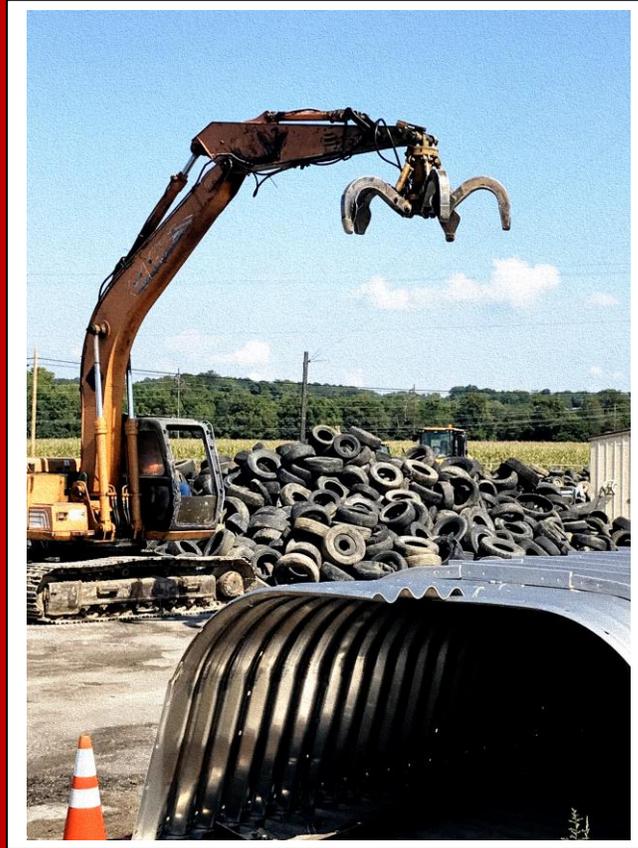


CY2018



Waste Tire Program Annual Report to the General Assembly



**KENTUCKY ENERGY &
ENVIRONMENT CABINET**

**Commonwealth of Kentucky
Energy and Environment Cabinet
Department for Environmental Protection
Division of Waste Management
waste.ky.gov**

TABLE OF CONTENTS

ENERGY AND ENVIRONMENT CABINET MANDATE 1

HISTORY & PURPOSE OF THE FUND 1

REVENUE 2

EXPENDITURES 3

COUNTY GRANTS 5

WASTE TIRE MANAGEMENT PROGRAM 6

MARKET DEVELOPMENT 7

MARKET DYNAMICS 15

FUTURE OF THE FUND 16

CREDITS & ACKNOWLEDGEMENTS 20

ACRONYMS 28

FIGURES

Figure 1: Waste Tire Trust Fund Revenues 3

Figure 2: Waste Tire Trust Fund Expenditures..... 4

Figure 3: Waste Tire Collection Events Total (PTE)..... 7

Figure 4: 2018 Kentucky Waste Tire Markets..... 9

PHOTOGRAPHS

Photo 1: Crumb rubber pour-in-place playground, City of Somerset, Pulaski County 5

Photo 2: Waste tires used to make blasting mats, Bullitt County 6

Photo 3: Waste Tire Collection Event, Nelson County 12

Photo 4: Waste Tire Collection Event, Nelson County 13

Photo 5: Road preparation for RMA paving project, 4th Street, Jefferson County..... 14

Photo 6: RMA paving project, Marion County. 15

Photo 7: Blasting mats made from recycled tires to contain blast and suppress dust, Bullitt
County..... 16

Photo 8: RMA paving project, Dover Road, Bracken County 17

Photo 9: RMA paving project, 4th Street, Jefferson County 29

APPENDICES

Appendix A: Fiscal Year 2018 Waste Tire Grants22

Appendix B: Calendar Year 2018 Crumb Rubber/Tire-Derived Products Grants26

Appendix C: Calendar Years 2016 to 2018 Rubber-Modified Asphalt Grants27

ENERGY AND ENVIRONMENT CABINET MANDATE

This report has been prepared as required by KRS 224.50-872. The purpose of this report is to provide information relevant to the commonwealth's waste tire program. Specifically, it includes information pertinent to expenditures and revenues, effectiveness in developing markets, benefits of the fee in funding the Energy and Environment Cabinet's (EEC) implementation of the waste tire program, and recommendations for program improvements.

KRS 224.50-872 states, "The cabinet shall report to the General Assembly no later than January 15 each year on the effectiveness of the waste tire program in developing markets for waste tires, the amount of revenue generated and the effectiveness of the fee established in KRS 224.50-868 in funding the cabinet's implementation of the waste tire program, to include any waste tire amnesty program established by the cabinet as provided for in KRS 224.50-880(1)(b), whether the fee should be extended, comparative data on the number of waste tires generated each year, the number disposed of, the number of orphan tire piles, and the cost of tire disposal by counties in the Commonwealth."

HISTORY & PURPOSE OF THE FUND

In 1990, the Kentucky General Assembly passed House Bill 32 creating the waste tire control program and establishing the Waste Tire Trust Fund (WTTF) to eliminate existing, and prevent future, waste tire piles. The original program imposed a \$1.00 fee on retailers of new motor vehicle tires sold in Kentucky, created requirements for tire accumulation and storage, and resulted in the removal of many tires from the environment. However, hundreds of thousands of tires continued to be stockpiled in anticipation that future waste tire markets would develop. In 1994, the General Assembly extended the program an additional four years, adding a prohibition on open burning of waste tires.

In 1998, the General Assembly repealed the waste tire control program and created a program with a renewed approach. The revised statute retained the \$1.00 fee collected on new motor vehicle tires, the WTTF, and registration requirements for accumulators of waste tires. New additions to the waste tire management program included financial assurance requirements for accumulators, processors, and transporters of waste tires, grants for projects that manage waste tires, and reporting requirements for the Energy and Environment Cabinet regarding the effectiveness of the program. This fee, collected from consumers by retailers, is paid monthly to the Department of Revenue (DOR). The EEC uses the fee to implement the waste tire program, which includes waste tire collection events (WTCE), cleanups, and grant funding to manage and develop markets for waste tires. The program has been extended during each General Assembly regular session since 2002, including the most recent session in 2018. It is set to expire on June 30,

2020. The tire fee was increased from \$1.00 to \$2.00 during the 2018 Regular Session of the Kentucky General Assembly, but the EEC anticipates this additional funding will not be applied to waste tire programs.

In 2011, House Bill 433 established the Waste Tire Working Group (WTWG), a Division of Waste Management (DWM) committee. This committee is tasked to discuss and research topics in waste tire management, and to make recommendations to the EEC in efforts to improve Kentucky’s programs. The committee is charged to convene twice annually, and its meetings are open to the public. The WTWG consists of two ex-officio members of DWM’s Recycling and Local Assistance (RLA) Branch, and six appointed members. The six WTWG committee members, are appointed by the governor in accordance with KRS 224.50-855.

Governor Matthew Bevin appointed Steve Frodge, Mason County Solid Waste Coordinator, to the WTWG in February 2018. His term expires February 2020. Mayor Edna Burger, Elizabethtown, was appointed by the governor in August 2018, and represents Kentucky mayors. Her term expires August 2021. Current members of the WTWG are:

- Director, DWM or Designee:..... Byron J. Bland, RLA (ex-officio)
- Manager, RLA Branch or Designee: Gary Logsdon, Manager, RLA (ex-officio)
- Kentucky Department of Agriculture Representative: Harlan Hatter
- Kentucky Solid Waste Coordinator Representative: Scott Tussey (Madison Co.)
- Kentucky Solid Waste Coordinator Representative: Steve Frodge (Mason Co.)
- Mayor Representative: Edna Burger (Elizabethtown)
- County Judge/Executive Representative: Shane Gabbard (Jackson Co.)
- Private Retail Tire Sales Representative:..... Joe Durkin

The WTWG met on February 20, and August 7, of 2018. These meetings provided updates and new information on the status of WTCEs, rubber-modified asphalt (RMA), crumb rubber, and the Waste Tire Manifest System. The meetings also provided the opportunity for outside speakers to present information to the public about RMA uses and pour-in-place walk and driving surfaces using crumb rubber from waste tires. The next meeting for the WTWG is scheduled for March 5, 2019.

