employ 60 people and use 800 tons of tires a day, approximately 80,000 tires, to provide 50,000 homes with electricity. Using fluidized bed technology, they will convert tire chips into gas to create steam and drive steam engines to generate electricity. The company is currently in negotiations to sell the to be generated energy to Penelec/First Energy Corporation. It is also in discussions with Waste Management to provide them with tires. According to the company, the tires would be stored under a roof. DEP reserved comment on the project, since at the time it had not received the permit applications, but again was generally supportive of alternate energy facilities that turn an "environmental challenge into an economic opportunity."[273]

In addition to these two companies, another player in the electricity generation industry is interested in using tires in their operations. Cogentrix's Northampton Power Plant is pursuing the use of TDF as an alternate fuel at its coal fired cogeneration power plant, which uses a circulating fluidized bed boiler. The plant already utilizes culm, or waste coal, but the BTU output of tires (15,000 BTUs) is greater than that for coal (12,500 BTUs) and culm (4,000 BTUs). Test burns have already been done at 30 percent replacement and have performed well,

[269] House Bill 1338, Session of 1999, Printer's Number 1557; House Bill 574, Session of 1997, Printer's Number 639; House Bill 616, Session of 1995, Printer's Number 682.
[270] Senate Bill 47, Session of 2005, Printer's Number 40.
[271] House Bill 2319, Session of 2000, Printer's Number 3076.
[272] Jonathan Berr, *Philadelphia Inquirer*, "Tire-recycling plant in the works," May 14, 2007, http://www.philly.com/inquirer/business/20070514_Tire-recycling_plant_in_the_works.html (May 14, 2007).
[273] George Miller, *The Erie Times-News*, "Plant for IP site?" March 9, 2007, page 1A.

as has the beneficial use of the ash. The current air quality control systems should properly filter the emissions with the same effectiveness as coal. The in-place coal feeding system can be used to deliver tires which come pre-shredded, in two to three inch chips. While few modifications have to be made to the plant, tire supply issues remain problematic, not just for Northampton but most TDF users. In addition to needing a consistent supply of tires, they will also have to absorb the added costs of purchasing tire shreds. Most plants are located near their supply of raw materials and Northampton was built in 1995 to utilize waste coal in the area. The success of this or other plants is not guaranteed, but it is encouraging that companies like Cogentrix are willing to take the lead, make the investment and shoulder the risk to help the environment and tap a potential source of alternate energy.[274]

TDF is already the most widespread use of waste tires, including whole and shredded tires, and the cement industry is one of the largest users. Tires supplement coal in the production process, which reduces nitrogen oxide emissions and adds iron, a necessary element, to the mixture. Pennsylvania has three cement plants permitted to burn tires in their kilns: Lafarge Cement in Whitehall; Lehigh Cement in Evansville; and Essroc Cement in Bessemer. Most of the plants currently burn at 20 to 25 percent replacement and consume one to two million tires annually. They have reduced their costs and improved performance by using tires but often struggle to overcome negative environmental and health perceptions about burning TDF and fight to get a consistent supply of tires. All parties are interested in expanding their use of tires and alternate fuel in general.[275]

Further research will also help to develop this industry and lead it to the future. Recently, Professor Yuefeng Xie, in the Environmental Engineering Department at Penn State Harrisburg, developed a use for crumb rubber as a method for filtering wastewater. While this technology is not intended for use as drinking water, the possibility of cleaning wastewater to be used for flushing toilets and irrigation is a real possibility.[276] All of these projects reflect the growing tire market and bright future the industry and commodity have in the Commonwealth.

During the course of writing this report, Joint State Government Commission staff met with various tire industry groups, businesses, and research entities as well as various state officials including individuals from DEP and PennDOT. The vast majority of these stakeholders gave the staff recommendations/policy options that they believed would improve Pennsylvania's used tire/tire recycling industry. The following list is a selection of some of those recommendations/policy options that staff believed are the most feasible. That being said, the recommendations/policy options listed below have not been circulated to all stakeholders for comments, so further research may be necessary before implementing any of these recommendations/policy options.

[274] Meeting with Office of Energy and Technology Deployment, April 9, 2007; Meeting with ARIPPA on February 26, 2007; See also http://www.arippa.org, and http://www.cogentrix.com.
[275] Meeting with Vince Martin, Environmental and Public Relations Manager, Lafarge Cement, September 28, 2006; Interview with John Chadbourne, Environmental Engineer, Essroc Cement, December 13, 2006; Meeting with Mark Stillwagon, Director of Purchasing-Lehigh North, Lehigh Cement, September 1, 2006.
[276] Penn State Harrisburg: News Releases, "Faculty Member's Research Results in Patent," October 23, 2006.

RECOMMENDATIONS/POLICY OPTIONS

1. Concentrate on consistent funding of pile clean-up in DEP by adding 25 cents per year per vehicle registration to raise $2.7 million per year and $13.5 million over five-years (sunset). This money should go directly to the Used Tire Pile Restricted Account (currently supported by waste tire hauler $50 permits, which raises only $30,000 to $50,000 per year).

2. Re-fund DCED and DEP grant programs for recycling infrastructure improvements and market development. This money could come from a five-year commitment of $500,000 from the Recycling Fund. This may require an amendment to Act 101 of 1988 to allow grants to industries and not just municipalities.

3. Amend Act 190 of 1996 to require a business plan/tire program plan in DEP like Act 175 of 2002 requires for municipalities.

4. Consider tax credits, up to a certain amount or certain percentage of cost, for using recycled tires when the purchase is made from a Pennsylvania permitted facility.

5. Make all testing and product development eligible to be used for tax credits and grants as seed money to establish higher and better uses.

6. Consider tax credits, or grants, for recycling market's infrastructure capital improvements or equipment purchases.

7. Implement a policy to clean-up tire piles as fast as possible, while avoiding market disruptions, and continue enforcement efforts to keep piles a finite problem.

8. DEP should encourage or require clean-up bidders to get tires to certain end uses, or could give preference to getting those tires to Pennsylvania businesses. Regional clean-up contracts and bidding should also be pursued.

9. DEP should be required to re-bid clean-up contracts and not be allowed to renew them. DEP should also consider giving preferences to Pennsylvania businesses for remediation contracts and should allow off-site tire processing during clean-up.

10. Enact a landfill ban on all annual generation tires, but give exceptions for landfill construction and daily cover that do not count against their daily caps. Require landfills to accept tires and hold them at central collection points. These tires should be made available to registered and licensed tire processors allowed to do business in the Commonwealth of Pennsylvania.

11. Do not concentrate on highest and best uses for tires on piles, but rather focus on landfill use, civil engineering and TDF applications for expedited pile remediation.

12. Encourage municipalities, counties, regions, school districts and businesses to engage in collective or cooperative purchasing of recycled rubber products, similar to Act 101 of 1988. Encourage the use of public-private-partnerships for tire clean-up and help facilitate partnerships between the industry and local organizations or communities to clean-up or accept tires. Amnesty or immunity events could also be used to encourage people to come forward with their own tires.[277]

13. Continue to encourage and support state use of recycled rubber products, but analyze the impact an end user incentive will have on the market. The state should compare the ability of the market to grow with and without end user incentives as well as the ability of stakeholders to compete in the marketplace. End user incentives, however, can create artificial markets and processing incentives can create products without demand.

14. Encourage state agencies to make a reasonable effort to find solutions to problems associated with the use of recycled tire products. However, agencies should not be required to increase their use of recycled rubber products if they are not cost effective or do not meet performance standards.

15. Separation of Starr Pile funding from General Tire clean-up money should be discontinued. DEP should concentrate on tire clean-up as a whole, focused effort.

16. Consolidate all aspects of the scrap tire program under DEP, Bureau of Waste Management and establish a clearing house for tire information or designate a statewide tire coordinator in DEP that handles all tire issues.

17. Encourage tire manufacturers, recyclers and regulators to work together to promote a common goal of enabling 100 percent of tires to be recyclable.

18. Amend Act 190 to regulate tires as a commodity and not as a waste. Change the definition of "waste tire" to mean tires that are not bound for recycling or reuse. Treat tires more like a recyclable and not as a residual waste. Help facilitate a change of the mentalities inside state agencies, and with the general public, to recognize tires not as a waste but a commodity.

19. Concentrate on enforcement to keep piles from growing. Increase fines and penalties for tire dumping and make haulers, retailers and processors equally liable for contributing to illegal piles.

20. Require dollars received for Waste Tire Processing/Beneficial Use of residual waste general permits, which currently benefit the Recycling Fund, to be remitted to the Used Tire Pile Remediation Restricted Account immediately upon receipt.

[277] DEP News Release, "DEP Secretary Helps Wyoming County Volunteers Remove Waste Tires," October 13, 2001; See also DCNR's PA Cleanways Program http://www.pacleanways.org/prevention.html, where both Departments work with students, Boy Scout troops, local business volunteers and environmental and community groups at litter clean-up events.

21. Require all dollars collected in fines and penalties for the improper transport, handling and disposal of waste tires, which currently benefits the Solid Waste Abatement Fund, to be remitted to the Used Tire Pile Remediation Restricted Account immediately upon receipt.

22. Require insurance and clean-up bonds for all haulers, just as processors, before permits are issued. Tighten reigns on shop owners to get tires to reputable haulers.

23. There is often confusion between the one dollar per tire tax and an additional recycling fee that most retailers charge. While patrons have no way of avoiding the state's tire tax, they can often avoid the additional recycling fee by choosing to take their waste tires along home. Many of these tires are discarded or added to illegal piles. Retailers should be required to include any recycling charges in the purchase price and not listed as a separate line item, which would require patrons to pay the recycling fee whether they keep their old tires or not, thereby eliminating the financial incentive to keep their used tires.

24. There is a need for more reliable tire data and a tracking/manifest system that requires retailers, haulers, processors and end users to report their data rather than simply making them available upon request. A unified tracking document should be instituted between all parties to be submitted to DEP. In addition, all dollars spent and tires remediated should be required to be reported to DEP immediately.

25. Require tire recycling information to be included in municipal recycling guides.

26. DEP should work with the industry and trade groups to issue fact sheets on additional tire derived products and reuses to encourage further market utilization.

27. Require DEP to submit an annual tire report to the General Assembly (or the Joint Conservation Committee or Environmental Protection Committee) by February 1, of the previous year's activities. It could provide: existing tire pile data; details of clean-up projects; a list of waste tire and recycled rubber industries in Pennsylvania; a list of all permitted haulers, processors and end users; specific projects where tires have been used or considered for use by DEP and all state agencies; details of the number of grants issued; a markets report; details on PennDOT testing of rubber products including RA; an accounting of all monies available for tire recycling and how it was spent; air quality permits issued and studies requested; a list of tire imports and exports; a compilation of violations and fines collected and what fund they support; and recommendations for change.

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TIRE RELATED DEFINITIONS

Throughout this report many topics are discussed that relate to a wide variety of issues surrounding tire recycling and reuse. Below are a few statutory definitions that may prove helpful to the reader.

"Abatement." The restoration, reclamation, recovery, etc., of a natural resource adversely affected by the activity of a person, permittee or municipality. (Act of Jul. 7, 1980, P.L. 380, No. 97, § 103)

"Beneficial use." Use or reuse of residual waste or residual material derived from residual waste for commercial, industrial or governmental purposes, where the use does not harm or threaten public health, safety, welfare or the environment, or the use or reuse of processed municipal waste for any purpose, where the use does not harm or threaten public health, safety, welfare or the environment. (Def. added July 11, 1989, P.L.331, No.55) (Act of Jul. 7, 1980, P.L. 380, No. 97, § 103)

"Clean-up or remediation." To clean-up, mitigate, correct, abate, minimize, eliminate, control or prevent a release of a regulated substance into the environment in order to protect the present or future public health, safety, welfare or the environment, including preliminary actions to study or assess the release. (Act of May 19, 1995, P.L. 4, No. 2, § 103)

"Commonwealth agency." The Commonwealth and its departments, boards, commissions and agencies, Commonwealth-owned universities and the State Public School Building Authority and any other authority now in existence or hereafter created or organized by the Commonwealth. (Act of Dec. 19, 1996, P.L. 1478, No. 190, § 104)

"Contaminant." A regulated substance released into the environment. (Act of May 19, 1995, P.L. 4, No. 2, § 103)

"Disposal." The deposition, injection, dumping, spilling, leaking or placing of solid waste into or on the land or water in a manner that the solid waste or a constituent of the solid waste enters the environment, is emitted into the air or is discharged to the waters of this Commonwealth. (Act of Jul. 28, 1988, P.L. 556, No. 101, § 103)

"Energy recovery." The use of whole or processed waste tires to supplement the combustion of fossil fuels or the combustion of whole or processed waste tires in a resource recovery facility. (Act of Dec. 19, 1996, P.L. 1478, No. 190, § 104 and Act of Jul. 10, 2002, P.L. 781, No. 111, § 104)

"Landfill." A facility using land for disposing of solid waste. (Act of Dec. 19, 1996, P.L. 1478, No. 190, § 104)

"Manifest system." A written record identifying the quantity, composition, origin, routing, and destination of hazardous waste from the point of generation to the point of disposal, treatment or storage. (Act of Jul. 7, 1980, P.L. 380, No. 97, § 103)

"Municipal recycling program." A source separation and collection program for recycling municipal waste or source-separated recyclable materials, or a program for designated drop-off points or collection centers for recycling municipal waste or source-separated recyclable materials, that is operated by or on behalf of a municipality. The term includes any source separation and collection program for composting yard waste that is operated by or on behalf of a municipality. The term shall not include any program for recycling construction/demolition waste or sludge from sewage treatment plants or water supply treatment plants. (Act of Jul. 28, 1988, P.L. 556, No. 101, § 103)

"Municipal waste." Any garbage, refuse, industrial lunchroom or office waste and other material, including solid, liquid, semisolid or contained gaseous material, resulting from operation of residential, municipal, commercial or institutional establishments and from community activities and any sludge not meeting the definition of residual or hazardous waste in the Solid Waste Management Act from a municipal, commercial or institutional water supply treatment plant, wastewater treatment plant or air pollution control facility. The term does not include source-separated recyclable materials. (Act of Jul. 28, 1988, P.L. 556, No. 101, § 103)

"Municipal waste landfill." Any facility that is designed, operated or maintained for the disposal of municipal waste, whether or not such facility possesses a permit from the Department under the Solid Waste Management Act. The term shall not include any facility that is used exclusively for disposal of construction/demolition waste or sludge from sewage treatment plants or water supply treatment plants. (Act of Jul. 28, 1988, P.L. 556, No. 101, § 103)

"Pollution." Contamination of any air, water, land or other natural resources of this Commonwealth that will create or is likely to create a public nuisance or to render the air, water, land or other natural resources harmful, detrimental or injurious to public health, safety or welfare, or to domestic, municipal, commercial, industrial, agricultural, recreational or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other life. (Act of Jul. 28, 1988, P.L. 556, No. 101, § 103 and Act of Jul. 7, 1980, P.L. 380, No. 97, § 103)

"Post-consumer material." Any product generated by a business or consumer which has served its intended end use and which has been separated or diverted from solid waste for the purposes of collection, recycling and disposition. The term includes industrial by-products that would otherwise go to disposal or processing facilities. The term does not include internally generated scrap that is commonly returned to industrial or manufacturing processes. (Act of Jul. 28, 1988, P.L. 556, No. 101, § 103)

"Priority site." Any site designated by the Department of Environmental Protection to contain more than 10,000 stockpiled tires. (Act of Dec. 19, 1996, P.L. 1478, No. 190, § 104)

"Processing." (1)The term includes any of the following: (i)Any method or technology used for the purpose of reducing the volume or bulk of municipal or residual waste or any method or technology used to convert part or all of such waste materials for off-site reuse. (ii)Transfer facilities, composting facilities, and resource recovery facilities.(2)The term does not include a collection or processing center that is only for source-separated recyclable materials, including clear glass, colored glass, aluminum, steel and bimetallic cans, high-grade office paper, newsprint, corrugated paper and plastics. (Def. amended July 11, 1990, P.L.450, No.109) (Act of Jul. 7, 1980, P.L. 380, No. 97, § 103)

"Recycled content." Goods, supplies, equipment, materials and printing containing post-consumer materials. (Act of Jul. 28, 1988, P.L. 556, No. 101, § 103)

"Recycled tire product." Rubber material derived from waste tires produced at a permitted waste tire recycling facility and intended for beneficial use. (Act of Feb. 14, 2006, P.L. 23, No. 7, § 104 and Act of Dec. 19, 1996, P.L. 1478, No. 190, § 104)

"Recycling." The collection, separation, recovery and sale or reuse of metals, glass, paper, leaf waste, plastics and other materials which would otherwise be disposed or processed as municipal waste or the mechanized separation and treatment of municipal waste (other than through combustion) and creation and recovery of reusable materials other than a fuel for the operation of energy. (Act of Jul. 28, 1988, P.L. 556, No. 101, § 103)

"Recycling facility." A facility employing a technology that is a process that separates or classifies municipal waste and creates or recovers reusable materials that can be sold to or reused by a manufacturer as a substitute for or a supplement to virgin raw materials. The term "recycling facility" shall not mean transfer stations or landfills for solid waste nor composting facilities or resource recovery facilities. (Act of Jul. 28, 1988, P.L. 556, No. 101, § 103)

"Residual waste." Any garbage, refuse, other discarded material or other waste, including solid, liquid, semisolid or contained gaseous materials resulting from industrial, mining and agricultural operations and any sludge from an industrial, mining or agricultural water supply treatment facility, waste water treatment facility or air pollution control facility, provided that it is not hazardous. The term shall not include coal refuse as defined in the act of September 24, 1968 (P.L.1040, No.318), known as the Coal Refuse Disposal Control Act. The term shall not include treatment sludges from coal mine drainage treatment plants, disposal of which is being carried on pursuant to and in compliance with a valid permit issued pursuant to the act of June 22, 1937 (P.L. 1987, No.394), known as The Clean Streams Law. (Act of Jul. 28, 1988, P.L. 556, No. 101, § 103)

"Resource recovery facility." A processing facility that provides for the extraction and utilization of materials or energy from municipal waste that is generated offsite, including, but not limited to, a facility that mechanically extracts materials from municipal waste, a combustion facility that converts the organic fraction of municipal waste to usable energy, and any chemical and biological process that converts municipal waste into a fuel product. The term also includes any facility for the combustion of municipal waste that is generated offsite, whether or not the facility is operated to recover energy. The term does not include: (1) Any composting facility.