REVENUE

Precise data on statewide replacement tire sales are not readily available, but by reviewing national sales totals and population statistics, it is estimated that Kentuckians annually purchase approximately 3.66 million new replacement tires¹. Subtracting an estimated 7 percent of this total for internet sales the commonwealth could collect approximately \$3.4 million per year. Over the past three years Kentucky has received an average of \$2.94 million per year from the motor vehicle

¹ *Tire dealers are anything but average*, Modern Tire Dealer, January 1, 2018, www.moderntiredealer.com/uploads/stats/facts-section-2018-1.pdf

retail tire fee, or approximately 86 percent of the money that could be collected. Figure 1 illustrates tire fee receipts, as well as the other revenue generated from the WTTF for the past five years.

Several explanations exist to explain why all of the fees are not being collected, including:

- *Not all retailers collect and remit the proper amount of tire fees;*
- *Fees are not paid by some trucking companies when large quantities of tires are purchased through fleet sales from wholesale companies;*
- *DOR is paid a flat annual fee of \$50,000. Insufficient resources and a lack of incentive to monitor non-paying entities could be reduced by paying DOR a percentage of collections, reflective of several states with similar programs; and*
- *The tire fee may be collected with other taxes and fees. Some fees may be inadvertently misallocated to the wrong fund's ledger. This has occurred in at least one other state, and was detected when their collection mechanism changed.*

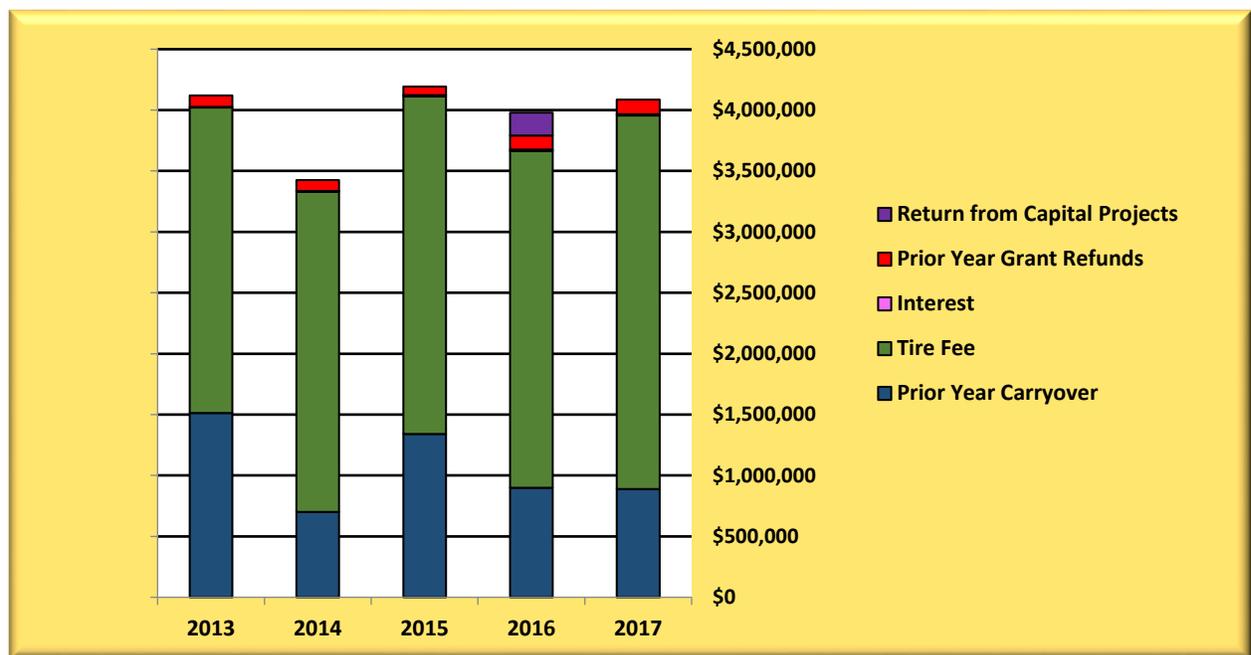


Figure 1: Waste Tire Trust Fund Revenues

EXPENDITURES

A waste tire is most commonly measured in 20-pound units or Passenger Tire Equivalents (PTEs), which is the approximate average weight of a passenger automotive tire. A light truck tire weighs approximately 30 pounds, or 1.5 PTEs, while a medium truck tire, such as a tractor-trailer tire, weighs roughly 110 pounds, and is 5.5 times heavier than an automotive tire, or 5.5

WASTE TIRE PROGRAM ANNUAL REPORT TO THE GENERAL ASSEMBLY

PTEs. Conversion of tire units into a uniform weight basis (100 PTE = 1 ton) allows comparison of waste tire generation to markets that are tracked in tons. This average weight has historically varied from 17 to 23 pounds based on the sizes of tires used in the operating vehicle inventory. Actual data are limited, therefore 20 pounds is used in this report for mathematical uniformity.

During 2017, the EEC expended waste tire funds to conduct WTCEs, providing monies directly to counties for the removal of waste tires, and for remediation of “off-site” tire piles. Collection events held by the EEC recycled 638,690 PTEs, costing \$1,115,472. Grants distributed by the EEC to Kentucky counties financed \$380,518 for disposal and recycled 237,162 PTEs. In addition, the EEC spent \$21,720 to clean up 8,710 PTEs collected from orphan tire piles. Collectively, state and county government efforts represented the cleanup of 884,562 PTEs during 2018. Kentuckians generated 5.1 million PTEs of waste tires in calendar year 2016, thus the state and counties handled 16.6 percent of the PTEs sent to market. The private sector handled the remaining 83.4 percent of waste tires. Figure 2 provides a five-year synopsis of expenditures for the WTTF.

A potentially substantial cost for the EEC is the cleanup of facilities after tire fires occur at sites where responsible parties are unable to remediate these sites. The burning of tires results in releases of hazardous substances into the environment. Cleanup of a post-fire site is a significantly greater cost than removing the same volume of tires at a typical dump site. Regular compliance inspections of permitted waste tire accumulators can minimize the risk of tire fires.

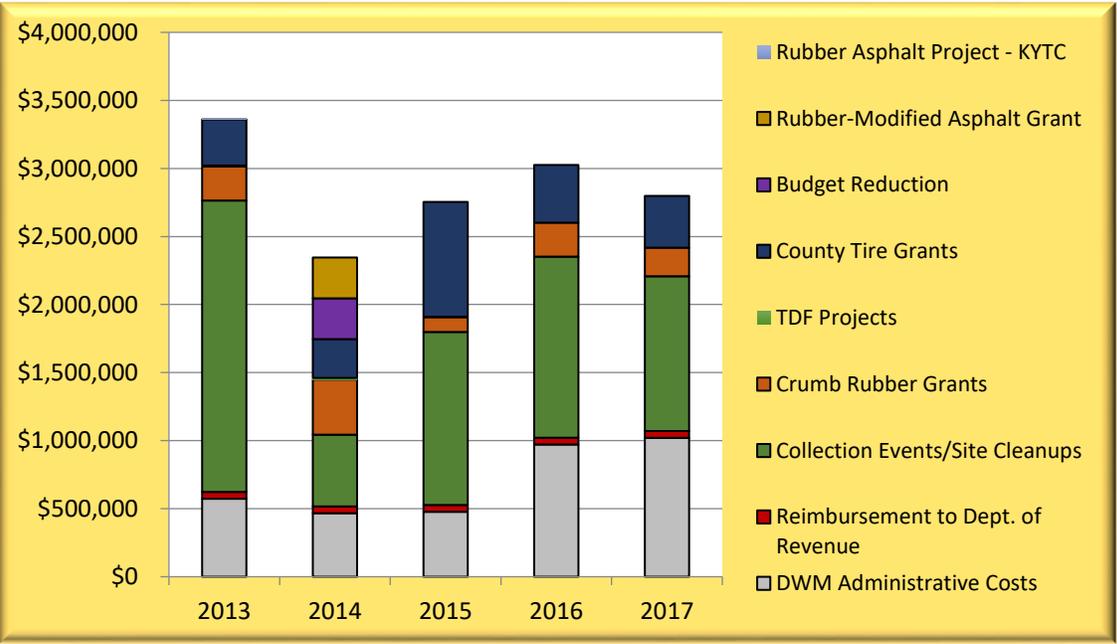


Figure 2: Waste Tire Trust Fund Expenditures

COUNTY GRANTS

WTTF receipts are used by the DWM to fund several programs, assisting in the management of waste tires. These RLA programs include WTCEs, Direct Grants to counties, Crumb Rubber/Tire-Derived Products (CR/TDP) Grants, RMA Grants, and “off-site” tire cleanups.

The WTCE program, formerly referred to as “tire amnesty,” was established in 1998 as part of the EEC’s continuing effort to clear waste tires from Kentucky’s landscape. WTCEs are conducted in rotating, three-year cycles for 40 of Kentucky’s 120 counties. Each county provides a suitable location and manpower, and the EEC contracts for removal and delivery of recovered tires to a processor where they are recycled into products (usually tire-derived fuel or crumb rubber). WTCEs allow individuals a three-day window to drop off unwanted tires at a specified location within their counties at no cost.

Counties are also provided an annual Direct Grant to manage waste tires. This state-provided grant pays for transportation and recycling/disposal and concurrently, the county designs a program for collection or drop-off of tires that complements its needs. The EEC increased the annual direct tire grant amount to counties from \$3,000 to \$4,000 in 2015. See Appendix A for details on the most recent cycle of Direct Tire Grants.



*Photo 1: Crumb rubber pour-in-place playground, City of Somerset, Pulaski County
Photo by Lisa Evans*

The CR/TDP Grant funds the purchases of tire-derived materials or products for landscaping projects, pour-in-place playgrounds, walking trails, horse trailer or stall mats, tree wells, and other products utilizing recycled Kentucky tires. See Appendix B for details on the most recent cycle of CR/TDP Grants.

RMA Grants pay for the application of RMA, requiring counties to fund the installation of an equivalent area of standard asphalt on a similar road. The performances of the standard and rubber-modified paving are monitored and compared over a five-year period. The purpose of this grant is to encourage recycling of Kentucky tires, demonstrate the benefits of RMA, collect performance data for the different types of asphalt, and create opportunities for county governments and paving contractors to gain experience working with RMA.

In addition to the structured grants and programs above, the EEC also funds the cleanup of illegal tire dumps (sometimes referred to as “off-sites”) in specific cases where a responsible party is either unknown or incapable of paying for cleanup.

WASTE TIRE MANAGEMENT PROGRAM

Since 1998, the RLA waste tire program has funded the removal and disposal of approximately 26.4 million PTEs at a cumulative cost of \$27.7 million. These tires have been collected from all 120 Kentucky counties.



*Photo 2: Waste tires used to make blasting mats, Bullitt County
Photo by Byron J. Bland*

During the spring of 2018, the EEC conducted WTCEs in the Pennyrite, Barren River, and Green River Area Development Districts (ADD). These events garnered 446,267 PTEs at a cost of \$779,405. During the fall of 2018, the EEC directed collection events in the Bluegrass ADD netting 192,423 PTEs at a cost of \$336,067. These two periods, when combined, achieved a total of 638,690 PTEs at an overall cost of \$1,115,472 for 2018. WTCEs scheduled for 2019 include Lincoln Trail, Lake Cumberland, FIVCO,² and Buffalo Trace ADDs.

The EEC awarded \$400,000 to 100 counties in 2018 Direct Tire Grants. Of the money the EEC awarded, the counties spent \$328,653 to dispose of or recycle 262,125 PTEs. In addition, counties spent \$2,142 of their own money toward waste tire remediation. Counties returned \$71,347 of unspent state grant funds. This totals \$402,142 of both state and county funding for an average cost of \$1.53 per PTE. Figure 3 provides a recap of the WTCE collection event totals for the past five years.

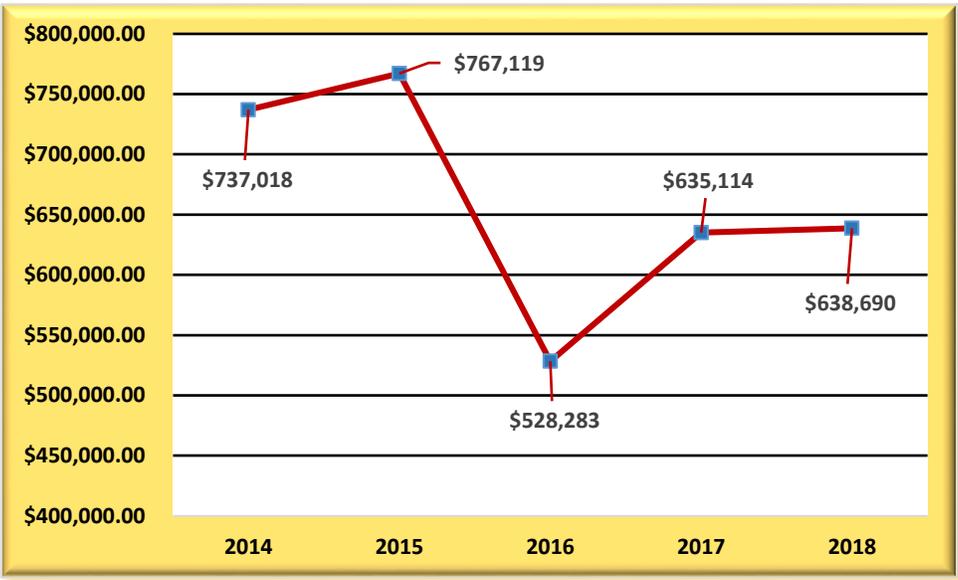


Figure 3: Waste Tire Collection Events Total (PTE)

MARKET DEVELOPMENT

The WTTF helps support the continued removal of waste tires from the environment to prevent fires and reduce breeding grounds for mosquitoes. The EEC has removed waste tires from the environment, funded CR/TDP grant projects, and assisted in developing markets for waste tires. The U.S. Tire Manufacturers Association has placed emphasis on the importance of waste

² FIVCO is named for the five counties it serves: Boyd, Carter, Elliott, Greenup, and Lawrence.

tire cleanups in relation to threats borne by mosquitoes carrying the Zika virus. Waste tires are a haven due to their ability to retain heat, collect water, and offer protection from predators.³

The statewide recycling rate for tires was 82.7 percent for 2018 compared to 84.1 percent for 2017. This figure is slightly above the 81.4 percent national average in the U.S. for 2017⁴, the latest available national data. The commonwealth increased its recycling rate initially by working to increase the in-state tire derived fuel (TDF) market, but this market is being negatively impacted in Kentucky, and nationally, by decreased solid fuel usage in general, increased competition from low cost natural gas, international manufacturing competition, and environmental regulations unfavorable to coal and other solid fuels like TDF. The cabinet has expanded its market development efforts, using grants to encourage the initial use of ground rubber in several major applications. It is appropriate for the cabinet to consider additional efforts to increase the reuse percentage in the future through the diversification of markets. TDF is expected to remain the largest end-use of waste tires for the foreseeable future. Ground tire rubber is considered a higher-end market than TDF, because properties of the original tire are carried forward to the new product rather than use of a one-time energy value of the waste tire as TDF. Additional market development efforts for civil engineering application of tire-derived aggregate (TDA) in highway, landfill, foundation backfill, and similar projects could enhance market diversification, offsetting the potential for additional future declines in TDF markets.