(2) Methane gas extraction from a municipal waste landfill. (3) Any separation and collection center, drop-off point or collection center for recycling, or any source separation or collection center for composting leaf waste. (4) Any facility, including all units in the facility, with a total processing capacity of less than 50 tons per day. (Act of Jul. 28, 1988, P.L. 556, No. 101, § 103)

"Responsible person." The term shall have the same meaning as given to it in the act of October 18, 1988 (P.L.756, No.108), known as the Hazardous Sites Cleanup Act, and shall include a person subject to enforcement actions for substances covered by the act of June 22, 1937 (P.L.1987, No.394), known as The Clean Streams Law, the act of January 8, 1960 (1959 P.L.2119, No.787), known as the Air Pollution Control Act, the act of July 7, 1980 (P.L.380, No.97), known as the Solid Waste Management Act, the act of July 13, 1988 (P.L.525, No.93), referred to as the Infectious and Chemotherapeutic Waste Law, and the act of July 6, 1989 (P.L.169, No.32), known as the Storage Tank and Spill Prevention Act. (Act of May 19, 1995, P.L. 4, No. 2, § 103)

"Solid waste." Any waste, including but not limited to, municipal, residual or hazardous wastes, including solid, liquid, semisolid or contained gaseous materials. The term does not include coal ash or drill cuttings. (Def. amended Dec. 12, 1986, P.L.1556, No.168) (Act of Jul. 7, 1980, P.L. 380, No. 97, § 103)

"Storage." The containment of any municipal waste on a temporary basis in such a manner as not to constitute disposal of such waste. It shall be presumed that the containment of any municipal waste in excess of one year constitutes disposal. This presumption can be overcome by clear and convincing evidence to the contrary. (Act of Jul. 28, 1988, P.L. 556, No. 101, § 103)

"Transfer facility." A facility which receives and processes or temporarily stores municipal or residual waste at a location other than the generation site, and which facilitates the transportation or transfer of municipal or residual waste to a processing or disposal facility. The term includes a facility that uses a method or technology to convert part or all of such waste materials for offsite reuse. The term does not include a collection or processing center that is only for source-separated recyclable materials, including clear glass, colored glass, aluminum, steel and bimetallic cans, high-grade office paper, newsprint, corrugated paper and plastics. (Def. added July 11, 1990, P.L.450, No.109) (Act of Jul. 7, 1980, P.L. 380, No. 97, § 103)

"Transportation." The off-site removal of any solid waste at any time after generation. (Act of Jul. 7, 1980, P.L. 380, No. 97, § 103)

"Waste tire." A tire that will no longer be used for the purpose for which it was originally intended. The term includes a tire that has been discarded by any owner or user even though the tire may have some remaining useful life. A tire becomes a waste tire when it is discarded by any owner or user. (Act of Dec. 19, 1996, P.L. 1478, No. 190, § 104 and Act of Feb. 14, 2006, P.L. 23, No. 7, § 104)

"Waste tire hauler." Any person that transports whole used or waste tires in this Commonwealth for business-related purposes. This term does not include persons who haul their own waste tires in the course of routine tire replacement. (Act of Jul. 10, 2002, P.L. 781, No. 111, § 104 and Act of Dec. 19, 1996, P.L. 1478, No. 190, § 104)

"Waste tire recycling facility." A facility whose purpose is the systemic collection, sorting, storage, recapping or cleaning of waste tires to return them to commerce for use as commodities. The term includes a facility that may use waste reduction, reuse or recycling equipment to process or convert waste tires into a beneficial product or productive use. (Act of Feb. 14, 2006, P.L. 23, No. 7, § 104 and Act of Dec. 19, 1996, P.L. 1478, No. 190, § 104)

In addition to the statutory definitions, the following industry definitions regarding tire construction, composition and RA may prove helpful.

Asphalt Wearing Course: Except for Open Graded Courses, "the asphalt wearing course is the final part of the pavement upon which the traffic travels."[278]

Bead: "The [b]ead is a structure [within a tire] composed of high tensile strength steel wire formed into hoops which function as anchors for the plies and hold the tire assembly onto the rim of the wheel."[279]

Belts: "The [b]elts [in tires] are narrow layers of coated tire cord or rubber encased steel cords located directly under the tread in the crown of the tire to resist deformation in the footprint (i.e., the tire's contact patch on the road) to restrict the carcass plies, and to increase the puncture resistance of the tire."[280]

Bias ply tire: "The bias-ply tire is made of layers of rubber-coated plies composed of textile cords, usually nylon, placed upon each other at approximately 30-degree angles. These plies are then wrapped around the bead wires - which anchor the tire to the rim - to form the casing, or air chamber. The plies are then covered with more rubber to form the tread pattern."[281] With the creation of radial tires, bias ply tires are not as widely used today as they were in the past.

Buffing waste: "High quality scrap tire rubber, which is a by-product from the conditioning of tire carcasses in preparation for retreading." [282]

Binder: "The bituminous or modified bituminous material used to hold a mixture of aggregates together as a cohesive mass." [283]

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[278] Roads and Drainage Specification Part 2 – Section 62 Hot Mix Asphalt, August 2006, http://www.surfcoast.vic.gov.au/Infrastructure/Documents/Subdivision_Development_Guidelines/SubDevGlines_Section3_Std_Sections.pdf (August 25, 2007).

[279] Tire Litigation.com, "Tire Terms," http://www.tirelitigation.com/tire_terms.html (June 1, 2007).

[280] Tire Litigation.com, "Tire Terms," http://www.tirelitigation.com/tire_terms.html (June 1, 2007).

[281] Michelin, "FACT SHEET – Radial Tires vs. Bias-Ply Tires," March 25, 1999, http://www.michelingc.com/na_eng/News/85.html (June 1, 2007).

[282] US DOT, FHWA, "State of Practice – Design and Construction of Asphalt Paving Materials with Crumb Rubber Modifier," A-2.

[283] Roads and Drainage Specification Part 2 – Section 62 Hot Mix Asphalt, August 2006 (August 25, 2007).

Crumb rubber: Scrap tire or other rubber that has been reduced into uniform particle sizes, with the steel, fiber and other contaminants removed.[284]

Crumb rubber modifier: "A general term for scrap tire rubber that is reduced in size and is used as a modifier in asphalt paving materials." [285]

Cryogenic: "Process that freezes the scrap tire rubber and crushes the rubber to the desired particle size." [286]

Dry process: "Any method that mixes the crumb rubber modifier with the aggregate before the mixture is charged with asphalt binder. This process only applies to hot mix asphalt production." [287]

Hot Mix Asphalt: "A mixture of coarse and fine aggregates, filler and binder which is mixed, spread and compacted to a uniform layer while hot." [288]

Light truck tire: A light truck tire is similar to a passenger tire except for the following. Light truck tires "are usually designed to operate in more severe conditions, such as carrying greater loads more of the time and going off-road. Light truck tires may have an extra casing ply, an extra belt, a stronger belt steel cord and/or a larger bead with more sidewall rubber. … Some light truck tires are also capable of higher air pressures and load carrying capacities."[289] The average weight of a scrap light truck tire is 30 pounds (roughly 10 pounds greater than the average passenger scrap tire).[290]

Plies: "The [p]lies are layers of fabric cord extending from bead to bead to reinforce the tire."[291]

Passenger tire: The typical passenger tire is made with primarily synthetic and natural rubber, carbon black, and steel. By weight, carbon black is approximately 28 percent of the total tire. Similarly, synthetic rubber is 27 percent, natural rubber is 14 percent, and steel is 14 to 15 percent of the total weight of the tire. The remaining 16 to 17 percent of the tire's weight is made up of fabric, fillers, accelerators, antiozonants and other materials. On average, new tires weigh 25 pounds, while scrap tires weigh about five pounds less or 20 pounds.[292]

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[284] Scrap Tire News Online, http://www.scraptirenews.com/areas/crumb/intro.html (August 27, 2007).
[285] US DOT, FHWA, "State of Practice…," A-2.
[286] US DOT, FHWA, "State of Practice…," A-2.
[287] US DOT, FHWA, "State of Practice…," A-2.
[288] Roads and Drainage Specification Part 2 – Section 62 Hot Mix Asphalt, August 2006 (August 27, 2007).
[289] Imagine Software Development Corp., "How is a tire constructed?" http://www.imaginecorp.com/tire_construction.htm (June 1, 2007).
[290] Entech, "Tire Disposal Facts," http://www.4entech.com/disposalFacts.htm (June 1, 2007).
[291] Tire Litigation.com, "Tire Terms," http://www.tirelitigation.com/tire_terms.html (June 1, 2007).
[292] Rubber Manufacturers Association, "Scrap Tires: Scrap Tire Markets, Typical Materials Composition of a Tire," http://www.rma.org/scrap_tires/scrap_tire_markets/scrap_tire_characteristics/#anchor156842 (June 1, 2007).

Radial ply tire (also known as steel-belted radial tire): "The radial tire is constructed in two parts. First, a single layer of rubber-coated steel cables arch from one bead to the other to form the tire casing. Second, numerous rubber-coated steel belts are placed in the crown, under the tread, to form a strong stabilizing unit."[293]

Rubberized Asphalt: Regular asphalt concrete that incorporates crumb rubber.[294]

Sidewalls: The "[s]idewalls are the portions of the tire between the beads and the tread compounded of rubber with high flex and weather resistance to control the ride and provide support."[295]

Tread: Tire "[t]read is the outermost part of the tire, and is composed of wear resistant compounds consisting of ribs designed for noise suppression and traction and grooves designed for traction, directional control, and cool running. … [T]he tread is located above the steel belts."[296]

Truck tire: The typical truck tire is made with primarily synthetic and natural rubber, carbon black, and steel. By weight, carbon black is approximately 28 percent of the total tire. Similarly, natural rubber is 27 percent, synthetic rubber is 14 percent, and steel is 14 to 15 percent of the total weight of the truck tire. The remaining 16 to 17 percent of the tire's weight is made up of fabric, fillers, accelerators, antiozonants and other materials. On average, new truck tires weigh 120 pounds, while scrap truck tires weigh about 20 pounds less or 100 pounds.[297]

Wet process: "Any method that blends crumb rubber modifier with the asphalt cement prior to incorporating the binder in the asphalt paving project." [298]

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[293] Michelin, "FACT SHEET – Radial Tires vs. Bias-Ply Tires," March 25, 1999. http://www.michelingc.com/na_eng/News/85.html (last viewed June 1, 2007).
[294] Arizona Department of Transportation, http://www.azdot.gov/Highways/EEG/QuietRoads/what_is_rubberized_asphalt.asp (August 27, 2007).
[295] Tire Litigation.com, "Tire Terms," http://www.tirelitigation.com/tire_terms.html (June 1, 2007).
[296] Tire Litigation.com, "Tire Terms," http://www.tirelitigation.com/tire_terms.html (June 1, 2007).
[297] Rubber Manufacturers Association, "Scrap Tires: Scrap Tire Markets, Typical Materials Composition of a Tire," http://www.rma.org/scrap_tires/scrap_tire_markets/scrap_tire_characteristics/#anchor156842 (June 1, 2007).
[298] US DOT, FHWA, "State of Practice…," A-3.

LIST OF ACRONYMS

The following is a list of all acronyms that are used throughout this report. In many cases, the acronyms are used separately from their definition. This listing may prove helpful to the reader.

ADOT – Arizona Department of Transportation

ARHM – Asphalt Rubber Hot Mix

BTU – British Thermal Unit

Caltrans – California Department of Transportation

CDC – (United States') Centers for Disease Control and Prevention

CDOT – Colorado's Department of Transportation

CIWMB – California Integrated Waste Management Board

CRM – Crumb Rubber Modifier

CRMA – Crumb Rubber Modified Asphalt

CRMB – Crumb Rubber Modified Binder

CTAP – (Indiana's) Compliance and Technical Assistance Program

DCED – (Pennsylvania) Department of Community and Economic Development

DCNR – (Pennsylvania) Department of Conservation and Natural Resources

DEP – (Pennsylvania) Department of Environmental Protection

DGS – (Pennsylvania) Department of General Services

DEQ – (Virginia) Department of Environmental Quality

DOC – (Pennsylvania) Department of Corrections

DOE – (Pennsylvania) Department of Education

EPA – (United States) Environmental Protection Agency

FDOT – Florida Department of Transportation

FHWA – Federal Highway Administration

GDOT – Georgia Department of Transportation

HMA – Hot-Mix Asphalt

IDOT – Illinois Department of Transportation

ISRI - Institute for Scrap Recycling Industries

ISTRA – Intemodal Surface Transportation Efficiency Act

MES – Maryland Environmental Service

MoDOT – Missouri Department of Transportation

MOU – Memorandum of Understanding

NCAT – National Center for Asphalt Technology

NDEQ - Nebraska Department of Environmental Quality

OGFC – Open Graded Friction Course

PBLs – Performance Based Loans

PennDOT – The Pennsylvania Department of Transportation

PENNTAP – Pennsylvania Technical Assistance Program

PFC – Permeable Friction Course

PG – Performance Grade

PTE – Passenger Tire Equivalent

PRM – Powdered Rubber Modifier

PROP – Professional Recycles of Pennsylvania

REG - Recycling Environmental Group

RA – Rubberized Asphalt

RAC - Rubberized Asphalt Concrete

RACTC – Rubberized Asphalt Concrete Technology Center

RAP – Reclaimed Asphaltic Pavement

RCC – Resource Conservation Challenge

RMA – Rubber Modified Asphalt

RMC – Recycling Markets Center

SAMI – Stress Absorbing Membrane Interlayer

SHA – (Maryland) State Highway Administration

SMW – Solid Municipal Waste

SMA – Stone Matrix Asphalt

SWAF – Solid Waste Abatement Fund

TDA – Tire-Derived Aggregate

TDF – Tire-Derived Fuel

TDP – Tire-Derived Products

TxDOT – Texas Department of Transportation

US DOT – United States' Department of Transportation

WRI – Western Research Institute

PRINTER'S NO. 2781

THE GENERAL ASSEMBLY OF PENNSYLVANIA

HOUSE RESOLUTION

No. 456 Session of 2005

INTRODUCED BY R. MILLER, ARGALL, ARMSTRONG, BALDWIN, BARRAR, BELFANTI, BOYD, CALTAGIRONE, CAPPELLI, CLYMER, COHEN, CRAHALLA, CREIGHTON, DENLINGER, DERMODY, FABRIZIO, FREEMAN, GEIST, GEORGE, GILLESPIE, GINGRICH, GOOD, GOODMAN, HARRIS, HASAY, HENNESSEY, HERMAN, HERSHEY, HESS, HUTCHINSON, JAMES, MARKOSEK, MARSICO, McGILL, MILLARD, MUSTIO, NAILOR, PALLONE, PAYNE, PHILLIPS, PICKETT, RAPP, READSHAW, REICHLEY, RUBLEY, SATHER, SHANER, SIPTROTH, B. SMITH, SONNEY, STABACK, STERN, R. STEVENSON, SURRA, TIGUE, VITALI, WALKO, WILT AND PETRARCA, OCTOBER 17, 2005

REFERRED TO COMMITTEE ON TRANSPORTATION, OCTOBER 17, 2005

A RESOLUTION

Directing the Joint State Government Commission to conduct a study and report on the use of rubberized asphalt in the other 49 states and to indicate the number of waste tires consumed in the highways and the new markets created for recycled rubber.