TDF applications include use in boilers at paper mills, cement kilns, and utilities that use whole or processed tires as a supplemental energy resource, displacing a small percentage of coal usage. These facilities are required to operate in full compliance with all applicable federal, state, and local environmental regulations. The largest ground rubber applications include playground safety cushioning, colored landscape mulch, and athletic fields.

The EEC has conducted the following steps to gather information about the commonwealth's waste tire recycling markets, generation, and other data required for this report:

- Obtaining recycling market information from each major in-state processor;
- Compiling total tonnage of disposal of waste tires and processing wastes from each landfill;
- Separating tires collected in Kentucky from those collected out-of-state based on processor records and knowledge;
- Identifying and contacting out-of-state processors believed to collect tires from Kentucky and/or supplying TDF to end users in Kentucky; and
- Contacting users of the tire products to verify receipt of processed tires and landfill owners to verify disposal amounts.

³ *Recycling Today*, October 3, 2016, Recycling Today Staff, www.recyclingtoday.com/article/rubber-manufacturers-tire-piles-declined/

⁴ 2017 US Scrap Tire Management Summary, U.S. Tire Manufacturers Association, July 18, 2018

Based on this analysis, a brief summary of Kentucky’s major markets in 2018 compared to 2017 national markets shows:

- TDF is the largest Kentucky market at 37.4 percent, slightly below the national average of 43 percent.⁵ Total TDF usage in Kentucky rebounded in 2018 after a sharp decline in 2017. Increased usage by East Kentucky Power Cooperative (EKPC) attributed to the rebound, even though operating disruptions at Owensboro Municipal Utility (OMU) and Cemex, and closure of the New Page paper mill using TDF, limited overall growth in 2018. Large TDF users typically utilize both in- and out-of-state markets for waste tires, so large swings in volume are not always reflected in the calculation of TDF as a percentage of the market for Kentucky generated tires;
- Kentucky’s ground rubber applications represented 26.4 percent in 2018, slightly above the national average of 25 percent, for a range of applications including landscape mulch, playground cushioning, synthetic turf infill, and ground rubber;
- Kentucky’s civil engineering applications used less than one percent compared to the national average of eight percent. This market segment offers substantial opportunity for growth, but will require substantial technical and educational efforts;
- Limited by stable volume in reselling used tires;
- Limited exporting to other countries; and
- A 1.4 percent increase in landfill disposal of tires generated in Kentucky in 2018 due to slightly lower cumulative markets.

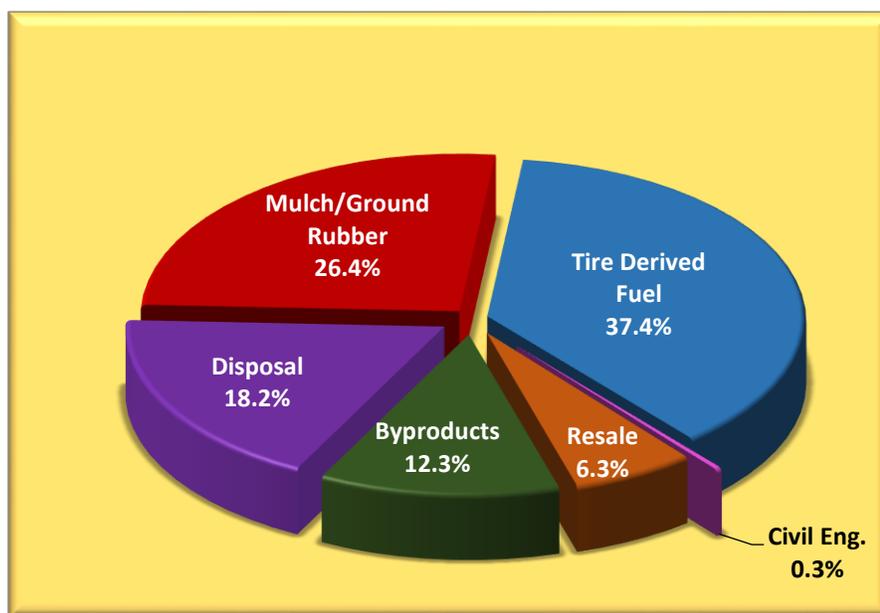


Figure 4: 2018 Kentucky Waste Tire Markets

⁵ U.S. Tire Manufacturers Association, 2017

Because processors and landfill owners have no knowledge of open tire dumps, the cabinet does not include waste tire totals at open dumps in the recycling report. Since the cabinet gives \$4,000 grants to each county to assist in remediating tire piles, and counties expend some additional funds cleaning up tire dumps; the percentage for tires remaining in dumps in Kentucky may be lower.

Kentucky has transitioned from no in-state markets in 2000 to a point where potentially all TDF produced in Kentucky could be consumed in constructive applications. The EEC is involved in several initiatives to encourage TDF market growth, providing both grant funding and technical assistance. There are several success stories in this field:

- In 2001, Kentucky spent \$454,276 on capital equipment to assist OMU in using TDF. Although their contractual obligation expired in 2004, OMU continued to use TDF. Its consumption since 2016 has been limited by power generation equipment outages, as well as economic and other operational factors. Their boiler using TDF is scheduled for permanent shutdown in 2019 due to a major scheduled expense and poor economics, but its cumulative consumption of TDF to date has greatly exceeded its contractual obligation. In 2001, TDF production in Kentucky was an estimated 1.1 million tires, all shipped out of state because there were no in-state users. In 2018, TDF users in Kentucky consumed 3.5 million PTEs, over 2.3 million of which were produced from tires generated in Kentucky. Some TDF still crosses into and out of Kentucky based on regional markets and transportation logistics.
- Kosmos Cement, a partnership between Cemex and Lone Star Cement, began using whole tires as TDF in 2010, and has added the use of tire chip TDF to become one of the two largest in-state users. The company uses a unique tire machine, similar to a baseball pitching machine, to toss whole tires into the center of the kiln for a more efficient burning. The reinforcing wire in the tire is incorporated into the clinker. Compliance air emission testing revealed no significant change in emissions from using waste tires and coal as opposed to only coal. In fact, nitrogen oxide emissions, a major greenhouse gas (GHG), were reduced by 37 percent when using TDF with coal.⁶ By increasing the use of tire chips, in addition to whole tires, Kosmos may further increase its capacity for recovering the energy from tires, so additional growth is possible, but is dependent on competitive economics. An automated whole tire feeding system could improve economics and allow increased whole tire usage.
- Another progressive company using TDF is EKPC. The EEC submitted a letter in support of EKPC's petition to the Public Service Commission (PSC) during 2012 to use the Fuel Adjustment Clause for TDF, which was granted in 2013. Use of the provision allows for quicker recovery of TDF cost from the electrical customer and makes the use of alternative fuels more economical. EKPC has become one of the largest TDF users, potentially using up to 4 million PTEs per year to provide two to four percent of its energy requirements. The operating rates for this efficient, environmentally sound fluidized bed boiler are diminished by low-cost natural gas boilers.