WHEREAS, The Commonwealth should promote the recycling of rubber and the recovery of renewable resources for the betterment of the environment and for that of its citizens; and

WHEREAS, The recycling of waste rubber and the creation of a new market for waste tires and the renewable resource industry provides important environmental and economic advantages; and

WHEREAS, The Commonwealth should promote markets for recycled tire rubber and encourage the recycling of waste tire rubber and the renewable resource industry to increase productivity; therefore be it

RESOLVED, That the House of Representatives direct the Joint State Government Commission to undertake a study on the use of rubberized asphalt in the other 49 states and to indicate in the study the cost of its use, the number of tires removed from the waste stream and the new market impact analysis; and be it further

RESOLVED, That the Joint State Government Commission report its findings to the General Assembly and the Governor's office within one year of the adoption of this resolution.

WASTE TIRE RECYCLING ACT/SMALL BUSINESS AND HOUSEHOLD POLLUTION PREVENTION PROGRAM ACT
Act of Dec. 19, 1996, P.L. 1478, No. 190 Cl. 27

AN ACT

Relating to the recycling and reuse of waste tires; providing for the proper disposal of waste tires and the cleanup of stockpiled tires; authorizing investment tax credits for utilizing waste tires; providing remediation grants for the cleanup of tire piles and for pollution prevention programs for small business and households; establishing the Small Business and Household Pollution Prevention Program and management standards for small business hazardous waste; providing for a household hazardous waste program and for grant programs; making appropriations; and making repeals.

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Chapter 3. Miscellaneous Provisions

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Section 302. Effective date.

The General Assembly of the Commonwealth of Pennsylvania hereby enacts as follows:

CHAPTER 1
WASTE TIRE RECYCLING

Section 101. Short title of chapter.

This chapter shall be known and may be cited as the Waste Tire Recycling Act.

Section 102. Legislative findings.

The General Assembly finds and declares as follows:

(1) An estimated 36,000,000 waste tires are stockpiled in Pennsylvania.

(2) Waste tires and stockpiled tires continue to be an environmental threat to this Commonwealth.

(3) Approximately 12,000,000 waste tires are generated in Pennsylvania each year.

(4) Stockpiled tires create environmental hazards such as tire fires and heavy mosquito infestations.

(5) Landfilled whole tires and tire piles use valuable and productive land space.

(6) Financial incentives need to be created to help stimulate waste tire markets.

Section 103. Purpose.

It is the purpose of this act:

(1) To ensure that whole used and waste tires are collected and put to beneficial use or properly disposed.

(2) To provide for the abatement of whole used and waste tire dumps and their associated threats to public health and welfare.

(3) To encourage qualified investments by private companies to rehabilitate, expand or improve manufacturing processes, facilities, buildings and land to promote the use and recycling of waste tires.

(4) To reuse the current supply of waste tires generated each year in this Commonwealth.

Section 104. Definitions.

The following words and phrases when used in this chapter shall have the meanings given to them in this section unless the context clearly indicates otherwise:

"Commonwealth agency." The Commonwealth and its departments, boards, commissions and agencies, Commonwealth-owned universities and the State Public School Building Authority and any other authority now in existence or hereafter created or organized by the Commonwealth.

"Department." The Department of Environmental Protection of the Commonwealth.

"Disposal." The dumping, spilling or placing of whole used or waste tires into or on the land or water in a manner that the tires or a constituent of the tires enters the environment.

"Energy recovery." The use of whole or processed waste tires to supplement the combustion of fossil fuels or the combustion of whole or processed waste tires in a resource recovery facility. (Def. added July 10, 2002, P.L.781, No.111)

"Landfill." A facility using land for disposing of solid waste.

"Person." Any individual, partnership, corporation, association, institution, cooperative enterprise, municipal authority, Federal Government or agency, State institution and agency, including, but not limited to, the Department of General Services and the State Public School Building Authority, or any other legal entity whatsoever which is recognized by law as the subject of rights and duties. In any provisions of this act prescribing a fine, imprisonment or penalty or any combination of the foregoing, the term "person" shall include the officers and directors of any corporation or other legal entity having officers and directors.

"Priority site." Any site designated by the Department of Environmental Protection to contain more than 10,000 stockpiled tires.

"Recycled tire product." Rubber material derived from waste tires produced at a permitted waste tire recycling facility and intended for beneficial use. (Def. added Feb. 14, 2006, P.L.23, No.7)

"Recycling." The systematic collection, sorting, cleaning and returning of waste tires to commerce for use as commodities.

"Waste reduction, reuse or recycling equipment." Machinery, equipment or facility modification designed to process or convert waste tires into a beneficial product or productive use.

"Waste tire." A tire that will no longer be used for the purpose for which it was originally intended. The term includes a tire that has been discarded by any owner or user even though the tire may have some remaining useful life. A tire becomes a waste tire when it is discarded by any owner or user. (Def. amended Feb. 14, 2006, P.L.23, No.7)

"Waste tire hauler." Any person that transports whole used or waste tires in this Commonwealth for business-related purposes. This term does not include persons who haul their own waste tires in the course of routine tire replacement. (Def. added July 10, 2002, P.L.781, No.111)

"Waste tire recycling facility." A facility whose purpose is the systemic collection, sorting, storage, recapping or cleaning of waste tires to return them to commerce for use as commodities. The term includes a facility that may use waste reduction, reuse or recycling equipment to process or convert waste tires into a beneficial product or productive use. (Def. added Feb. 14, 2006, P.L.23, No.7)

Section 105. Powers and duties of department.

The department shall have the power and its duty shall be to:

(1) Administer the whole used or waste tire management program pursuant to the provisions of this act.

(2) Consult with the Department of Revenue concerning matters of tax credit disbursements.

(3) Cooperate with local units of government and appropriate private businesses in carrying out the duties of this act.

(4) Regulate the disposal of waste tires.

Section 106. Disposal of whole waste tires.

(a) Landfill disposal prohibited.--No person shall knowingly

mix any whole used or waste tires with solid waste for disposal in a landfill. Owners or operators of landfills shall not accept whole used or waste tires for disposal. Nothing in this section shall be construed:

(1) to prohibit the disposal at landfills of occasional whole used or waste tires unknowingly and inadvertently mixed with solid waste; or

(2) to preclude the department from such disposal if it determines that such disposal is necessary.

((a) amended July 10, 2002, P.L.781, No.111)

(b) Exceptions.--Landfills may accept whole tires when:

(1) the landfill provides for shredding, chopping or splitting of whole used or waste tires prior to disposal, except that such shredding, chopping or splitting shall not be required when it is not feasible due to the condition of the waste tires;

(2) the landfill uses the whole used or waste tires for alternative uses, which may include onsite uses such as lining of roadways with waste tires, use in landfill construction as liner protection, alternative daily landfill cover, use in a landfill leachate collection system or as otherwise provided for by regulation; or

(3) the landfill makes available the whole used or waste tires to an appropriate facility for reuse, recycling or use as an alternative fuel source.

(c) Written management plan.--Landfills that accept whole used or waste tires shall prepare and implement a written plan that addresses the management of waste tires. The plan shall, at a minimum, consist of the following:

(1) Procedures for notifying transporters of solid waste to the landfill of the existence and purpose of the waste tire management program.

(2) Procedures for distributing information regarding alternative management methods for waste tires or processed tires.

(d) Notice to department.--Landfills that transfer whole used or waste tires to an appropriate facility for reuse, recycling or processing or as an alternative fuel source shall submit an annual report to the department. Notification shall include information regarding the following:

(1) The name and address of the facility owner and operator to which waste tires are transferred.

(2) The name, address and location of the facility.

(3) The type of operation using the whole used or waste tires.

(4) The dates of shipments or transfers.

(5) The number of whole used and waste tires or the volume or weight of processed tires transferred.

(e) Permit.--No person shall construct, alter, operate or utilize a waste tire recycling facility without a processing permit from the department as required by the act of July 7, 1980 (P.L.380, No.97), known as the Solid Waste Management Act, or in violation of the regulations promulgated thereunder that relate to the storage of waste tires. ((e) added Feb. 14, 2006, P.L.23, No.7)

Section 106.1. Authorization program.

(a) Duty of department.--The department shall establish an authorization program for waste tire haulers.

(b) Authorization number to be issued.--The department shall

issue an authorization number for each waste tire hauler.

(c) Renewal required.--Authorization expiration and renewal shall be determined by the department.

(d) Authorization fee.--Each waste tire hauler shall pay an annual authorization fee of $50. All fees received by the department pursuant to this subsection shall be deposited into the Used Tire Pile Remediation Restricted Account established in section 110 and shall be used by the department for the implementation and management of the authorization program. The department shall evaluate and modify the authorization fee in an amount to cover the actual costs of the department in implementing and managing the authorization program. The department shall publish any such modification as a notice in the Pennsylvania Bulletin.

(e) Authorization required.--It shall be unlawful for a waste tire hauler to transport waste tires without obtaining authorization from the department under this section.

(f) Nontransferability.--An authorization for a waste tire hauler shall not be transferable.

(g) Powers and duties of Environmental Quality Board.--The Environmental Quality Board shall have the power and duty to adopt such regulations of the department as it deems necessary and appropriate to accomplish the purposes and to carry out the provisions of this act, including regulations that:

(1) Encourage the processing of waste tires and beneficial use of waste tires and recycled tire products when the department determines that the processing and use does not harm or present a threat of harm to the health, safety or welfare of the people or environment of this Commonwealth.

(2) Allow the department to determine that waste tires, after processing or when beneficially used, no longer constitute a waste.

(3) Encourage the beneficial use of recycled tire products.

((g) amended Feb. 14, 2006, P.L.23, No.7)

Section 106.2. Documentation and recordkeeping.

(a) Duty of waste tire haulers.--Each waste tire hauler shall maintain records of waste tires transported. The record shall be on a form approved by the department.

(b) Nature of records to be maintained.--Recordkeeping requirements shall be determined by the department and shall include at least the following:

(1) The number of waste tires transported.

(2) The waste tire hauler authorization number.

(3) The location where the waste tires were disposed of or transported to.

(c) Records retention.--All records shall be retained by the waste tire hauler for a period of five years. The records shall be made available to the department upon request.

(106.2 added July 10, 2002, P.L.781, No.111)

Section 106.3. Waste tire registry.

(a) Establishment.--The department shall establish and maintain a registry of authorized waste tire haulers in this Commonwealth. The registry shall include the information required for issuance of an authorization under this section and any other relevant information as the department deems necessary and appropriate. The information in the registry shall be a matter of public record and shall be made readily available to the public.

(b) Toll-free number.--The department shall establish and maintain a toll-free number which any person in this Commonwealth may call to request information contained in the registry established under subsection (a). Any person suspecting a violation of this act may also call this toll-free number to report a suspected violation to the department.

(c) Duty to use authorized hauler.--No person may provide whole used or waste tires to a waste tire hauler that does not have a valid authorization as provided under this act. No person may accept whole used or waste tires from a waste tire hauler that does not have a valid authorization as provided under this act. Failure to comply with this provision shall result in a civil penalty assessment as provided under section 108.1. ((c) amended Feb. 14, 2006, P.L.23, No.7)

Section 106.4. Revocation.

The department may suspend, revoke or deny any authorization issued under this act for a specified length of time to be determined by the department for:

(1) Failure to maintain a complete and accurate record of waste tires transported.

(2) Alteration of recordkeeping documents.

(3) Failure to comply with any rule or regulation established by the department under this act or the act of July 7, 1980 (P.L.380, No.97), known as the Solid Waste Management Act.

(106.4 added July 10, 2002, P.L.781, No.111)

Section 107. Priority enforcement list.

(a) Development of list of waste tire sites.--Within 90 days of the effective date of this act, the department shall identify and develop a Statewide list of waste tire sites with more than 10,000 waste tires known or estimated to be stockpiled. The department shall rank the waste tire sites according to their potential for creating environmental health and safety hazards and designate these sites as priority sites to those facilities requesting tax investment credits under section 109.

(b) Maintenance of updated list.--The department shall review and update the priority enforcement list every two years.

(c) Municipal notification.--For the purposes of section 112, the department shall notify in writing the counties and municipalities of the waste tire sites selected to be listed on the priority enforcement list that are located within their borders.

(d) Additional waste tire sites to be listed.--Within one year from the effective date of this subsection, each municipality shall report to the department the existence and location of waste tire sites within its jurisdiction that contain more than 1,500 but less than 10,000 waste tires known or estimated to be stockpiled. Upon receipt of this information, the department shall develop and maintain a Statewide list of waste tire sites containing the amount of waste tires specified in this subsection.

(107 amended July 10, 2002, P.L.781, No.111)

Section 108. Criminal penalties. (Hdg. amended July 10, 2002, P.L.781, No.111)

(a) Penalty for first violation.--For the first violation, a person commits a summary offense and shall, upon conviction, be sentenced to pay a fine of not less than $100 and not more than $1,000 per violation or be subject to imprisonment for not more than 30 days, or both.

(b) Additional penalty for subsequent violations.--For the second and any subsequent violations, a person commits a misdemeanor of the third degree and shall, upon conviction, be sentenced to pay a fine of not less than $1,000 and not more than $5,000 per violation or be subject to imprisonment for not more than 90 days, or both.

Section 108.1. Civil penalties.

(a) Authority to issue.--

(1) In addition to proceeding under any other remedy available at law or in equity for a violation of any provision of this act, any rule or regulation of the department or order of the department or any term or condition of any permit issued by the department, the department may assess a civil penalty upon a person for such violation. Such a penalty may be assessed whether or not the violation was willful or negligent.

(2) In determining the amount of the penalty, the department shall consider the willfulness of the violation, damage to air, water, land or other natural resources of the Commonwealth or their uses, cost of restoration and abatement, savings resulting to the person in consequence of such violation and other relevant factors.

(b) Notice and appeal.--

(1) When the department assesses a civil penalty, it shall inform the person or municipality of the proposed amount of said penalty.

(2) The person charged with the penalty shall then have 30 days to pay the penalty in full or, if the person wishes to contest either the amount of the penalty or the fact of the violation, the person shall within such 30-day period file an appeal of such action with the Environmental Hearing Board.

(3) Failure to appeal within 30 days shall result in a waiver of all legal rights to contest the violation or the amount of the penalty.

(c) Amount.--The maximum civil penalty which may be assessed pursuant to this section is $25,000 per offense. Each violation for each separate day and each violation of any provision of this act, any rule or regulation under this act, any order of the department or any term or condition of a permit shall constitute a separate and distinct offense under this section.

(d) Deposit of penalties collected.--All penalties collected under this section and section 108 shall be deposited into the Used Tire Pile Remediation Restricted Account established in section 110.