⁶ *Cement Kiln Burns Scrap Tires*, The Courier-Journal, November 26, 2012

The use of TDF helps further the use of coal as it makes the fossil fuel more environmentally friendly. According to the United States Environmental Protection Agency (EPA), (GHG) emissions can be reduced as a co-benefit of the use of secondary materials. Specifically, TDF combustion results in slightly lower GHG emissions per British Thermal Unit (BTU) than coal, and when considering emissions related to extraction and processing of coal, this difference becomes even more significant. Similarly, TDF combustions generate a slightly lower volume of particulate matter per BTU compared to coal.⁷ Therefore, the use of TDF to reduce certain pollutants may make the long-term use of coal more viable.

Substituting TDF for coal would also help avoid an estimated 0.246 lbs/million BTUs of particulate matter associated with the extraction and processing of the coal. Multiplying the 2016 use of 38,340 tons TDF with coal in Kentucky by these factors shows a savings of nearly 13,000 tons carbon dioxide (CO₂) and 147 tons of particulate matter not emitted each year. The use of TDF to reduce certain pollutants makes the long-term use of coal more viable.

The ground rubber market has remained steady over time. Since 2004, the commonwealth has awarded 590 grants totaling over \$8.4 million, primarily to schools and municipalities, for crumb rubber uses. The most common uses were crumb rubber spread on athletic fields to increase turf life and on playgrounds to reduce injuries. In October 2014, NBC News presented a story about possible health threats associated with the use of crumb rubber on athletic fields, and later presented a similar story on concerns with the use of crumb rubber mulch on playgrounds. A premise of these studies is that exposure to crumb rubber and playground mulch may result in exposure that could result in adverse health effects. In light of these concerns, and out of an abundance of caution, the EEC has not provided grant funding for loose shredded or crumb rubber on playgrounds and athletic fields as part of its grant portfolio since 2014.

An October 2018 EPA study to identify the types and levels of exposure to chemicals originating from crumb rubber used on athletic fields has been completed. It is still in the editing phase and is currently being peer reviewed before it is released for public comment. The release date is anticipated to be sometime in 2019. Existing studies conducted by the industry and third parties indicate that exposure to recycled waste tires under these scenarios does not result in adverse health effects. CR/TDP grants were still made available to entities for other applications, including landscaping and solid pour-in-place surfacing for hiking trails and playgrounds. The suspension of grant funding for loose rubber material playgrounds and athletic fields has significantly affected rubber production for these uses in the state, but there has been an overall increase in shredded and ground tire production. Improved TDF metering, which has the potential to increase TDF, is currently being evaluated technically and economically.

⁷ 76FR15494, 40 C.F.R. Part 241, EPA, Identification of Non-Hazardous Secondary Materials that Are Solid Waste, Final Rule, March 21, 2011, *Federal Register*



Photo 3: Waste Tire Collection Event, Nelson County

Photo by Donny Atha

Manufacturing of ground rubber and mulch from Kentucky tires increased from an essentially nonexistent product in 1998 to 1,164,000 PTEs in 2018. Liberty Tire Recycling, LLC, in Union County, manufactures a large quantity of colored mulch for retail outlets including Lowes, Home Depot, and Wal-Mart. Dalton Tire Recycle, in Boyd County, produces ground rubber for playgrounds and horse arenas. Porter's Tire and Auto Service, in Carter County, initiated crumb rubber and rubber mulch production in 2013.



Photo 4: Waste Tire Collection Event, Nelson County

Photo by Donny Atha

Ground tire rubber used in RMA is emerging as an expanding market. The EEC promotes this type of asphalt as an additional option to increase scrap tire recycling and has offered the RMA grant program to the commonwealth's counties and cities since 2016. These WTTF grants are applied as reimbursement to county or urban-county government recipients for the purpose of paving a segment of roadway with RMA. The recipients must match the grant by paving an equal portion of the roadway, or a similar roadway, using the same volume of traditional asphalt.

The maximum volume reimbursed for chip seal asphalt is 24,000 square yards, and for thin overlay it is 12,000 square yards. These grant projects are part of an ongoing five-year study designed to collect performance data on using RMA on Kentucky roads.

Since the RMA grants were initiated, the WTTF has funded 17 different road projects reimbursing \$1,287,612 to counties for RMA paving. In 2018, \$452,998 was paid to reimburse seven grant projects; five thin overlay projects and two chip seal projects, which expended approximately 2,280

tires (approximately 22.8 tons). This grant is expected to continue in 2019, and could possibly be expanded to include additional pavement processes, contingent on sufficient funding. Appendix C includes grant recipient information.

All RMA projects have passed tests in 2017 to meet existing Kentucky Transportation Cabinet (KYTC) standard specifications. These tests, which compared RMA surfaces to traditionally paved asphalt areas of similar area, included compaction density, asphalt content, voids, and performance grade (resistance to hot and cold weather under load).

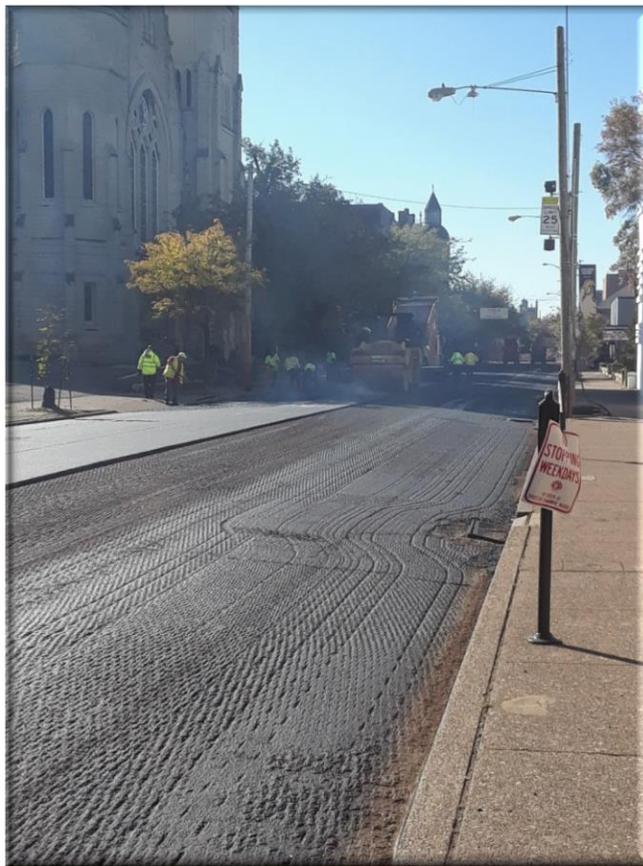


Photo 5: Road preparation for RMA paving project, 4th Street, Jefferson County.

Photo by Byron J. Bland

Market diversity is a critical component of successful waste tire management programs. Kentucky has developed diverse product markets, producing TDF and ground rubber products, representing approximately 64 percent of Kentucky's waste tire generation. However, developing civil engineering markets for shredded tires could further enhance the diversity of Kentucky's markets, providing constructive applications for shredded tires that are currently landfilled. Additionally, when considering possible new areas for growth in waste tire markets,

it should be noted that in 2015, Kentucky ranked third in the U.S. for car and truck production.⁸ The commonwealth could consider assisting the three major Kentucky automotive manufacturers in using waste tire ground rubber in molded automotive parts to expand this important potential application.