(108.1 added July 10, 2002, P.L.781, No.111)

Section 109. Investment tax credits for equipment for reducing, reusing or recycling whole used or waste tires.

(109 repealed July 10, 2002, P.L.781, No.111)

Section 110. Funds.

(a) Establishment of restricted account.--There is hereby established in the General Fund a restricted account to be known as the Used Tire Pile Remediation Restricted Account. This account shall receive up to $1,000,000, transferred upon approval of the Governor, on an annual basis for a period not to exceed five consecutive years from the Recycling Fund created by section 706 of the act of July 28, 1988 (P.L.556, No.101), known as the Municipal Waste Planning, Recycling and Waste Reduction Act.

(b) Appropriation of fund.--Moneys in the account are hereby appropriated upon approval of the Governor to the department for the purposes of this act. No more than 5% of the money in the account may be used for the development and implementation of public education and technical assistance programs concerning the management of used tires.

(c) Transfer of unexpended funds.--((c) repealed July, 10, 2002, P.L.781, No.111)

Section 111. Remediation grants.

(a) Authorization.--The department shall award grants for the remediation of waste tire piles existing on or before the effective date of this act upon receipt of a proposal submitted by a person or municipality.

(b) Priority.--The department will announce the sites for which each proposal may be accepted. The department shall select these sites based on the environmental danger posed by the sites as determined by the department.

(c) Prerequisites.--

(1) Persons or municipalities submitting proposals to the department to remediate sites shall do so on a form provided by the department. The proposal at a minimum shall contain:

(i) A description of the person or municipality experienced in tire pile remediation.

(ii) Markets or uses for the remediated tires.

(iii) Schedule for the remediation of tires.

(iv) Proposed cost of the used tire pile remediation.

(2) Proposals shall include any additional information the department deems necessary. The department shall establish guidelines for awarding grants. These guidelines may be updated by the department as needed.

(3) The department shall establish a grant ceiling for each proposed tire pile to be remediated based on the number of tires contained in the pile and estimated processing costs. Proposals must request an amount that may not exceed the ceiling established by the department. The department will give priority to those proposals indicating the removal of tires for reuse, recycling or energy recovery, in that order. The department shall award a grant for the proposal requesting the fewest funds for any given site unless it determines, in its sole discretion, that a greater potential for environmental degradation would be remediated by a proposal for another site.

(4) Grant recipients shall apply funds received from the department under this section only to those purposes and activities authorized by contract with the department or otherwise approved by the department.

(d) Required grants.--The department shall not award a grant under this section to any person or municipality which has contributed in any manner to the creation of a waste tire pile.

(e) Limitation.--Grants under this section shall not be used for the purchase of equipment.

(f) Lapse of grant.--A grant offering under this chapter shall lapse automatically if funds for the grant are not encumbered within one year of the offering. The department may, in its sole discretion, reoffer the grant, offer the grant for the remediation of that site to another entity which submitted a proposal or announce the solicitation for new proposals for that

site.

(g) Lapse of encumbered funds.--Grant funds that have been encumbered shall lapse automatically to the Used Tire Pile Remediation Restricted Account if the funds are not expended by the grantee within two years after they have been encumbered. The department may, upon written request from the grantee, extend the two-year period for an additional period not to exceed three months.

(h) Availability of funds.--All obligations of the Commonwealth under this section are contingent upon the availability of funds under section 110.

Section 111.1. Remediation liens.

(a) Effect of remediation activity.--The amount of a grant issued under section 111 for remediation that is attributable to or expended on a specific site where the grant recipient conducts remediation activity and the benefits accruing to the land on which the site is located shall be chargeable against the land and shall mitigate or offset any claim in or any action brought by any owner of any interest in the land for any damages by virtue of the remediation activity. This subsection shall not be construed to establish a new right of action or eliminate any existing immunity.

((b) Statement to be filed with prothonotary.--(Deleted by amendment).

(b.1) Escrow.--After the completion of remediation activity by a grant recipient on a site, the department shall itemize the amount of grant moneys expended on remediation of the site and inform any person or municipality that has contributed in any manner to the creation of the waste tire pile or that owns the site of the amount of grant moneys that have been expended. The person or municipality charged with the amount shall then have 30 days to pay the amount in full or, if the person or municipality wishes to contest the amount, its contribution to the waste tire pile or its ownership of the site, either to forward the amount to the department for placement in an escrow account with the State Treasurer or with a bank in this Commonwealth or to post an appeal bond in the amount. The bond must be executed by a surety licensed to do business in this Commonwealth or contain collateral and must be satisfactory to the department. If, through administrative or judicial review of the amount, it is determined that the person or municipality did not contribute to the creation of the waste tire pile or did not own the site or that the amount shall be reduced, the department shall, within 30 days, remit the appropriate amount to the person or municipality. Failure to forward the money or the appeal bond to the department within 30 days shall result in a waiver of all legal rights to contest the contribution of the person or municipality to the creation of the waste tire pile, the ownership of the site or the amount charged against the person or municipality.

((c) Amount of lien.--(Deleted by amendment).

(c.1) Lien.--If the person or municipality liable to pay the amount of grant moneys expended on remediation of a site neglects or refuses to pay the same after demand, the amount, together with interest, shall be a judgment in favor of the Commonwealth upon the property of such person or municipality, but only after the same has been entered and docketed of record by the prothonotary where such property is situated. The Commonwealth may, at any time, transmit to the prothonotaries of

the respective counties certified copies of all such judgments, and it shall be the duty of each prothonotary to enter and docket the same of record in the prothonotary's office, and to index the same as judgments are indexed, without requiring the payment of costs as a condition precedent to the entry thereof. Any lien on real estate shall have priority second only to the lien of real estate taxes imposed on the land.

((d) Rights of landowners.--(Deleted by amendment).

(d.1) Limitation on action.--Notwithstanding any other provision of law to the contrary, actions for the recovery of grant moneys expended under this section may be commenced at any time within a period of 20 years from the date it is discovered that the person or municipality contributed, in any manner, to the creation of the waste tire pile.

((e) Rights of appeal.--(Deleted by amendment).

(e.1) Deposit of amounts collected.--All grant moneys collected under this section shall be deposited into the fund or account from which the grant was issued.

((f) Entry and enforcement of lien.--(Deleted by amendment).

((g) Construction.--(Deleted by amendment).

(111.1 amended Feb. 14, 2006, P.L.23, No.7)

Section 112. Report to General Assembly.

The department shall submit a report to the General Assembly concerning the implementation of this act and the reduction of stockpiled waste tires not later than three years after the implementation of this act.

Section 113. Commonwealth recycling and use of waste tires.

(a) Use of waste tires by Commonwealth agencies.--By July 30, 2004, the Department of Conservation and Natural Resources, the Department of Corrections, the Department of Education, the Department of Environmental Protection, the Department of General Services, the Department of Transportation, the State System of Higher Education and the State-related universities shall, to the maximum extent practicable and feasible, give due consideration to the use of waste tires in all appropriate construction and engineering activities which are paid with public funds.

(b) Reports.--By July 30, 2004, the Department of Environmental Protection shall submit a report to the Environmental Resources and Energy Committee of the Senate and the Environmental Resources and Energy Committee of the House of Representatives concerning the implementation of this section. The report shall include a description of what actions the agencies have taken in the previous two years to implement this section.

(113 amended July 10, 2002, P.L.781, No.111)

Section 114. Waste tire collection programs.

(a) General rule.--An individual, local government, business, corporation or other organization shall operate waste tire collection programs only in accordance with requirements established by the department.

(b) Department approval.--No person, local government, business, corporation or other organization shall establish a program for the collection of whole used or waste tires without approval from the department.

(c) Qualifications.--No individual, local government, business, corporation or other organization may be selected to operate a waste tire collection program unless the ability to properly collect, transport and process waste tires is

demonstrated to the satisfaction of the department.

(d) Program recordkeeping.--Each approved program shall maintain records regarding the collection, transportation and processing of whole used or waste tires. Recordkeeping requirements shall be determined by the department and shall include at least the following:

(1) The number of whole used or waste tires collected.

(2) The number of tires transported.

(3) The waste tire hauler authorization number.

(e) Availability of records.--All records shall be made available to the department upon request.

(114 added July 10, 2002, P.L.781, No.111)

Section 115. Grants for waste tire collection programs.

(a) General rule.--The department may provide grants to individuals, local governments, businesses, corporations or other organizations for reimbursement of eligible costs for waste tire collection programs approved by the department.

(b) Grant disbursement.--The department shall establish a grant ceiling for each proposed collection program based on the number of tires to be collected and the estimated processing costs.

(c) Restrictions.--Grants awarded under this section shall be subject to the following:

(1) Grant recipients shall apply the funds received from the department only to those purposes and activities authorized by the department or otherwise approved by the department.

(2) The department may not award the grants to any individual, local government, business, corporation or other organization that has contributed in any manner to the creation of a waste tire pile.

(3) Any additional restrictions which the Environmental Quality Board, by regulation, may designate so long as the restriction is promulgated in regulation.

(d) Funding limitation.--Commencing with the fiscal year beginning July 1, 2002, and continuing through the fiscal year beginning July 1, 2006, the department may not expend more than $250,000 each fiscal year from the Recycling Fund created by section 706 of the act of July 28, 1988 (P.L.556, No.101), known as the Municipal Waste Planning, Recycling and Waste Reduction Act, for awarding grants under this section.

(115 added July 10, 2002, P.L.781, No.111)

Section 116. Construction.

The definition of "waste tire recycling facility" in section 104 and the provisions of section 106(e) shall be construed in pari materia with the permitting requirements of the act of July 7, 1980 (P.L.380, No.97), known as the Solid Waste Management Act.

(116 added Feb. 14, 2006, P.L.23, No.7)

CHAPTER 2
SMALL BUSINESS AND HOUSEHOLD POLLUTION PREVENTION PROGRAM

Section 201. Short title of chapter.

This chapter shall be known and may be cited as the Small Business and Household Pollution Prevention Program Act.

Section 202. Legislative findings.

The General Assembly finds and declares as follows:

(1) It is the goal of the Commonwealth to achieve a goal

of zero discharge of pollutants into our air, water and land through voluntary pollution prevention measures, recognizing this goal may not be completely achievable by some.

(2) Education, demonstration project and technical assistance programs on pollution prevention are essential to help small- and medium-sized businesses achieve the zero-discharge goal and help the public conserve resources, reduce the volume and toxicity of wastes and recycle or reclaim wastes.

(3) Hazardous and other wastes generated by small businesses and households may present dangers to the public health and the environment if managed improperly. These dangers can be greatly reduced by pollution prevention techniques, including source reduction, energy conservation, waste minimization, reduction in the toxicity of wastes generated, beneficial use, reuse, recycling and reclamation.

(4) Traditional "end-of-pipe" pollution control techniques often result in the transfer of pollutants from one environmental medium to another. Pollution prevention and source reduction techniques reduce pollution forming in the first place and lessen transfers between air, water and land.

Section 203. Definitions.

The following words and phrases when used in this chapter shall have the meanings given to them in this section unless the context clearly indicates otherwise:

"Collection contractor." A person registered and approved by the Department of Environmental Protection and retained by a sponsor to operate a waste collection event for eligible entities under this chapter.

"Collection event." An event or program that includes collection and management of solid wastes from eligible entities under this chapter. The term includes one-day waste collection programs and waste collection programs that are designed for continuous or ongoing operation throughout a designated period of time.

"Department." The Department of Environmental Protection of the Commonwealth and its authorized representatives.

"Eligible entity." A household, political subdivision or a small business.

"Household hazardous waste." A waste which would be chemically or physically classified as a hazardous waste but is excluded from regulation as a hazardous waste pursuant to the regulations of the Department of Environmental Protection because it is generated by a household.

"Household Hazardous Waste Funding Act." The act of December 27, 1994 (P.L.1346, No.155), known as the Household Hazardous Waste Funding Act.

"Pollution prevention assessment." An evaluation designed to identify opportunities to eliminate and reduce pollution or reuse waste materials.

"Program." The Small Business and Household Pollution Prevention Program.

"Small business." A business entity that is defined as a small quantity generator or a conditionally exempt small quantity generator under the regulations of the Department of Environmental Protection.

"Solid Waste Management Act." The act of July 7, 1980 (P.L.380, No.97).

"Sponsor." A municipality, corporation, public utility,

trade association, not-for-profit corporation, not-for-profit association or other person sponsoring a collection event or Small Business and Household Pollution Prevention Program for eligible entities under this chapter.

"Universal waste." Hazardous wastes that are managed as universal waste as defined by the hazardous waste regulations of the Department of Environmental Protection.

Section 204. Small Business and Household Pollution Prevention Program.

(a) Establishment.--The department shall establish the Small Business and Household Pollution Prevention Program for educating and providing assistance to small businesses and the general public in pollution prevention and the proper management of solid and hazardous wastes generated in households and small businesses.

(b) Educational materials.--The department shall develop educational materials for the operation of the program in consultation with small businesses, trade associations, educational institutions and appropriate advisory committees.

(c) Program concerns.--The program shall include education, training and technical assistance concerning:

(1) Source reduction and methods for conducting pollution prevention assessments to eliminate or reduce the volume or toxicity of solid wastes generated.

(2) Natural resource and energy conservation.

(3) Opportunities to reduce environmental contamination from air emissions and water effluents.

(4) Opportunities to beneficially use, reuse, recycle or reclaim solid waste materials.

(5) Opportunities to collect and manage universal wastes received from small business and the general public.

(6) Opportunities to develop and apply environmental improvement technologies and methods.

(7) Information on compliance with applicable environmental protection laws, including compliance with solid waste management requirements.

(d) Technical assistance.--The department shall provide educational materials and technical assistance to sponsors and collection contractors for the operation of the programs and collection events to encourage and promote all aspects of pollution prevention.

(e) Technical assistance for implementation.--The department shall provide technical assistance to sponsors and collection contractors to implement the purposes of this chapter and to facilitate the program and the proper collection, treatment, recycling or disposal of hazardous wastes generated by eligible entities.

(f) Site visit.--At the request of a small business, the department may offer a pollution prevention site visit at the place of business and may provide assistance on compliance with the environmental protection laws administered by the department and guidance issued by the department on pollution prevention.

(g) Appropriations.--Moneys are hereby appropriated upon approval of the Governor to the department for the purposes of administering this chapter from the Recycling Fund created by section 706 of the act of July 28, 1988 (P.L.556, No.101), known as the Municipal Waste Planning, Recycling and Waste Reduction Act, and the Hazardous Sites Cleanup Fund established under section 901 of the act of October 18, 1988 (P.L.756, No.108),

known as the Hazardous Sites Cleanup Act. The combined total of appropriations from these two funds for the program shall not exceed $2,000,000 annually. No more than 3% of the funds appropriated may be expended by the department for the administration of the program.

(h) Private contract authorization.--The department may cooperate with and may contract for services from private and other entities and is authorized to make grants to private, governmental and other entities to implement this section.

(i) Definition.--For purposes of this section, the term "small business" shall mean a business with 100 or fewer employees or a political subdivision.

Section 205. Small business hazardous waste collection program.

(a) General rule.--A sponsor may establish a collection program for the collection and management of solid wastes generated by eligible entities through collection events. Each sponsor must register the program with the department and receive approval of the department prior to commencing operation.

(b) Sites.--Collection events may be conducted on sites selected by the sponsor. Such sites may be on public or private property, including, but not limited to, property owned, leased or controlled by the Commonwealth, its agencies or its political subdivisions. Written permission to use the site for the conduct of the event shall be obtained from the owner prior to the event.

(c) Liability.--An owner who, without charge, permits any property to be used as a site for a collection event shall not be liable for any damage, harm or injury to any person or property which results from the use of the property as a site for a collection event. A sponsor of a collection event shall not be liable for any damage, harm or injury to any person or property which results from the operation of a collection event.

(d) Limitation of type.--The sponsor may limit the types of solid wastes or materials to be collected at a collection event in accordance with guidance issued by the department and further limitations determined at the discretion of the sponsor. A small business entity may bring up to but not more than 1,000 kilograms of hazardous waste to a collection event or collection events in any calendar month for waste recycling, treatment or disposal arranged by the collection contractor.

(e) Fees.--The sponsor may establish and assess reasonable fees from eligible entities for services provided in connection with a collection event.

(f) Registration and approval.--The sponsor may select a collection contractor to operate the collection event or may operate the collection event as the collection contractor. Each sponsor or collection contractor which operates a collection event must first be registered and approved by the department to operate collection events. The department shall issue guidance for registration requirements for the operation of collection events.

(g) Qualifications.--No collection contractor may be selected to operate a collection event unless the contractor can demonstrate to the satisfaction of the department its ability to collect, package, transport and dispose of solid waste collected under this program consistent with the requirements of the Solid Waste Management Act, the environmental protection laws of this Commonwealth, the regulations of the department and guidelines

or regulations under this act.

(h) Ineligibility.--A collection contractor shall not be eligible to operate a collection event if the department finds that such person has shown a lack of ability or a lack of intent to comply with the Solid Waste Management Act or other environmental protection laws of this Commonwealth, other states or the United States.

(i) Generator.--A collection contractor shall be deemed to be the generator of hazardous waste collected at the event which is sent for treatment, storage or disposal at a permitted hazardous waste management facility.

(j) Pollution prevention.--The collection contractor shall practice and encourage pollution prevention and shall recycle or reclaim collected solid wastes to the greatest extent practicable.

(k) Documentation.--In conducting a collection event under this act, the collection contractor shall manage wastes and other materials received at a collection event in compliance with the environmental protection acts of this Commonwealth and the regulations and guidance issued thereunder. The sponsor and the collection contractor shall provide documentation and records of an event as requested by the department.

(l) Optional participation.--This section shall not be interpreted as requiring a small business to participate in a small business hazardous waste collection program or as prohibiting a small business from disposing of its hazardous waste under other applicable provisions established under the act of July 7, 1980 (P.L.380, No.97), known as the Solid Waste Management Act.

Section 206. Household hazardous waste collection program.

(a) Collection events.--A sponsor may establish a collection event for the purpose of collecting and managing solid waste generated by households that pose a risk to the public health, safety or the environment if managed as part of the municipal waste stream. A collection event designed for household hazardous waste shall meet the standards and requirements of section 205. A sponsor may operate a collection event exclusively for household hazardous waste, exclusively for small business waste or for specified wastes from eligible entities.

(b) Hazardous waste.--A collection event that includes collection of household hazardous waste shall provide educational materials that emphasize home safety, fire prevention and pollution prevention in the home, including source reduction through the use of alternative less toxic products, recycling and proper disposal methods for waste materials that cannot be recycled. Waste materials collected from households shall be appropriately reused or recycled to the greatest extent practicable. The department shall issue guidance on proper management of household hazardous waste.

Section 207. Management of small business hazardous waste.

(a) Regulations.--The Environmental Quality Board may promulgate regulations as needed to implement this chapter.

(b) Municipal and residual waste landfills.--The department shall not approve applications for permit modifications for municipal or residual waste landfills that propose to accept and dispose of any hazardous waste.

Section 208. Grants for small business and household pollution prevention programs.

(a) General rule.--The department is authorized to provide

grants to counties under section 901 of the act of July 28, 1988 (P.L.556, No.101), known as the Municipal Waste Planning, Recycling and Waste Reduction Act, to reimburse a county for eligible costs for education programs on pollution prevention or for providing other technical assistance to small business for the purpose of this chapter.

(b) Education programs.--The grant to any county under this section may reimburse the county for up to 80% of the approved cost of education programs on pollution prevention or for providing technical assistance to small business for the purposes of this chapter.

(c) Restrictions.--Grants paid under this subsection shall be subject to the restrictions of the Municipal Waste Planning, Recycling and Waste Reduction Act, including sections 706, 901 and 905 of that act, and the applicable regulations of the department.

(d) Eligible costs.--Eligible costs under this section may include costs incurred by a county by contract with another sponsor or other person selected by the county to operate the program under this chapter. The department shall issue guidance for counties in the operation of the program and for eligibility requirements for grants administered under this subsection.

Section 209. Grants for collection events.

(a) Restricted revenue account.--The department is authorized to administer specifically appropriated funds deposited within the restricted revenue account created under section 4(b) of the Household Hazardous Waste Funding Act within the Recycling Fund established under section 706 of the act of July 28, 1988 (P.L.556, No.101), known as the Municipal Waste Planning, Recycling and Waste Reduction Act. No more than 3% of the funds transferred into the restricted revenue account under section 4(b) of the Household Hazardous Waste Funding Act may be expended by the department for the administration of these programs.

(b) Grant eligibility.--Grants approved under this section may be paid to a registered sponsor of a collection event, including sponsors other than municipalities. The department is authorized to reimburse sponsors for eligible costs incurred after the effective date of this chapter for the operation of collection events for eligible entities under this chapter.

(c) Matching requirement.--The funds administered by the department under this section may be expended by the department only to the extent that the grant amount has been matched, at least dollar for dollar in value, by the grant applicant. Sponsors of a collection event are hereby authorized to receive all or part of the required matching funds from manufacturers or other persons.

(d) Other limitations.--No more than $100,000 per fiscal year may be expended by the department for collection events in any one county.

CHAPTER 3
MISCELLANEOUS PROVISIONS

Section 301. Repeals.

(a) Absolute repeals.--The following acts and parts of acts are repealed:

Section 1512 of the act of July 28, 1988 (P.L.556, No.101), known as the Municipal Waste Planning, Recycling and Waste Reduction Act.

Section 3(e) and 5 of the act of December 27, 1994 (P.L.1346, No.155), known as the Household Hazardous Waste Funding Act.

(b) Inconsistent.--Standards for management of household hazardous waste under the Household Hazardous Waste Funding Act and the regulations of the department under 25 Pa. Code Ch. 272 are repealed insofar as they are inconsistent with the provisions of this act and regulations of the department issued under this act.

Section 302. Effective date.

This act shall take effect immediately.

MANAGEMENT DIRECTIVE

205.28
Number

COMMONWEALTH OF PENNSYLVANIA
GOVERNOR'S OFFICE

Subject:

Purchase of Recycled Content Products by State Agencies

By Direction Of:

Mark S. Singel, Lieutenant Governor

Date:
April 2, 1993

This directive establishes policy and responsibilities for the use of post–consumer recycled content in the procurement of goods and services.

1. **PURPOSE.** To ensure that products containing post–consumer recycled content are purchased by Commonwealth agencies both through direct purchases of goods and indirectly through the purchase of services and construction.

2. **SCOPE.** Applies to all agencies under the Governor's jurisdiction.

3. **OBJECTIVE.** To ensure Commonwealth procurement is directed towards increasing the demand for products containing post–consumer recycled materials.

4. **POLICY.**

a. **Purchase of goods.** For those goods, supplies, equipment, materials, and printing for which the Environmental Protection Agency (EPA) has adopted procurement guidelines under the *Resource Conservation and Recovery Act of 1976 (Public Law 94–580, 42 U.S.C. Section 6901 et seq.),* as amended, the procurement documents shall require that the items meet the minimum percentage levels for total recycled content and post–consumer recycled content as specified in the guidelines or in the Department of General Services' (DGS) specifications, whichever reflects the higher level of post–consumer recycled content. The Department of General Services may also identify other goods, supplies, equipment, materials, and printing for which the procurement documents shall require that the items meet the minimum percentage levels for total recycled content as set forth in DGS specifications.

b. **Purchase of services.** All contracts for services shall include the requirement that any products, which are provided to the Commonwealth as a part of the performance of the contract and for which either the EPA has adopted procurement guidelines under the *Resource Conservation and Recovery Act of 1976 (Public Law 94–580, 42 U.S.C. Section 6901 et seq.),* as amended, or DGS has identified, must meet the minimum percentage levels for total recycled content and post–consumer recycled content as specified in the guidelines or in DGS specifications, whichever reflects the higher level of post–consumer recycled content.

c. **Construction contracts.** All contracts for the construction, alteration or repair of a public work shall include the requirement that any products, which are provided to the Commonwealth as a part of the performance of the contract and for which either the

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EPA has adopted procurement guidelines under the *Resource Conservation and Recovery Act of 1976 (Public Law 94–580, 42 U.S.C. Section 6901 et seq.),* as amended, or DGS has identified, must meet the minimum percentage levels for total recycled content and post–consumer recycled content as specified in the guidelines or in DGS specifications, whichever reflects the higher level of post–consumer recycled content.

d. Leased property. Commonwealth agencies shall require their landlords to include in all their procurement documents for renovations to facilities to be leased to Commonwealth agencies the requirements that any products, which are provided in the renovation of the facility and for which either the EPA has adopted procurement guidelines under the *Resource Conservation and Recovery Act of 1976 (Public Law 94–580, 42 U.S.C. Section 6901 et seq.),* as amended, or DGS has identified, must meet the minimum percentage levels for total recycled content and post–consumer recycled content as specified in the guidelines or in DGS specifications, whichever reflects the higher level of post–consumer recycled content.

e. Waiver. DGS may, in its discretion or at the request of an agency, waive the requirements of this directive with the approval of the Governor's Market Development Task Force for Recycled Materials, if it determines that products with post–consumer recycled content:

(1) invalidate warranties on equipment.

(2) compromise safety of equipment or materials.

(3) compromise the operational capacity of equipment.

(4) significantly decrease the cost effectiveness of equipment or materials.

(5) are inconsistent with established testing and acceptance procedures for materials.

(6) are not readily available in the marketplace.

5. DEFINITIONS.

a. Post–consumer recycled content. That portion of a finished product which was originally a product generated by a business or consumer which has served its intended end use and which has been separated or diverted from solid waste for the purposes of collection, recycling, and disposition. The term includes industrial byproducts that would otherwise go to disposal or processing facilities. The term does not include internally generated scrap that is commonly returned to industrial or manufacturing processes.

b. Procurement documents. Includes invitations to bid, requests for proposals, requests for quotations, and contracts.

6. RESPONSIBILITIES.

a. The Department of General Services shall:

(1) Prepare and distribute to all agencies a list of the products for which either the EPA has adopted procurement guidelines under the *Resource Conservation and Recovery Act of 1976 (Public Law 94–580, 42 U.S.C. Section 6901 et seq.),* as amended, or DGS has identified as an item which should be procured as a product containing post–consumer recycled content.

(2) Prepare and distribute to all agencies a contract clause for agencies to include in procurement documents for goods, supplies, equipment, materials, printing, and construction relating to products containing post-consumer recycled content.

(3) Report annually to the Governor's Market Development Task Force on the department's activity with respect to the listing of recycled content products and the issuance of waivers to agencies.

b. The Office of the Budget shall prepare and distribute to all agencies a contract clause for agencies to include in procurement documents for services relating to products containing post–consumer recycled content.

c. **Commonwealth agencies** shall:

(1) Include the contract clauses distributed by DGS and the Office of the Budget in their applicable procurement documents to require the procurement of products containing post–consumer recycled content.

(2) Review existing procurement procedures and specifications. For products not on the DGS list, if a product is readily available in the market with post–consumer recycled content at a reasonable price, revise the specification and procedure to require the use of such product containing post–consumer recycled content at a percentage level established by the agency. Agencies may also specify percentages of recycled content which are higher than the percentages established by DGS if such products are generally available in the market.

(3) Agencies shall apply to DGS for a written waiver if there is a need for a waiver and obtain that waiver, in writing, in accordance with paragraph 4.e., prior to the award being made to the vendor/ contractor.

GSPUR 95 Revised 08/06/01

BIDDING PREFERENCE FOR PRODUCTS WITH RECYCLED POSTCONSUMER MATERIAL

PLEASE NOTE: Bidders ARE NOT required to complete this form or obtain the following Manufacturer's Recycled Postconsumer Material Certification if they ARE NOT seeking a bidding preference for products or printing with recycled postconsumer material.

A. PREFERENCE

Except as otherwise provided in Paragraph G every bidder who certifies that the goods, supplies, equipment, materials or printing, which the bidder is offering, contains at least 10% of recycled postconsumer material shall be given a five percent (5%) preference against any bidder that has not so certified (or such higher percentage specified in the invitation for bids for the bidding preference for products with recycled postconsumer material) "Postconsumer material" is defined as "Any product generated by a business or consumer which has served its intended end use, and which has been separated or diverted from solid waste for the purpose of collection, recycling, and disposition. The term includes industrial by-products that would otherwise go to disposal or processing facilities. The term does not include internally generated scraps that is commonly returned to industrial or manufacturing processes." This preference for products and printing with recycled postconsumer material shall be in addition to any reciprocal preference for Pennsylvania bidders and manufacturers.

B. BIDDER CERTIFICATION

If the bidder is submitting a bid price on more than one item, and the percentage of recycled postconsumer material differs for each item, the bidder must state the percentage for each item. Bidder certifies that the goods, supplies, equipment, materials or printing which the bidder is offering: (to be completed by the bidder)

Item No._____Contains_____% of recycled postconsumer material.

Item No._____Contains_____% of recycled postconsumer material.

Item No._____Contains_____% of recycled postconsumer material.
(use additional sheets if necessary to complete required information)

If a bidder does not comply with this Subsection (B), he shall not be eligible for the 5% preference.

C. MANUFACTURER'S RECYCLED POSTCONSUMER MATERIAL CERTIFICATION

In addition to the Bidder Certification in Subsection (B), in order to be eligible for the 5% preference a manufacturer's certification must be completed, signed and submitted by each of the manufacturers listed by the bidder in Section III of the Reciprocal Limitations Act Requirements of this Invitation for Bid. Bidders must use the enclosed Manufacturer's Recycled Postconsumer Material Certification form. If this form is not completed, signed and submitted with the bid, no bidding preference shall be given to the bidder.

D. FEDERAL FUNDS

No preference shall be given if the Commonwealth's receipt of federal funds would be jeopardized by granting the preference.

E. TIE BIDS

When there is a tie for lowest responsible bidder, the Department of General Services may consider, as one factor in determining to whom the contract should be awarded, which of the bids provides for the greatest percentage of recycled postconsumer material in the product or printing.

F. ENFORCEMENT

Awarded bidders may be required, after delivery of the goods, supplies, equipment, materials or printing, to provide the Commonwealth with documentary evidence that the goods, supplies, equipment, materials or printing was in fact produced with the certified percentage of recycled postconsumer material. If a bidder is awarded a contract or a purchase order on the basis of the 5% preference and fails to supply the item(s) with the required content of recycled postconsumer material or refuses or fails to provide sufficient documentary evidence that the item(s) was in fact produced with the certified percentage of recycled postconsumer material, the Department reserves the right, at its sole discretion, to:

1) Reduce the purchase price paid to the contractor by 5%.
2) Require the contractor to remove and replace the materials at the contractor`s sole expense.
3) Cancel the contract or the purchase order.
4) Obtain the item(s) from another source.
5) Pursue its other remedies under the contract for damages and costs for breach of contract.

G. STEEL AND ALUMINUM PRODUCTS EXCEPTION

The Commonwealth of Pennsylvania recognizes that both steel and aluminum products are universally made of recycled material, including postconsumer steel and postconsumer aluminum. Therefore, if steel or aluminum is used in the manufacture of the product offered by a bidder in response to this invitation to bid, the bidder is not required to provide certification that the product contains recycled postconsumer material. If a bidder is offering a product with steel or aluminum and the steel or aluminum contains no postconsumer material, the bidder is required to provide written notification in its bid. Bidders offering products containing steel and/or aluminum shall be given a five percent bidding preference over bidders offering: (1) steel or aluminum products that are reported to be made without recycled (postconsumer) content and (2) non-steel or non-aluminum products (such as plastic) which are not certified as containing recycled (postconsumer) content.

MANUFACTURER RECYCLED POSTCONSUMER MATERIAL CERTIFICATION

TO BE COMPLETED BY MANUFACTURER:

NAME OF MANUFACTURING FIRM:_____

ADDRESS OF MANUFACTURING FIRM:_____

FEDERAL EMPLOYER I.D. NO:_____

CONTRACT OR REQUISITION NO:_____

NAME OF BIDDER:_____

ADDRESS OF BIDDER:_____

Goods, supplies, equipment, materials or printing which the manufacturer will furnish to the bidder if the bidder is awarded the above-referenced contract or purchase requisition:

_____

_____

Short description of the nature of the postconsumer material which will be contained in the goods, supplies, equipment, materials or printing:_____

_____

_____

CERTIFICATION: I, the undersigned officer of the above-named firm, do hereby certify that I am authorized to provide this certification on behalf of the above-named firm and that the goods, supplies, equipment, materials or printing listed above which my company will furnish to the bidder named above, if the bidder is awarded the above-referenced contract or purchase requisition, shall contain not less than _____% postconsumer material as that term is defined in the invitation for bid. The nature of the postconsumer material is also identified above. I understand that this document is subject to the provisions of the Unsworn Falsification of Authorities Act (18 P.S. Section 4904).