*Photo 6: RMA paving project, Marion County.
Photo by Byron J. Bland*

MARKET DYNAMICS

Due to the volatile nature of the scrap tire market, it is not uncommon for tire processors to quickly accumulate more tires than they can reasonably manage during peak times, processing equipment outages, or changes in product markets. When shredded tires are improperly stored, specifically in large, deep compacted piles, the possibility of auto-ignition exists. When a large pile of whole or shredded tire material ignites, it is extremely difficult to extinguish. Permitted tire processors are required to have a bond equal to \$1.00 per on-site PTE, with a minimum of \$10,000. A common problem with this system is that facilities often bond for the minimum amount, then accumulate well over 10,000 tires, resulting in circumstances where their bond is inadequate to cover a required cleanup. In addition to stronger enforcement of the bonding requirement, a solution for consideration could be realized by funding remediation of tire fires to include a statutory increase in the amount of the bond required. The bond amount in KRS

⁸ *Auto Jobs & Economics*, Auto Alliance, www.autoalliance.org/auto-jobs-and-economics/state-facts

224.50-862 could be increased from \$1.00 per tire to \$1.50 to cover cleanup costs. Similar to other states, the legislature could consider requiring an actual cost estimate for closure to determine the amount of financial assurance requirement.

A potential problem for tire processors is the maturation of national TDF markets, reflecting a general downturn in U.S. manufacturing, and reduction in coal usage. Unlike many states, Kentucky's TDF market remains fairly robust and has ongoing potential to continue as a major use of waste tires for the commonwealth. However, use of all solid fuels, including coal and TDF, is expected to decline in the foreseeable future. Continuing efforts to further diversify markets are critical to maintaining a high rate of constructive utilizations of waste tire resources.



*Photo 7: Blasting mats made from recycled tires to contain blast and suppress dust, Bullitt County
Photo by Byron J. Bland*

FUTURE OF THE FUND

The waste tire program exemplifies the EEC's mission of protecting human health and the environment by encouraging waste reduction, reuse, and recycling. The WTTF supports statewide WTCEs on a three-year rotation, remediates large tire piles, provides direct grants to counties, and develops markets for TDF and ground rubber. If the waste tire fee is not extended, program funds will not be available to Kentucky businesses involved in tire processing, and remediation would be negatively affected.



*Photo 8: RMA paving project, Dover Road, Bracken County
Photo by Byron J. Bland*

A total of 35 states have mandated tire fees⁹. The median fee is \$1.00 per new tire sold. The highest fee is \$2.50 in Alaska, Illinois, New York, and Oklahoma, while the lowest fee is \$0.25 in Indiana and Kansas. Waste tire funds discontinued in other states resulted in illegal waste tire dumps reappearing. These states were faced again with a recurrence of the original emergency situation which necessitated the fee, including remediation of large tire piles and fires. Legislators and governors were asked to remedy a problem that was previously solved. Examples of problems encountered by states that discontinued their waste tire fee include¹⁰:

- Minnesota: An increase in waste tire tipping fees and an increase in monofilling (landfilling of tires in a disposal cell and a loss to the recycling market), and an initial increase in low value marginal civil engineering projects that were more like landfilling than constructive use of TDA's technical and economic advantages. TDA applications have since broadened into good applications in Minnesota, providing an important market;
- Wisconsin: Product markets crashed without the state subsidy;
- Texas: \$9.5 million in general funds to clean up two waste tire piles and buy TDF metering (feed) systems for industry. They saw an increase in land reclamation using

⁹ *State Scrap Tire Legislation Summary*, Rubber Manufacturers Association, 2015, www.rma.org/download/scrap-tires/state_&federal_reports/legislation_chart_2015.pdf

¹⁰ *Waste Tire Management Program Closure-Precedents/Experience in Other States*, Terry Gray, TAG Resource Recovery, Inc., Houston, TX, 2011

waste tires in conjunction with soil to fill excavated sites, and still have major legacy stockpiles;

- Missouri: No fee for two years during which the state had an increase in tire fires. The legislature reinstated the fee for five years in 2009 with subsequent renewal; and
- Recycling rates decreased by over 25 percent, on average, in seven states after discontinuance of the fee, and over 40 percent in some states.

In addition to the repercussions discussed above, the following impacts could happen in Kentucky as a result of the fee expiring:

- Counties would not receive the \$4,000 annual grant to clean up abandoned waste tires;
- Rural areas would be impacted by abandoned waste tires on farms and roadsides;
- Counties might be unable to rely on the commonwealth for tire pile remediation; and
- Market development would likely cease.

The waste tire program faces many challenges, common to similar programs throughout the country:

- It is probable that some retailers collect disposal fees and stockpile waste tires until a WTCE is conducted in their area, or otherwise mismanage their waste tires.
- Individuals have chosen to retain their waste tires to avoid additional fees charged by tire retailers for waste tire disposal, taking these tires out of the recycling stream. Some of these tires may later be mismanaged, burdening counties with continued waste tire management issues.

It has been reported that some tire retailers charge higher tire disposal/recycling fees of \$3.00 to \$3.50 to discourage individuals from leaving waste tires with the retailer, compared to the average \$1.50 to \$2.00 fee. As an alternative, this situation could be improved by requiring the disposal price to be included separately and alongside the sale price and tire fee, or list the actual statewide average disposal rate on a notice and allow the free market to manage the situation.

Many tires collected by registered waste tire transporters are still being legally disposed of in landfills rather than being recycled. It is less capital intensive to cut or shred and landfill a tire, than to install equipment required to produce a recyclable product. Some states have corrected this problem by banning all tire material, including cut or shredded tires, from landfills except for pre-approved construction civil engineering applications within landfills.

Based on national averages, it is estimated that Kentuckians purchase 530,000 used tires annually.¹¹ A recent tire industry survey disclosed that 88 percent of all tire repairs are incorrectly performed.¹² In reaction, consideration could be given to whether reuse of tires should be promoted or discouraged.

Statewide coverage by reputable tire processing facilities is necessary for the free market to work. Long transportation distances translate into higher costs that keep tire recycling from being economically feasible.

Aligning the reporting schedule of the WTTF within the state budget cycle of two fiscal years, could improve the efficiency of the report. A revision to KRS 224.50-872 from annually to a two-year reporting cycle would become necessary.

KRS 224.50-868(3) authorizes the DOR to collect the waste tire fee. The statute requires up to \$50,000 per year be transferred to DOR for collection of this fee. This neither provides enough money (estimated cost of \$75,000 to employ one person annually) nor incentive for DOR to enforce the collection. States incorporating a specific percentage to be awarded to the collection agency have higher collection rates than Kentucky.

In conclusion, the Energy and Environment Cabinet strongly recommends that the General Assembly extend the waste tire fee and continue the waste tire program.

¹¹ *Used Tires Businesses Balloon*, Feb. 2011, Mike Breslin, www.americanrecycler.com/0211/814used.shtml

¹² *RMA: 88% of Tire Repairs Done Incorrectly*, 2008, www.tirebusiness.comm/article/20080228/NEWS/302289997?template=printart

CREDITS & ACKNOWLEDGEMENTS

Commonwealth of Kentucky

Governor Matthew G. Bevin

Energy and Environment Cabinet

Secretary Charles G. Snavelly

Deputy Secretary R. Bruce Scott, P.E.

Department for Environmental Protection

Commissioner Anthony R. Hatton, P.G.

Deputy Commissioner Sean Alteri

This annual report is intended to provide a concise set of facts and measurements to support environmental decision-making. We welcome your questions and comments to the contacts below:

Division of Waste Management

Director Jon Maybriar

300 Sower Boulevard, Second Floor

Frankfort, KY 40601

Phone: 502-564-6716

Fax: 502-564-4245

waste.ky.gov

We acknowledge the contributions of the management, staff and consultants of the Division of Waste Management:

Byron "BJ" Bland

Donny Atha

Gary Logsdon

George Gilbert

Grant White

Lisa Evans

Terry Gray

Edited by: Program Planning and Administration Branch staff

The Kentucky Division of Waste Management does not discriminate on the basis of race, color, religion, sex, national origin, sexual orientation or gender identity, ancestry, age, disability or veteran status. The division provides, on request, reasonable accommodations necessary to afford an individual with a disability an equal opportunity to participate in all services, programs, and activities. Contact the division to request materials in an alternate format.