PLEASE NOTE: Bidders ARE NOT required to complete this form if they ARE NOT seeking a bidding preference for products with recycled post-consumer material.

_____
Signature

_____
Name of Signatory

_____ _____
Title Date

PENNSYLVANIA TIRE-RELATED BUSINESSES

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WASTE TIRE DISPOSAL AND RECYCLING INFORMATION BY STATE

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Arizona	2% of new tire price up to $2.00/ tire[299]	Tire or new car dealer[300]	Waste Tire Fund: Money used for county waste tire programs; tire fire clean-up; and State's Solid Waste Fund[301]	Yes	Yes	Yes, but shredded or chopped tires may be used as daily cover for a solid waste landfill[302]	Yes, counties each have their own clean-up plans with monetary support coming from the Waste Tire Fund[303]	Yes, state provides funds to counties to contract with private waste tire collectors/ processors.

[299] A.R.S. § 44-1302.
[300] Ibid.
[301] A.R.S. § 44-1305.
[302] A.R.S. § 44-1304.
[303] A.R.S. § 44-1305.

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Alabama	$1.00/tire and retreaded casing tire[304]	Tire dealer (point of sale)[305]	Scrap Tire Fund (STF): Money used for remedial action; regulations; programs for alternatives to tire landfill disposal; funding county tire programs; and paying tire retailers.[306]	Yes	Yes	No. Tires are allowed in landfills permitted by the Alabama Department of Environmental Management (ADEM).[307]	Yes, the ADEM shall establish a ranking system for remediation and award clean-up contracts based on rankings.[308]	Yes, the STF supports training for county tire collection and remediation programs and development of other incentive programs.[309]
Alaska	$2.50/ new tire and an extra $5.00/ new studded tire[310]	Tire dealer[311]	Not specified except that the seller may retain 5% of amount collected, not to exceed $900 a quarter, for expenses with collecting and remitting fees.[312]	No	No	No	None found	None found

[304] Ala. Code 1975 § 22-40A-14.
[305] Ala. Code 1975 § 22-40A-14.
[306] Ala. Code 1975 § 22-40A-15.
[307] Ala. Code 1975 § 22-40A-3(a).
[308] Ala. Code 1975 § 22-40A-5.
[309] Ala. Code 1975 § 22-40A-11.
[310] Alaska Stat. § 43.98.025(a) (b).
[311] Alaska Stat. § 43.98.025(d).
[312] Alaska Stat. § 43.98.025(e).

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Arkansas	$2.00/ auto or truck tire and an extra $3.00/ truck tire[313]	Tire dealer[314]	Waste Tire Grant Fund (WTGF) receives 92% of the funds and the Arkansas Department of Environmental Quality (DEQ) Fee Fund receives remaining 8%. The WTGF is administered by the Arkansas DEQ which authorizes grants from the WTGF.[315]	Yes	Yes	Yes, unless shredded or split. As of August 12, 2008, tires cut, shredded or split may be disposed of at a permitted landfill operated as a waste tire monofill. Some whole truck tires may be place in a waste tire monofill without shredding or splitting.[316]	Yes. DEQ has a program to make waste tire grants to regional solid waste management boards, for construction, facility operation, contracting for services, removal of illegal waste tire piles, research, and waste tire collection centers.[317]	Yes. DEQ provides incentives for enabling private waste tire collection centers for public use and establishing educational programs.[318] Also, there is a Recycling Equipment Tax Credit Program allows taxpayers to take an income tax credit for the purchase of recycling equipment.[319]

[313] Ark. Code Ann. § 8-9-404 (1987) (a)(3)(A),(B).
[314] Ark. Code Ann. § 8-9-404 (1987) (a)(2)(A).
[315] Ark. Code Ann. § 8-9-404 (1987) (a)(1), (2); (d)(1).
[316] Ark. Code Ann. § 8-9-403 (1987) (c)(3)(A)-(D).
[317] Ark. Code Ann. § 8-9-405 (1987) (a)(1)-(b).
[318] Ark. Code Ann. § 8-9-405 (1987) (a)(7)-(10).
[319] State of Arkansas Department of Environmental Quality, Market Development Branch, Solid Waste Management Division. The Recycling Equipment Tax Credit Program. Last updated May 19, 2006. http://www.adeq.state.ar.us/solwaste/branch_market_dev/default.asp (last viewed November 14, 2006).

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
California	From Jan 1, 2005 – Dec. 31, 2006: $1.75/ new tire; From Jan. 1, 2007 on: $1.50/ new tire[320]	Tire dealer	California Tire Recycling Management Fund: Money used for various tire clean-up and recycling programs.[321]	Yes	Yes	Yes[322]	Yes, state provides local governments with grant funding to clean-up tires.[323]	Several grants offered by the CA Integrated Waste Management Board[324]

[320] West's Ann. Cal. Pub. Res. Code § 42885 (b).
[321] State Board of Equalization. California Tire Fee. January 2005. http://www.boe.ca.gov/pdf/pub91.pdf (last viewed August 30, 2006).
[322] The Defense Reutilization & Marketing Tire Management Program (TMP). Synopsis State Tire Guidance. September 2005. http://www.drms.dla.mil/TMP/synopsisguide.pdf (last viewed August 30, 2006).
[323] California Integrated Waste Management Board. Tire Grants: Local Government Waste Tire Clean-up and Amnesty Event Grant Program. March 24, 2006. http://www.ciwmb.ca.gov/Tires/Grants/Cleanup/ (last viewed August 30, 2006).
[324] California Integrated Waste Management Board. Tire Recycling, Cleanup, and Enforcement Grants. http://www.ciwmb.ca.gov/Tires/Grants/default.htm (last viewed June 19, 2006).

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Colorado	$1.00/ used tire given to tire retailer[325] until July 1, 2012.[326]	Tire dealer	Waste Tire Recycling Development Cash Fund: Money given to the Depts. of Revenue, Public Health and Environment for administrative costs; to the Dept. of Local Affairs for local governments; and to the advanced technology fund.[327]	Yes. Persons who transport waste tires for storage or disposal are required to: (1) maintain records; (2) register with the Dept. of Public Health and Environment; and (3) post bond set by State Board of Health up to $10,000.[328]	Yes, a certificate of designation for scrap tire disposal facility is required and facilities are regulated.[329]	No	Yes. The state has a Waste Tire Recycling Development Cash Fund (WTRDCF) that allows any state agency to expand tire reuse or recycling incentives.[330]	Yes. The state created the WTRDCF to assist processors and end users. There are annual appropriations to the Dept. of Local Affairs for allocation to local governments to provide incentives in public projects and provide partial reimbursement to processors and end users to encourage the use of waste tires.[331]

[325] Colo. Rev. Stat. § 25-17-202 (2003) (1)(a)(I),(III)(A).
[326] Colo. Rev. Stat. § 25-17-202 (2003).
[327] Colo. Rev. Stat. § 25-17-202 (2003) (3)(a)(I)(II), (3)(a)(I)(A), (II)(A).
[328] Colo. Rev. Stat. § 25-17-204 (2003) (3)(a)(I)(II)(III).
[329] Colorado Dept. of Public Health and Environment, Hazardous Materials and Waste Management Division. 6 CCR 1007-2, Part 1: Regulations Pertaining to Solid Waste Sites and Facilities. Amended by the State Board of Health 11/15/06. http://www.cdphe.state.co.us/regulations/solidwaste/6CCR100702SWRegswith061115amendments.pdf (last viewed December 6, 2006).
[330] Colo. Rev. Stat. § 25-17-204 (2003) (3.5)(a); Colo. Rev. Stat. § 24-32-114 (2003).
[331] Colo. Rev. Stat. § 25-17-202.5 (2003) (1); Colo. Rev. Stat. § 24-32-114 (2003) (1)(a)(c).

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Connecticut	None	NA	NA	No	Yes	Yes[332]	None found	10% price preference for products made with recycled materials.
Delaware	None	NA	NA	No	Yes	No	None found	Tax incentives, low interest loans to business & industry using recycled materials in manufacturing of recyclables.
Florida	$1.00/ new tire sold	Tire dealer	Solid Waste Management Trust Fund: Money used to fund solid waste management education, research and training; mosquito control; litter prevention; and recycling grant programs and reducing solid waste.[333]	Yes	Yes	Yes, but cut tires may be used as initial cover at a landfill or tire cut into eight or more pieces may be disposed of at a landfill.[334]	Yes, eligible counties are provided grant money to clean-up tires; operate processing facilities; enforce illegal transport & dumping, etc.[335]	Grants to counties to buy products made from waste tires. DOT specifies rubber modified asphalt for all surfacing contracts.

[332] Connecticut Department of Environmental Protection. Recycling and Disposal of Scrap Tires. Management of Waste Tires in Connecticut. January 2003. http://www.dep.state.ct.us/wst/recycle/tires.htm (last viewed December 4, 2006).
[333] Fla. Stat. § 403.709.
[334] Fla. Admin. Code Ann. r. 62-711.400.
[335] Fla. Admin. Code Ann. r. 62-716.610 and Fla. Admin. Code Ann. r. 62-716.620.

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Georgia	$1.00/ new tire sold	Tire dealer	Supposed to fund the Solid Waste Trust Fund,[336] but in recent years, most of the fees are directed to the General Fund.[337]	Yes	Yes	Yes, whole tires are banned; however, shredded, chopped or chipped tires can be disposed in landfills.[338]	Grants and loans can be made to counties, municipalities, and others for tire clean-up and market development to stimulate businesses that recycle tires.[339]	None found

[336] Ga. Code § 12-8-27.1.

[337] Georgia's Environmental Protection Division, Land Protection Branch, Waste Reduction and Abatement Program. Georgia's Solid Waste Trust Fund: Fiscal Years 1993-2005. August 2005. Page 4. http://www.gaepd.org/Files_PDF/techguide/lpb/Ga_SWTF_1993-2005.pdf (last August 30, 2006).

[338] Ga. Code § 12-8-40.1 (b).

[339] Ga. Code § 12-8-37.1 and Georgia's Environmental Protection Division, Land Protection Branch, Waste Reduction and Abatement Program. Georgia's Solid Waste Trust Fund: Fiscal Years 1993-2005. August 2005. Page 15-24. http://www.gaepd.org/Files_PDF/techguide/lpb/Ga_SWTF_1993-2005.pdf (last viewed August 30, 2006).

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Hawaii	$1.00/ tire imported (Effective Sept. 30, 2000 through Jan. 1, 2006.)[340]	Tire imported (Effective Sept. 30, 2000 through Jan. 1, 2006.)[341]	Environmental Management Special Fund (EMSF). The money is used to support tire permitting, monitoring and enforcement; market development and reuse; promote tire recovery, recycling, and reuse through education, research and demonstration projects; prevent tire dumping; and site clean-up.[342]	Yes[343]	Yes[344]	Yes.[345]	Yes, the EMSF is used to support programs to prevent illegal dumping and for site clean-up.[346] Some used tires are transferred out-of-state, but most go to a processor in Oahu to be chopped and used as TDF.[347]	Yes, the EMSF is used to promote market development and reuse for recovered tires; promote tire recovery, recycling and reuse of tires through education, research and demonstration projects.[348]

[340] Haw. Rev. Stat. Ann. § 342I-27(a) (2004).
[341] Ibid.
[342] Haw. Rev. Stat. Ann. § 342I-29 (2004).
[343] Haw. Rev. Stat. Ann. § 342I-21 (2004).
[344] Ibid.
[345] Haw. Rev. Stat. Ann. § 342I-22(a) (2004).
[346] Haw. Rev. Stat. Ann. § 342I-29(5), (6) (2004).
[347] Phone interview with J. Valera of the Hawaii Dept. of Health, Office of Solid Waste Management. Oct 20, 2006.
[348] Haw. Rev. Stat. Ann. § 342I-29(2), (3) (2004).

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Idaho	None	NA	NA	Yes, there is a fine of no more than $500 per tire improperly disposed of in the state.[349]	Yes, there is a fine of no more than $500 per tire improperly disposed of in the state.[350]	Yes, except when disposed of at permitted public or private municipal solid waste landfill which has been approved to accept waste tires.[351]	Yes, it is state policy to protect public health and safety by eliminating fire hazards; minimizing breeding grounds for insects and eliminating surface and ground-water contamination.[352]	Yes, there is a state policy to encourage recycling and reuse of waste tires.[353]
Illinois	$2.50/ new or used tire sold until January 1, 2008; $2.00 after January 1, 2008.[354]	Tire dealer	Used Tire Management Fund: Money used to clean-up tires, assist marketing tires, provide assistance to local governments for waste tire collection projects, etc. After July 1, 2004, 23% of fund income went to the General Revenue Fund.[355]	Yes	Yes	Yes, whole tires are banned from landfills; however, the state does allow for shredded or chopped tire pieces to be disposed of in landfills under certain situations.[356]	Yes	Grants & low interest loans for scrap tire processing facilities and to promote beneficial end uses.

[349] Idaho Code Ann. §39-6504(1) (2003) and Idaho Code Ann. §39-6507 (2003).
[350] Idaho Code Ann. §39-6505 (2003); Idaho Code Ann. §39-6507 (2003); and Idaho Code Ann. §39-6502 (1), (2) (2003).
[351] Idaho Code Ann. §39-6503 (1), (2) (2003).
[352] Idaho Code Ann. §39-6508 (2003).
[353] Idaho Code Ann. §39-6506 (2003).
[354] 415 Ill. Comp. Stat. 5/55.8 (a).
[355] 415 Ill. Comp. Stat. 5/55.6 (c).
[356] 415 Ill. Comp. Stat. 5/55 (b-1).

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Indiana	$0.25/ new tire sold	Tire Dealer	Waste Tire Management Fund: Money used to clean-up waste tires, educate the public about waste tires and to provide grants and loans to establish and operate recycling and reuse of waste programs.[357]	Yes	Yes	Yes, whole tires are banned from landfills; however, the state does allow for shredded or ground up tires for use as daily cover at a solid waste landfill.[358]	Yes	Grants for tire derived fuel stack testing (50% of the cost, up to $30,000), and grants to government agencies to purchase products made from recycled Indiana scrap tires.

[357] Ind. Code § 13-20-13-9.
[358] Ind. Code § 13-20-14-1.

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Iowa	$5/ certif. of title[359]	State[360]	For fiscal years July 1, 2002 through July 1, 2006, 20% is deposited in the Waste Tire Management Fund (WTMF) with the remainder in Road Use Tax Fund.[361] 30% of the WTMF is used for personnel costs; 10% for public education and awareness, proper disposal options and environmental & health hazards posed by improper tire storage.[362]	Yes[363]	Yes[364]	Yes, unless waste tires are processed according to Department regulations. A landfill can accept properly processed waste tires.[365]	Yes, 30% of WTMF used for waste tire pile abatement initiatives requiring cost-sharing agreement with landowner.[366]	Yes, 30% of WTMF used for market development initiatives.[367] "The Scrap Tire Market Development Program is supported by House File 2549 adopted in May 2005 (Code of Iowa 455D.11C). Approximately $300,000 is available per fiscal year for scrap tire market development assistance until June 30, 2007."[368]

[359] Iowa Code Ann. § 321.52 A(1) (2003).
[360] Ibid.
[361] Iowa Code Ann. § 321.52 A(2) (2003).
[362] Iowa Code Ann. § 455D.11C (2)(a), (b) (2003).
[363] Iowa Code Ann. § 455D.11I (2) (2003).
[364] Iowa Code Ann. § 455D.11 (1)(a), (c) (2003).
[365] Iowa Code Ann. § 455D.11 (2) (2003).
[366] Iowa Code Ann. § 455D.11c (2)(d) (2003).
[367] Iowa Code Ann. § 455D.11c (2)(c) (2003).
[368] Iowa Department of Natural Resources, Energy & Waste Management Bureau. Scrap Tire Market Development Program: Proposal Application and Guidelines.

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Kansas	$0.25/ tire[369]	Tire retailer[370]	Waste Tire Management Fund (WTMF) money is used for administrative costs; removal and disposal or on-site stabilization of waste tires piles; public education; and various grants to public and private entities for up to 75% of the start-up costs to projects that recycle waste tires or use TDF.[371]	Yes, permits issued for one year and require and application fee of no greater than $250/ year.[372]	Yes, permits issued for one year and require and application fee of no greater than $250/ year.[373]	Yes, except state may authorize the disposal of processed or contaminated whole, unprocessed tires at permitted landfills and monofills; waste tires may be used in the leachate collection system of a landfill; tires cut into two or more parts be used as daily landfill cover; etc.[374]	Yes, state law allows the Waste Tire Management Fund to be used to clean-up waste tire piles.[375]	Yes, state law allows the WTMF to be used for grants to public and private entities for up to 75% of the start-up costs to projects that recycle waste tires or recover energy through TDF.[376]

[369] Kan. Stat. Ann. § 65-3424d (a) (1992).
[370] Ibid.
[371] Kan. Stat. Ann. § 65-3424g (a), (c)(1)-(5) (1992).
[372] Kan. Stat. Ann. § 65-3424b (a) (1992).
[373] Ibid.
[374] Kan. Stat. Ann. § 65-3424a (c) (1992).
[375] Kan. Stat. Ann. § 65-3424k (1992).
[376] Kan. Stat. Ann. § 65-3424g (c)(5) (1992).

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Kentucky	$1.00/ new tire (until July 31, 2010)[377]	Tire dealer[378]	Waste Tire Trust Fund money may be used for: Managing waste tires; administrative costs; implementing waste tire programs; agreements to collect, transport, process and recycle tires; TDF; waste tire disposal; implementing tire programs; removing waste tires; and awarding grants for clean-up markets.[379]	Yes[380]	Yes[381]	No. In a contained landfill, waste tires must be processed to prevent the entrapment of air or water. Residual landfills shall accept only tires that have been rendered suitable for disposal in a landfill.[382]	Yes, the Natural Resources and Environmental Protection Cabinet can enter into agreements with public, federal, state, or local agencies or with local government for tire disposal.[383]	Yes, the Natural Resources and Environmental Protection Cabinet can enter into agreements and award grants to develop markets for waste tires.[384]

[377] Ky. Rev. Stat. Ann. § 224.50-868 (1) (2002).
[378] Ibid.
[379] Ky. Rev. Stat. Ann. § 224.50-876 (1)-(3) (2002); Ky. Rev. Stat. Ann. § 224.50-878 (1) (2002).
[380] Ky. Rev. Stat. Ann. § 224.50-856 (2) (2002).
[381] Ky. Rev. Stat. Ann. § 224.50-858 (1) (2002).
[382] Ky. Rev. Stat. Ann. § 224.50-856 (1) (a), (b) (2002).
[383] Ky. Rev. Stat. Ann. § 224.50-876 (1) - (3) (2002).
[384] Ky. Rev. Stat. Ann. § 224.50-880 (1) (d), (e) (2002); Ky. Rev. Stat. Ann. § 224.50-876 (1) (2002); Ky. Rev. Stat. Ann. § 224.50-878 (1) (2002).

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Louisiana	$2.00/ tire[385]	Tire dealer[386]	Waste Tire Management Fund: (WTMF) Money used for the purpose of solving the state's waste tire problem.[387]	Yes[388]	Yes[389]	Yes; however waste tires prepared for disposal by cutting separating, shredding or other approved means, may be disposed of in a landfill.[390]	Yes, DEQ promulgates rules, and regulations for the administration and enforcement of the waste tire program. It encourages local governments to establish advisory councils regarding waste tire clean-up; and provides clean-up funds to local governments.[391]	The WTMF is used to provide technical assistance and incentives to encourage market research and development projects including tax credits to encourage the development and implementation of technologies utilizing recycled tire rubber; and to assist local governments to collect and transport tires.[392]

[385] La. Rev. Stat. Ann. § 30:2418I (1) (2000).
[386] Ibid.
[387] La. Rev. Stat. Ann. § 30:2418H (1) (2000).
[388] La. Rev. Stat. Ann. § 30:2418G (1) (2000).
[389] La. Rev. Stat. Ann. § 30:2418B (2000).
[390] La. Rev. Stat. Ann. § 30:2418C (2000).
[391] La. Rev. Stat. Ann. § 30:2418H (2), (6), (8), (9) (2000).
[392] La. Rev. Stat. Ann. § 30:2418 (1), (3), (4), (5), (7) (2000).

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Maine	$1/new tire, but the fee is not collected on the sale of tires on a trailer, mobile home or any motorized vehicle.[393]	Tire Retailer[394]	Maine Solid Waste Management Fund SWMF:[395] Fund money used to "support programs administered by the State Planning Office and the Department of Environmental Protection."[396] This includes programs "to abate threats to public health, safety and welfare posed by the disposal of solid waste."[397]	Yes[398]	Yes[399]	Yes[400]	Yes, SWMF is fed by appropriations and allocations, is used for tire stockpile abatement, remediation and clean-up.[401] Additionally, state law requires that a program be in put into place that eliminates tire stockpiles.[402]	Yes, the SWMF may be used to provide financial incentives to tire processors to make processing of tires economically feasible.[403] As resources allow, the state shall encourage the beneficial reuse of tires and identify favorable environment for businesses assisting in the processing of waste tires.[404]

[393] Me. Rev. Stat. Ann. tit. 36 § 4832 (1), (2).
[394] Maine Revenue Services Sales, Fuel & Special Tax Division Instructional Bulletin No. 48. Recycling Assistance Fee. Part 4. Retailers Responsibilities. http://mainegov-images.informe.org/revenue/salesuse/Bull48.pdf (last viewed December 14, 2006).
[395] Me. Rev. Stat. Ann. tit. 36 § 4833.
[396] Me. Rev. Stat. Ann. tit. 38 § 2201.
[397] Ibid.
[398] Me. Rev. Stat. Ann. tit. 38 §1316-L (2) (A) (1964).
[399] Me. Rev. Stat. Ann. tit. 38 §1316-L (1) (B) (1964).
[400] Me. Rev. Stat. Ann. tit. 38 §1316 (1964).
[401] Me. Rev. Stat. Ann. tit. 38 §1316-B (1)-(7) (1964).
[402] Me. Rev. Stat. Ann. tit. 38 §1316-G (1) (A)-(J) (1964).
[403] Me. Rev. Stat. Ann. tit. 38 §1316-F (1964).
[404] Me. Rev. Stat. Ann. tit. 38 §1316-G (2), (3) (1964).

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Maryland	$0.80/ new tire sold[405]	Tire dealer[406]	Used Tire Clean-up and Recycling Fund: Money used to administer the scrap tire program; license businesses and haulers; enforce and ensure compliance of tire laws' and clean-up stockpiles.[407]	Yes	Yes	Yes	Yes	Market development grants to stimulate in-state demand for recycled materials; and 5% price preference for state purchases of recycled materials.
Massachusetts	None	NA	NA	No	Yes	Yes, whole tires are banned from landfills; but, shredded tire can be placed.[408]	None found.	Recycling Loan Funds available for tire reuse projects, and 10% price preference for state purchases of recycled materials.

[405] Maryland Department of the Environment. [Maryland's Scrap Tire] Program Overview. http://www.mde.state.md.us/Programs/LandPrograms/Solid_Waste/ScrapTire/program.asp (last viewed August 30, 2006).
[406] Ibid.
[407] Ibid.
[408] 310 Mass. Code Regs. 19.017.

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Michigan	$1.50/ vehicle title issued	State	Scrap Tire Regulatory Fund:[409] Money used for clean-up or collection of tires and grants to generate new markets for used tire recycled products and to develop new ways to recycle tires.[410]	Yes	Yes	No	Yes, there is a grant program for scrap tire clean-up.[411]	The state had several grant programs designed to clean-up tires, and develop new markets for scrap tire recycled products.[412] The state also has a 10% price preference for of products containing recycled materials.

[409] Mich. Comp. Laws § 257.806.
[410] Mich. Comp. Laws § 324.16908.
[411] Waste and Hazardous Materials Division. Michigan Department of Environmental Quality. Fiscal Year 2005-2006 Scrap Tire Regulatory Program: Scrap Tire Clean-up Grant Program and Application for Funding. (August 2005). http://www.deq.state.mi.us/documents/deq-whm-stp-eqp5138.pdf (last viewed August 31, 2006).
[412] Michigan Department of Environmental Quality. Scrap Tires. (Click under "Grants".) http://www.michigan.gov/deq/0,1607,7-135-3312_4122---,00.html (last viewed August 31, 2006).

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Minnesota	NA	NA	NA	Yes[413]	Yes[414]	Yes[415]	None found.	Money for waste tire management is spent on "regulation of permitted waste tire facilities, research and studies to determine the technical and economic feasibility of uses for tire-derived products, and public education on waste tire management."[416]

[413] Minn. R. 9220.0530 (2003).
[414] Minn. R. 9220.0230 (2003).
[415] Minn. R. 9220.0220 (2003).
[416] Minn. State. Ann §115A.912 (1997).

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Mississippi	$1.00/ new tire with rim diameter of less than 24 inches; $2.00/ new tire with rim diameter of 24 inches or larger[417]	Tire retailer[418]	Environmental Protection Trust Fund/ Waste Tire Account: Money used for grants to local authorities to clean-up tire piles, and purchase Mississippi tire derived products; administrative costs; and incentive grants to persons that use and/or manufacture waste tire products (including fuel) and complete research projects relating to waste tires.[419]	Yes[420]	Yes[421]	Yes, unless the Commission of Environmental Quality grants an exception.[422]	Yes, each county, regional solid waste management authority or municipality shall provide a waste tire management service that includes waste tire collection sites and ensures delivery of tire to an authorized waste tire processing facility.[423]	Yes, the Commission of Environmental Quality shall establish a statewide plan for use of monies from the waste tire account including eligibility requirements for incentive grants and funding for research and demonstration projects.[424]

[417] Miss. Code Ann. §17-17-423 (1) (1972).
[418] Ibid.
[419] Miss. Code Ann. §17-17-425 (1) (a) – (d) (1972).
[420] Miss. Code Ann. §17-17-411 (1), (2) (1972).
[421] Miss. Code Ann. §17-17-407 (a) (i-vi), (b) (1972).
[422] Miss. Code Ann. §17-17-407 (v) (1972).
[423] Miss. Code Ann. §17-17-409 (1972).
[424] Miss. Code Ann. §17-17-425 (4) (1972).

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Missouri	$0.50/ new tire sold[425]	Tire dealer[426]	Solid Waste Management Fund (sub-account):[427] Money used for clean-up of tires, grants and education pertaining to scrap tires.[428]	Yes	Yes	Yes, whole scrap tires are banned from landfills; however, tires that have been cut, chipped or shredded are permitted.[429]	Yes	Grants currently given to help pay for scrap tire playground cover and surfacing; [430] Also, state has a purchase preference for recycled products including retread tires.[431]

[425] Mo. Rev. Stat. § 260.273 (2).
[426] Ibid.
[427] Mo. Rev. Stat. § 260.273 (3).
[428] Missouri Department of Natural Resources. Tire Fee Information. http://www.dnr.mo.gov/alpd/swmp/tires/tirefee.htm (Last viewed August 31, 2006).
[429] Mo. Rev. Stat. § 260.270 (6).
[430] Missouri Department of Natural Resources. Division of Environmental Quality. Scrap Tire Material Grant Information. http://www.dnr.mo.gov/alpd/swmp/tires/tirefinassistance.htm (Last viewed August 31, 2006).
[431] Mo. Rev. Stat. § 34.031 (1).

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Montana	None	N/A	N/A	No	Yes[432]	No	No	There is a tax credit for investments to manufacture a product from reclaimed material.[433] A taxpayer may deduct an additional 10% of the taxpayer's expenditure for the purchase of recycled material that was otherwise deductible as a business-related expense.[434]
Nebraska	$1.00/ new tire sold	Tire dealer	Waste Reduction and Recycling Incentive Fund: Money used for various recycling and waste reduction projects including, recycling scrap tires.[435]	Yes	Yes	Yes, whole scrap tires are banned from landfills; however, shredded and crumb rubber tire pieces are allowed.[436]	Yes	Grants are available through the Waste Reduction and Recycling Incentive Fund for tire recycling projects.[437]

[432] Mont. Code Add. § 75-10-205 (2005).
[433] Mont. Code Add. § 15-32-602 (2005). (This section of the code has a sunset date of December 31, 2011).
[434] Mont. Code Add. § 15-32-610 (2005). (This section of the code has a sunset date of December 31, 2011).
[435] Neb. Rev. Stat. § 81-15, 160.
[436] Neb. Rev. Stat. § 13-2039.
[437] Neb. Rev. Stat. § 81-15, 160.

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Nevada	$1.00/ tire[438]	Tire retailer[439]	Solid Waste Management Account[440]	Yes[441]	Yes[442]	Yes, unless a permitted site is not available.[443]	None found	Yes, the Division of Environmental Protection of the state DCNR may award grants to municipalities, educational institutions and nonprofit organization for projects that enhance solid waste management systems and promote efficiency.[444]
New Hampshire	None	NA	NA	No	No	Yes whole tires are banned from landfills, but quartered, split or shredded tires are permitted.[445]	None found	None found

[438] Nev. Rev. Stat. § 444A.090 (1).
[439] Ibid.
[440] Nev. Rev. Stat. § 444A.090 (2).
[441] Nev. Rev. Stat. § 444A.080 (1) (2) and NAC § 444A.440.
[442] Nev. Rev. Stat. § 444A.080 (1) (2) and NAC § 444A.280.
[443] Nev. Rev. Stat. § 444A.583 (1) (a) (b); (5).
[444] Nev. Rev. Stat. § 444A.110 (4).
[445] New Hampshire Department of Environmental Services. Scrap Tires. http://www.des.state.nh.us/swplan/IV_ScrapTires.pdf (last viewed November 15, 2006).

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
New Jersey	$1.50/ new tire sold	Tire dealer	The first $2.3 million goes to the Tire Management and Clean-up Fund (TMCF) and the remaining amount collected is used for snow removal operations.[446]	No	Yes	Yes, whole scrap tires are banned from landfills; however, cut or shredded tires are allowed in landfills	Using the TMCF, their DEP is authorized to create a Local Tire Management Program to clean-up tire piles and the provide grants to local governments for tire clean-up.[447]	Grants are available for qualified colleges and universities and private firms to help develop new markets for recycled products.[448]
New Mexico	$1.50/ vehicle registr.	State	Recycling and Illegal Dumping Fund: Money from fund used to clean-up illegal dumpsites, to offset the cost of collecting or recycling of tires, etc.[449]	Yes	Yes	Unknown	Yes	Grants are available to local government agencies and other groups to develop or operate a tire recycling facility, for education, and to help clean-up tire piles.[450]

[446] N.J. Stat. § 54:32F-2.
[447] N.J. Stat. § 13:1E-225.
[448] N.J. Stat. § 13:1E-99.38.
[449] N.M. Stat. § 74-13-19 (Recycling and Illegal Dumping Act).
[450] N.M. Stat. § 74-13-17 (Recycling and Illegal Dumping Act).