January 2019



APPENDICES

Appendix A: Fiscal Year 2018 Waste Tire Grants

Appendix B: Calendar Year 2018 Crumb Rubber/Tire-Derived Products Grants

Appendix C: Calendar Years 2016 – 2018 Rubber – Modified Asphalt Grants

Appendix A: Fiscal Year 2018 Waste Tire Grants

COUNTY	AWARD	FUNDS USED	FUNDS RETURNED	NUMBER OF PTE's
Adair Co.	\$4,000.00	\$4,366.70	\$0	2,003
Allen Co.	\$4,000.00	\$4,584.70	\$0	2,664
Anderson Co.	\$4,000.00	\$4,307.50	\$0	2,089
Ballard Co.	\$4,000.00	\$4,005.40	\$0	3,479
Barren Co.	NA	NA	NA	NA
Bath Co.	\$4,000.00	\$3,837.75	\$162.25	2,970
Bell Co.	\$4,000.00	\$4,051.50	\$0	2,306
Boone Co.	\$4,000.00	\$5,600	\$0	4,000
Bourbon Co.	NA	NA	NA	NA
Boyd Co.	\$4,000.00	\$4,322.50	\$0	1,205
Boyle Co.	\$4,000.00	\$5,559.00	\$0	2,535
Bracken Co.	\$4,000.00	\$4,018.89	\$0	1,148
Breathitt Co.	\$4,000.00	\$3,486.00	\$514.00	729
Breckinridge Co.	\$4,000.00	\$4,349.00	\$0	1,787
Bullitt Co.	\$4,000.00	\$1,990.00	\$2,010.00	690
Butler Co.	\$4,000.00	\$4,035.40	\$0	2,320
Caldwell Co	\$4,000.00	\$0	\$4,000.00	0
Calloway Co.	\$4,000.00	\$677.60	\$3,322.40	4,840
Campbell Co.	\$4,000.00	\$10,680.59	\$0	8,845
Carlisle Co.	\$4,000.00	\$0	\$4,000.00	0
Carroll Co.	\$4,000.00	\$0	\$4,000.00	0
Carter Co.	NA	NA	NA	NA
Casey Co.	\$4,000.00	\$4,361.30	\$0	2,274
Christian Co.	\$4,000.00	\$5,433.00	\$0	3,022
Clark Co.	\$4,000.00	\$0	\$4,000.00	NA
Clay Co.	\$4,000.00	\$4,935.11	NA	2,903
Clinton Co.	\$4,000.00	\$538.90	\$3,461.10	317
Crittenden Co.	\$4,000.00	\$1,000.00	\$3,000.00	1,400
Cumberland Co.	\$4,000.00	\$4,574.00	\$0	4,500
Daviess Co.	\$4,000.00	\$4,197.00	\$0	4,197
Edmonson Co.	\$4,000.00	\$4,067.50	\$0	1,068
Elliott Co.	\$4,000.00	\$4,000.00	\$0	2,844

WASTE TIRE PROGRAM ANNUAL REPORT TO THE GENERAL ASSEMBLY

COUNTY	AWARD	FUNDS USED	FUNDS RETURNED	NUMBER OF PTE's
Estill Co.	NA	NA	NA	NA
Fayette Co.	\$4,000.00	\$4,000.00	\$0	2,285
Fleming Co.	\$4,000.00	\$620.38	\$3,379.62	177
Floyd Co.	\$4,000.00	\$4,009.95	\$0	1,337
Franklin Co.	\$4,000.00	\$0	\$4,000.00	0
Fulton Co.	NA	NA	NA	NA
Gallatin Co.	\$4,000.00	\$2,133.98	\$1,866.02	790
Garrard-Lincoln	\$8,000.00	\$8,338.70	\$0	1,467
Grant Co.	\$4,000.00	\$3,703.21	\$296.79	8,504
Graves Co.	\$4,000.00	\$1,000.00	\$3,000.00	1,000
Grayson Co.	\$4,000.00	\$4,396.44	\$0	2,309
Green Co.	\$4,000.00	\$905.50	\$3,094.50	320
Greenup Co.	\$4,000.00	\$6,946.00	\$0	6,610
Hancock Co.	NA	NA	NA	NA
Hardin Co.	\$4,000.00	\$4,000.00	\$0	805
Harlan Co.	\$4,000.00	\$11,700.00	\$0	8,000
Harrison Co.	\$4,000.00	\$4,230.55	\$0	1,652
Hart Co.	\$4,000.00	\$3,649.00	\$351.00	1,253
Henderson Co.	\$4,000.00	\$4,200.00	\$0	6,000
Henry Co.	NA	NA	NA	NA
Hickman Co.	\$4,000.00	\$1,500.00	\$2,500.00	1,500
Hopkins Co.	\$4,000.00	\$4,120.48	\$0	5,129
Jackson Co.	\$4,000.00	\$4,362.20	\$0	1,984
Louisville-Jefferson Co.	NA	NA	NA	NA
Jessamine Co.	\$4,000.00	\$6,530.70	\$0	4,039
Johnson Co.	NA	NA	NA	NA
Kenton Co.	\$4,000.00	\$5,870.00	\$0	2,600
Knott Co.	NA	NA	NA	NA
Knox Co.	\$4,000.00	\$3,463.00	\$537.00	1,681
LaRue Co.	\$4,000.00	\$3,600.00	\$400.00	2,400
Laurel Co.	\$4,000.00	\$4,161.00	\$0	1,548
Lawrence Co.	\$4,000.00	\$4,266.00	\$0	1,922
Lee Co.	\$4,000.00	\$2,030.60	\$1,969.40	1,028
Leslie Co.	\$4,000.00	\$4,000.00	\$0	524
Letcher Co.	NA	NA	NA	NA
Lewis Co.	\$4,000.00	\$4,399.50	\$0	1,257

WASTE TIRE PROGRAM ANNUAL REPORT TO THE GENERAL ASSEMBLY

COUNTY	AWARD	FUNDS USED	FUNDS RETURNED	NUMBER OF PTE's
Livingston Co.	\$4,000.00	\$2,800.00	\$1,200.00	2,700
Logan Co.	\$4,000.00	\$406.20	\$3,593.80	206
Lyon Co.	\$4,000.00	\$3,867.40	\$132.60	1,588
Madison Co.	\$4,000.00	\$4,246.20	\$0	1,736
Magoffin Co.	\$4,000.00	\$4,000.00	\$0	4,022
Marion Co.	\$4,000.00	\$3,992.00	\$8.00	673
Marshall Co.	\$4,000.00	\$4,000.00	\$0	3,743
Martin Co.	NA	NA	NA	NA
Mason Co.	\$4,000.00	\$14,269.25	\$0	14,439
McCracken Co.	\$4,000.00	\$4,000.00	\$0	3,556
McCreary Co.	\$4,000.00	\$3,682.00	\$318.00	1,115
McLean Co.	\$4,000.00	NA	\$4,000.00	NA
Meade Co.	\$4,000.00	\$6,524.00	\$0	1,922
Menifee Co.	\$4,000.00	\$4,018.00	\$0	2,163
Mercer Co.	\$4,000.00	\$3,337.15	\$662.85	1,643
Metcalfe Co.	\$4,000.00	\$1,552.80	\$2,447.20	573
Monroe Co.	\$4,000.00	\$4,438.10	\$0	2,733
Montgomery Co.	\$4,000.00	\$3,872.50	\$127.50	1,679
Morgan Co.	NA	NA	NA	NA
Muhlenberg Co.	NA	NA	NA	NA
Nelson Co.	\$4,000.00	\$20,350.00	\$0	19,120
Nicholas Co.	NA	NA	NA	NA
Ohio Co.	\$4,000.00	\$3,997.00	\$3.00	2,799
Oldham Co.	\$4,000.00	\$2,022.50	\$1,977.50	705
Owen Co.	\$4,000.00	\$ 1,077.50	\$2,922.50	618
Owsley Co.	NA	NA	NA	NA
Pendleton Co.	\$4,000.00	\$3,397.00	\$603.00	2,604
Perry Co.	NA	NA	NA	NA
Pike Co.	\$4,000.00	\$7,200.00	\$0	4,000
Powell Co.	\$4,000.00	\$3,549.90	\$450.10	1,775
Pulaski Co.	\$4,000.00	\$5,914.00	\$0	3,160
Robertson Co.	NA	NA	NA	NA
Rockcastle Co.	\$4,000.00	\$4,004.60	\$0	2,101
Rowan Co.	\$4,000.00	\$3,319.20	\$680.80	1,224
Russell Co.	\$4,000.00	\$4,613.40	\$0	2,097
Scott Co.	\$4,000.00	\$2,372.48	\$1,627.52	600