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
New York	$2.50/ new tire sold until Dec. 31, 2010[451]	Tire dealer[452]	Waste Tire Management and Recycling Fund:[453] Money from fund used for clean-up of tire stockpiles; research projects to enhance sustainable tire recycling activities; and business development funds for technology that leads to increased markets tires etc.[454]	Yes	Yes	Yes, waste tires are banned from landfills except where there is no feasible use for the waste tires.[455]	The New York State Department of Environmental Conservation produced a report in July 2004 that outlined a Waste Tire Abatement Plan that is supposed to eliminate all waste tire piles by December 31, 2010.[456]	State is suppose to use some of the Waste Tire Management and Recycling Fund to provide funds to businesses to develop technology that leads to increased markets for waste tires and funds demonstration projects.[457]

[451] N.Y. Envtl. Conserv. § 27-1905 (2).
[452] Ibid.
[453] N.Y. State Fin. § 29-bb.
[454] N.Y. Envtl. Conserv. § 27-1915.
[455] N.Y. Envtl. Conserv. § 27-1911.
[456] NY State Department of Environmental Conservation, Division of Solid & Hazardous Materials. New York State Waste Tire Stockpile Abatement Plan: A comprehensive Plan Designed to Abate All Noncompliant Waste Tire Stockpiles by December 31, 2010. July 2004. http://www.dec.state.ny.us/website/dshm/redrecy/tireplan.pdf (last viewed August 31, 2006).
[457] N.Y. Envtl. Conserv. § 27-1915.

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
North Carolina	2% of the cost of tire (for tires less than 20 inches) and 1% of the cost of tire (for tires at least 20 inches).[458]	Tire dealer	27% of money goes to the Scrap Tire Disposal Account (to provide grants and for scrap tire clean-up and increased use of recycled tire products); 5% goes to the Solid Waste Management Trust Fund; and 68% goes to the counties to help fund tire pile clean-up.[459]	Yes	Yes	Yes, whole tires are banned from landfills, but there are exceptions relating to solid rubber coverings for landfills.[460]	Yes	State provides grants to local governments and others to encourage the use of tire-derived fuel, crumb rubber, carbon black, and other applications.[461]
North Dakota	No	N/A	N/A	Yes[462]	Yes[463]	No[464]	None Found	None Found

[458] N.C. Gen. Stat. § 105-187.16.
[459] N.C. Gen. Stat. § 105-187.19 and N.C. Gen. Stat. § 130A-309.63.
[460] N.C. Gen. Stat. § 130A-309.58.
[461] N.C. Gen. Stat. § 130A-309.63.
[462] N.D. Admin. Code § 33-20-02.1-01.
[463] N.D. Admin. Code § 33-20-02.1-02 (4).
[464] North Dakota Department of Health, Division of Waste Management. Guideline 21 – Scrap Tire Management in North Dakota. February 2003.

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Ohio	$1.00/ new tire sold.[465]	Tire wholesaler	Scrap Tire Management Fund for abatement of scrap tires; to make grants to promote research regarding other recycling options for tires; and to defray the cost of administering and enforcing various scrap tire laws.[466]	Yes	Yes	Yes	Yes	The "Scrap Tire Grant provided financial assistance to … [various organizations] that propose to convert manufacturing operations to accept scrap tire material as feedstock, expand tire processing, use scrap tire material in civil engineering projects or develop recycling related technology for scrap tire material."[467]

[465] Ohio Rev. Code Ann. § 3734.901.
[466] Ibid.
[467] Ohio Department of Natural Resources. Division of Recycling & Litter Prevention. 2006 Scrap Tire Grant. June 30, 2006. http://www.dnr.state.oh.us/recycling/grants/06scraptires.htm (last viewed August 30, 2006).

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Oklahoma	$1.00/ new tire with 17.5" rim diameter or less; $3.50/ new tire with greater that 17.5" rim diameter [468]	Tire dealer[469]	Waste Tire Recycling Indemnity Fund: Money used for administrative costs and reimbursement to tire facilities and others authorized by the Oklahoma Waste Tire Recycling Act that demonstrate that they successfully process tires.[470]	No	Yes[471]	Yes[472]	None found; However the state does have a priority clean-up list of unauthorized waste tire dumps including an estimate of the number of tires present at each dump site.[473]	10% of the Waste Tire Recycling Indemnity Fund goes to Oklahoma businesses that manufacture new products or derive energy benefits from waste tires processed under the Oklahoma Waste Tire Recycling Act.[474]

[468] Okla. Stat. Ann. tit. 27A § 2-11-403 A.1 (a)(1)(2).
[469] Ibid.
[470] Okla. Stat. Ann. tit. 27A § 2-11-404 A; Okla. Stat. Ann. tit. 27A § 2-11-405 A, B, C; and Okla. Stat. Ann. tit. 27A § 2-11-406 A.
[471] Okla. Admin. Code § 252: 515-3-1 (a)(2)(D).
[472] Okla. Admin. Code § 252: 515-21-112 (c).
[473] Okla. Admin. Code § 252: 515-21-3.
[474] Okla. Stat. Ann. tit. 27A § 2-11-405 B.

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Oregon	None	NA	NA	Yes[475]	Yes[476]	Yes, whole waste tire are prohibited at solid waste disposal sites; however, chipped waste tires permitted at DEQ approved disposal site.[477]	No; however Waste Tire Recycling Account (WTRA) money may be used by DEQ for programs related to waste tire storage, removal or disposal.[478]	"Recycling businesses in Oregon are eligible for the Pollution Control Facility Tax Credit and the Oregon Business Energy Tax Credit. The tax credits were created … to encourage investment in recycling and enhance the development of the infrastructure for recycling in Oregon."[479]

[475] OR. Rev. Stat. Ann. § 459.712(1) (2005) and ORS 340-064-0005, October 13, 2006.
[476] OR. Rev. Stat. Ann. § 459.715(1) (2005) and ORS 340-064-0005, October 13, 2006.
[477] OR. Rev. Stat. Ann. § 459.247(1)(d) (2005) and OR. Rev. Stat. Ann. § 459.710(1)(2) (2005).
[478] OR. Rev. Stat. Ann. § 459.775(b) (2005).
[479] Oregon Department of Environmental Quality, Land Quality. Solid Waste Incentive Programs. Tax Credits. Last undated February 25, 2003. http://www.deq.state.or.us/wmc/solwaste/incentives.html (Last viewed November, 15, 2006).

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Pennsylvania	$1 on sale of new tires for highway use[480]	Collected by the seller[481]	Public Transportation Assistance Fund[482]	Yes, the cost of a waste tire hauler permit is $50.[483]	Yes, a permit is required for processing or beneficial reuse of residual waste. The cost of a general permit is $2,000.[484]	Yes, whole tires are banned but may be used as alternate daily cover, leachate collections systems, and liner protection.[485]	Yes, DEP reviews funding for Used Tire Pile Remediation Restricted Account, Solid Waste Abatement Fund, and General Fund money.[486]	Yes, recycled content purchase requirements and bidder preference[487]

[480] Act of Mar. 4, 1971 (P.L. 6, No. 2), §2301 (c); Pa. Stat. Ann. tit. 72, §9301(c).
[481] Ibid.
[482] Ibid.
[483] Act 111 of 2002.
[484] 25 Pa. Code §287.621.
[485] Act 190 of 1996.
[486] DEP, Bureau of Waste Management.
[487] Management Directive #205.28 Commonwealth of Pennsylvania, Governor's Office, "Purchase of Recycled Content Products by State Agencies," April 12, 1993. As directed by Act 101 of 1988. "Bidding Preference for Products with Recycled Post Consumer Material," GSPUR 95 Revised 08/06/01.

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Rhode Island	Deposit of $5.00/ new tire to be refunded when consumer supplies a used tire to retailer within 14 days. [488]	Retailer[489]	NA	Yes.[490]	Yes.[491]	No. The Rhode Island Resource Recovery Corporation operates the central landfill.[492]	Yes. Funds in "the tire site remediation account shall be used for the following activities: (1) …for clean-up, recycling and disposal of tires in existing tire piles … [and] (2) … to assist cities and towns with the collection and proper disposal of waste tires…."[493]	Yes, the Department of Environmental Management provides grants for education and research programs on collection, marketing, and recycling, for hard-to-dispose material; and establish or plan state owned and operated regional collection centers for hard-to-dispose materials.[494]

[488] R.I. Gen Laws § 23-63-4.9.
[489] Ibid.
[490] R.I. Gen Laws § 23-63-4.
[491] Ibid.
[492] R.I. Gen Laws § 23-19-2 (12).
[493] R.I. Gen Laws § 23-63-4.2.
[494] R.I. Gen Laws § 37-15-1-6 (1)-(4).

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South Carolina	$2.00/ new tire sold	Tire dealer	$1.50 of fee (less applicable credit, refund or discount) goes to the counties (based on population) for collection, processing and recycling of waste tires; the remaining $0.50 goes to the Waste Tire Grant Trust Fund.[495]	Yes[496]	Yes[497]	Yes	Yes	The Waste Tire Trust Fund provides grants to local governments to construct, operate and contract with waste tire processing or recycling facilities; remove waste tires for processing or recycling; purchase or use products made from recycled waste tires; and perform or contract for the performance of research designed to facilitate waste tire recycling.[498]

[495] S.C. Code. Ann. § 44-96-170 (N).
[496] S.C. Code. Ann. § 44-96-170 (J).
[497] Ibid.
[498] S.C. Code. Ann. § 44-96-170 (P).

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South Dakota	0.25/ tire on each motor vehicle registered and licensed in South Dakota[499]	County Treasurer or Secretary of Revenue [500]	Water and Environment Fund: Money primarily used for solid waste source reduction, recycling and waste management program established in § 46A-1-83.[501]	No	Yes[502]	Yes[503]	Yes, the waste reduction and recycling program.[504]	Yes, the waste reduction and recycling program,[505] state assistance in all aspects of solid waste management,[506] and financial assistance for tire processing facilities.[507]
Tennessee	$1.00/ new tire sold	Tire dealer fund	Waste Tire Program: Money used to provide grants to counties to beneficial reuses for waste tires and to help clean-up tire dumps.[508]	No	Yes	Yes, but shredded tires are permitted in landfills if the net cost of shredding the tires is less than the cost of another beneficial use.[509]	None found	There are state grants available to counties to develop programs to fund beneficial uses for their waste tires.[510]

[499] S.D. Codified Laws § 34A-6-83.
[500] Ibid.
[501] S.D. Codified Laws § 34A-6-85.
[502] S.D. Codified Laws § 34A-6-1.4; S.D. Codified Laws § 34A-6-58; and S.D. Codified Laws § 34A-6-66.
[503] S.D. Codified Laws § 34A-6-64.
[504] S.D. Codified Laws § 34A-6-62.
[505] Ibid.
[506] S.D. Codified Laws § 34A-6-79.
[507] S.D. Codified Laws § 46A-1-91.
[508] Tennessee Department of Environment and Conservation. Solid and Hazardous Waste Management. Frequently Asked Questions About Tennessee's Waste Tire Program. Undated. http://tennessee.gov/environment/swm/tires/tiresfaq.shtml (last viewed September 5, 2006).
[509] Ibid.
[510] Ibid.

State	Fee collected	Fee collected by	What do fees collected benefit?	Collection/ transportation regulation or permit required?	Storage/ disposal regulation or permit required?	Are tires banned from landfills?	Is there a current tire clean-up program in place?	State incentives given to help recycle waste tires
Texas	None	NA	NA	Yes	Yes	No whole tires may be land filled except for off-the-road tires used on heavy equipment; however, split, quartered, or shredded tires may be landfilled.[511]	None found	None found
Utah	$1.00/ new tire[512]	Tire retailer[513]	Waste Tire Recycling Fund. Money is used for: partial reimbursement of transporting, processing, recycling or disposal of waste tires; payment of various administrative costs and tracking out-standing loans made under the Waste Tire Recycling Industrial Assistance Loan Program.[514]	Yes[515]	Yes[516]	Yes, except shredded waste tire may be disposed of in a landfill.[517]	Yes, a county or municipality may apply for payment from the fund for costs of the transporter or recycler to remove waste tires from waste tire piles.[518]	A recycler receives partial reimbursement of the cost of transporting and processing waste tires that meet requirements and are used within the state for: energy recovery; production of crumb rubber, chipped tires, or other uses defined as recycling.[519]

[511] Texas Commission of Environmental Quality (TCEQ). Scrap Tires. August 23, 2006. http://www.tceq.state.tx.us/permitting/registration/tires/ (last viewed September 5, 2006).
[512] Utah Code Ann. § 19-6-805 (2).
[513] Utah Code Ann. § 19-6-805 (1).
[514] Utah Code Ann. § 19-6-807 (1), (2), (3)(a)-(d).
[515] Utah Code Ann. § 19-6-806 (1)(a).

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Vermont	None	N/A	N/A	Yes[520]	Yes[521]	Yes[522]	None found	Tax incentives include: "(i) product taxes, based on a sliding scale, according to the degree of undue harm caused by the product, the…; [and] (ii) taxes on all nonrecyclable, nonbiodegradable products or packaging."[523]

[516] Utah Code Ann. § 19-6-806 (2)(a).
[517] Utah Code Ann. § 19-6-804 (3) and Utah Code Ann. § 19-6-812.
[518] Utah Code Ann. § 19-6-811 (1)(a).
[519] Utah Code Ann. § 19-6-809 (1)(a)(i)(ii) (A)-(E) and Utah Code Ann. § 19-6-810 (1).
[520] Vt. Stat. Ann. tit. 10 § 6607a.(a).
[521] Vt. Stat. Ann. tit. 10 § 6605 (a)(1).
[522] Vt. Stat. Ann. tit. 10 § 6621a. (a)(4).
[523] Vt. Stat. Ann. tit. 10 § 6604 (c)(2)(B)(i),(ii).

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Virginia	$1.00/ new tire	Tire dealer	Waste Tire Trust Fund: Money used to help clean-up tire piles.[524]	Yes	Yes	Yes, whole tires are banned from landfills, but cut/shredded tires are permitted in landfills as daily landfill cover.[525]	Yes	Virginia has an End User Reimbursement Program that makes direct payments to beneficial end users of Virginia-generated waste tire material.[526]

[524] Virginia Department of Environmental Quality. Waste Tires in Virginia. August 9, 2006. http://www.deq.virginia.gov/wastetires/homepage.html (last viewed September 7, 2006).
[525] Rubber Manufacturers Association. Scrap Tires: State Issues: Virginia Scrap Tire Briefing Sheet. Undated. http://rma.org/scrap_tires/state_issues/virginia.cfm (last viewed September 7, 2006).
[526] Virginia Department of Environmental Quality. Component #1: Waste Tire End User Reimbursement Program. August 9, 2006. http://www.deq.virginia.gov/wastetires/progsummary1.html (last viewed September 7, 2006).

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Washington	$1.00/ new tire[527]	Tire dealer[528]	Waste Tire Removal Account(WYRA): [529] Money used to clean-up tire piles, provide public education on tire recycling; and promote marketing studies for recycling tires.[530]	Yes	Yes	Tires are not banned from landfills; however, the state allows landfills to refuse to accept tires. Currently, only one landfill accepts shredded tires.[531]	State statutes require the Department of Ecology "initiate a pilot project … to contract to clean-up a formally licensed tire pile in existence for ten or more years."[532]	The WTRA funds "grants to local governments for pilot projects for on-site shredding and recycling of tires from dump sites; … [and] product marketing studies for recycled tires and alternative to land disposal."[533]
West Virginia	$5.00/ vehicle title	State	A. James Manchin Fund: Money used for remediation of waste tire piles.[534]	Yes	Yes	Yes	Yes	None found.
Wisconsin	None	N/A	N/A	Yes	Yes	Yes	None found	None found.
Wyoming	None	N/A	N/A	No regulation found	Yes[535]	No	No	No

SOURCE: Unless otherwise noted, all information on this table was taken from the following source: Rubber Manufacturers Association (RMA). State Legislation – Scrap Tire Disposal. November 2004. All information is current as of September 2006. https://www.rma.org/publications/scrap_tires/index.cfm?PublicationID=11121&CFID=9712854&CFTOKEN=56453101 (last viewed August 30, 2006).

[527] Wash. Rev. Code Ann. § 70.95.510 (1).
[528] Ibid.
[529] Wash. Rev. Code Ann. § 70.95.521.
[530] Wash. Rev. Code Ann. § 70.95.535 (2) and Wash. Rev. Code Ann. § 70.95.530 (1).
[531] Phone interview with Randy Martin of the Washington Dept. of Ecology, Solid Waste and Financial Assistance. September 7, 2006, 1pm EST.
[532] Wash. Rev. Code Ann. § 70.95.530 (3).
[533] Wash. Rev. Code Ann. § 70.95.535 (2).
[534] W. Va. Code §22-15A-9 (a).
[535] Wyo. Stat. Ann § 35-11-502.