WASTE TIRE PROGRAM ANNUAL REPORT TO THE GENERAL ASSEMBLY

COUNTY	AWARD	FUNDS USED	FUNDS RETURNED	NUMBER OF PTE's
Shelby Co.	\$4,000.00	\$5,000.00	\$0	4,200
Simpson Co.	\$4,000.00	\$668.75	\$3,331.25	308
Spencer Co.	\$4,000.00	\$4,400.00	\$0	2,414
Taylor Co.	\$4,000.00	\$4,000.00	\$0	2,175
Todd Co.	\$4,000.00	\$3,000.00	\$1,000.00	2,963
Trigg Co.	NA	NA	NA	NA
Trimble Co.	\$4,000.00	\$2,818.47	\$1,181.53	560
Union Co.	\$4,000.00	\$6,771.50	\$0	5,240
Warren Co.	\$4,000.00	\$4,185.00	\$0	7,720
Washington Co.	\$4,000.00	\$4,473.00	\$0	1,482
Wayne Co.	\$4,000.00	\$949.00	\$3,051.00	266
Webster Co.	\$4,000.00	\$4,101.77	\$0	4,837
Whitley Co.	NA	NA	NA	NA
Wolfe Co.	\$4,000.00	\$3,949.00	\$51.00	1,795
Woodford Co.	\$4,000.00	\$3,886.00	\$114.00	2,115
TOTALS	\$400,000.00	\$402,142.20	\$71,347.23	262,125

**Appendix B:
Calendar Year 2018 Crumb Rubber/Tire-Derived Products Grants**

COUNTY	APPLICANT	LOCATION	PROJECT	AWARD
Allen	Allen County Fiscal Court	Allen County Judicial Center	Landscaping	\$5,110
Daviess	Audubon Area Community Services – Head Start Program	Seven Hills Head Start/Preschool (2 playgrounds)	ADA Pour-In-Place Playground Surfacing	\$38,016
Daviess	Owensboro Public Schools	Sutton Elementary School	Pour-In-Place Playground	\$28,890
Grant	Williamstown Independent Schools	Williamstown JR/SR High School	Nature Trail	\$6,660
Green	City of Greensburg	Pocket Parks, Disc Golf Court and Fitness Park	Landscaping	\$18,400
McLean	McLean County Fiscal Court	Various County Buildings/Locations	Landscaping	\$13,900
Morgan	Morgan County Schools	Morgan County Schools & Central Office	Landscaping & Foot Paths	\$3,983
Pendleton	Pendleton County Fiscal Court	Pendleton County Courthouse and Courthouse Square	Landscaping	\$6,248
Perry	Hazard/Perry County Community Ministries, Inc.	New Beginnings Child Care Center	Pour-In-Place Playground	\$34,439
Pulaski	City of Somerset	Fischer Family Park	ADA Pour-In-Place Playground	\$95,600
Union	John Paul II Catholic School	John Paul II Catholic School	Pour-In-Place Playground	\$33,600
Whitley	City of Corbin	Larry Stevens Playground at Rotary Park	Pour-In-Place Playground	\$15,300
			TOTAL	\$300,146

**Appendix C:
Calendars Year 2016 to 2018 Rubber-Modified Asphalt Grants**

COUNTY	APPLICANT	LOCATION/ROAD	SURFACE TYPE	AWARD
CY2016 Grant Cycle				
Fleming	Fleming Co. Fiscal Court	Markwell Road	Chip Seal	\$94,973.10
Hart	Hart Co. Fiscal Court	Mr. Vernon, Rocky Hill Roads	Chip Seal	\$66,628.50
Metcalf	Metcalf Co. Fiscal Court	Granville Sexton Road	Chip Seal	\$63,108.00
Trigg	Trigg Co. Fiscal Court	Tyler, Ppool, Paradise, Buffalo Roads	Chip Seal	\$88,765.35
Whitley	Whitley Co. Fiscal Court	Tiny Branch Road	Chip Seal	\$87,726.40
CY2017 Grant Cycle				
Green	Green Co. Fiscal Court	South End Road	Thin Overlay	\$84,460.00
Hancock	Hancock Co. Fiscal Court	Vastwood Park	Thin Overlay	\$78,100.00
Jefferson	Louisville Metro Government	Lake Forest Parkway	Thin Overlay	\$73,400.00
Marion	Marion Co. Fiscal Court	Riley Gravel Switch Road	Thin Overlay	\$98,463.00
Webster	Webster Co. Fiscal Court	Sebree Slaughter, Watkins Sebree Roads	Thin Overlay	\$99,000.00
CY2018 Grant Cycle				
Adair	Adair Co. Fiscal Court	West Egypt, Snake Creek Roads	Thin Overlay	\$83,572.50
Bracken	Bracken Co. Fiscal Court	Dover Road, Fronks Lane	Thin Overlay	\$68,998.00
Green	Green Co. Fiscal Court	J. T. Ward Road	Chip Seal	\$73,946.00
Hart	Hart Co. Fiscal Court	Hatcher Valley Road	Thin Overlay	\$46,391.50
Jefferson	Louisville Metro Government	South 4 th Street	Thin Overlay	\$88,080.00
Marion	Marion Co. Fiscal Court	Helm School House Road	Chip Seal	\$34,500.00
Taylor	Taylor Co. Fiscal Court	Pike's Ridge Road	Thin Overlay	\$57,500.00

ACRONYMS

ADD	Area Development District
BGAD	Bluegrass Army Depot
BTU	British Thermal Unit
CR/TDP	Crumb Rubber/Tire-Derived Products
DOR	Department of Revenue
DWM	Division of Waste Management
EEC	Energy and Environment Cabinet
EKPC	East KY Power Cooperative
EPA	U.S. Environmental Protection Agency
GHG	Greenhouse Gas
KYTC	Kentucky Transportation Cabinet
OMU	Owensboro Municipal Utility
PSC	Public Service Commission
PTE	Passenger Tire Equivalent
RLA	Recycling and Local Assistance
RMA	Rubber-Modified Asphalt
TDA	Tire-Derived Aggregate
TDF	Tire-Derived Fuel
WTCE	Waste Tire Collection Event
WTTF	Waste Tire Trust Fund
WTWG	Waste Tire Working Group



Photo 9: RMA paving project, 4th Street, Jefferson County
Photo by Byron J. Bland

**Kentucky Division of Waste Management
300 Sower Boulevard, Second Floor
Frankfort, KY 40601
Report an Environmental Emergency, 24 hours to Environmental Response Team
502-564-2380 or 800-928-2380**