

WASTE TIRE PROGRAM



CY 2012

A REPORT TO THE GENERAL ASSEMBLY

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WASTE TIRE PROGRAM

A REPORT TO THE GENERAL ASSEMBLY

I. INTRODUCTION AND BACKGROUND

INTRODUCTION

This report has been prepared as required by KRS 224.50-872. The purpose of the report is to provide information related to the Kentucky waste tire program. Specifically, the report includes information related to the Commonwealth's amnesty and remediation program, markets in the Commonwealth, issues that have arisen in 2012 and recommendations for improvements to the program.

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.

BACKGROUND

In 1990, the General Assembly passed House Bill 32 which created the waste tire control program and established the Waste Tire Trust Fund, which was supposed to be used to eliminate existing waste tire piles and prevent the creation of 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 a market would develop in the future. In 1994, the General Assembly extended the program for four more years and added a prohibition on open burning of waste tires.

In 1998, the General Assembly repealed the existing waste tire control program and created a new program with a new approach. The revised statute retained the \$1.00 fee collected on new motor vehicle tires, the Waste Tire Trust Fund, 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 a report from the Energy and Environment Cabinet (Cabinet) regarding the effectiveness of the program. The 1998 legislation set an expiration date of July 31, 2002 for the collection of the \$1.00 fee on new motor vehicle replacement tires sold. However, the 2002 General Assembly extended the fee for an additional four years. The General Assembly extended the program for another four years during the 2006 legislative session. The provisions for collection of the tire fee were to have sunset on July 31, 2010, but the waste tire fee was extended in 2010 and again in 2012 during the legislative session as part of the budget bill. It is now set to expire on June 30, 2014.

The fee is collected from consumers by retailers and paid monthly to the Department of Revenue (DOR). The cabinet uses the fee to implement the waste tire program, including the waste tire amnesty and remediation program, and to fund grants to manage and develop markets for waste tires.

WASTE TIRE WORKING GROUP

In the 2011 regular session, the legislature passed House Bill 433 which established the Waste Tire Working Group (WTWG). According to KRS 224.50-855 the purpose of the WTWG is to review numerous aspects of the Kentucky waste tire program and to provide advice to the cabinet that could propose changes to the applicable statutes and regulations in hopes of improving the program. Initially, the WTWG consisted of the following positions:

- (1) The Director of the Division of Waste Management or his or her designee (currently, Mr. Anthony R. Hatton, P.G., Director, Division of Waste Management);
- (2) The Manager of the Recycling and Local Assistance Branch or his or her designee (currently, Mr. Gary Logsdon, Manager, Recycling and Local Assistance Branch);

In addition, Governor Steve Beshear appointed the following members to the group:

- (3) Mr. John Roberts, Jr., Assistant Director, Division of General Government, Department of Agriculture;
- (4) Ms. Mary F. Dickey, representative, Solid Waste Coordinators of Kentucky; and
- (5) Mr. Keith Brock, Marion County Solid Waste Coordinator.

During the 2012 regular session of the General Assembly, the legislature passed House Bill 518 which amended KRS 224.50-855 to add members to the WTWG, including: a county judge/executive, mayor and representative of private industry engaged in the business of retail tire sales. Governor Steve Beshear appointed the following members to the group:

- (6) The Honorable James R. Townsend, Webster County Judge-Executive;
- (7) The Honorable Martin L. Voiers, Mayor of Flemingsburg; and
- (8) Mr. Joe T. Durkin, assistant manager for a large tire retailer in Lexington.

During 2012, the cabinet, working with the WTWG, completed revisions to several waste tire program related fact sheets. The Fact Sheets developed by the WTWG can be found at <http://waste.ky.gov/RLA/Pages/Fact-Sheets.aspx>.

During 2013, the WTWG will work with the new members to better familiarize them with all aspects of the waste tire program to support upcoming evaluations conducted by the group.

II. EFFECTIVENESS OF THE FEE IN FUNDING IMPLEMENTATION OF THE WASTE TIRE PROGRAM

The cabinet has removed waste tires from the environment, funded crumb rubber grant projects, and assisted in developing markets for waste tires. Recycling markets change periodically, therefore occasional adjustments to improve the program are necessary.

The Waste Tire Trust Fund helps support the continued removal of waste tires from the environment, which in certain circumstances have been a fire threat and a breeding ground for mosquitoes.

PROGRAM SUCCESSES

1. Amnesties

Since 1998, the program has funded the removal and disposal of nearly 19.0 million Passenger Tire Equivalents (PTEs) at a cumulative cost of \$18.9 million. The tires were collected from 120 counties as part of the amnesty program and the remediation of numerous tire piles.

During FY2012, the cabinet conducted amnesties in the Purchase, Cumberland Valley, KIPDA, Barren River, Green River, and Pennyryle Area Development Districts (ADD). During the first six months of FY2013 the cabinet conducted tire amnesties in the Bluegrass ADD. The aforementioned amnesties netted a total of 1,520,643 PTEs for a cost of \$1,623,568.

Comparatively, tire amnesties have been effective in reducing the amount of waste tires by evidence of a declining trend in the number of tires collected at each amnesty. For example, the last time amnesties were conducted in the ADDs mentioned above, the total PTEs were 2,454,701, compared to 1,520,643 in the most recent round of amnesties. The result is a 38% reduction in PTEs collected. As a result of this trend in FY2010, the cabinet budgeted from a four year cycle to a three year cycle for tire amnesties. The cabinet will continue three year cycle amnesties assuming the funding remains stable. Additionally, reduced amnesty costs have allowed the cabinet to award funds directly to counties to assist them in addressing waste tires annually.

2. Grants to Counties

Since FY2011, the cabinet has made \$3,000 per year available to counties to transport and dispose or recycle waste tires. In FY2012, the cabinet disbursed \$336,000. The counties spent \$259,484 to dispose or recycle 252,883 PTEs. Counties are required to return any unspent portion of grant monies.

3. Orphan Tire Piles

The cabinet used Waste Tire Trust Fund monies in FY 2012 to remediate four orphan tire piles consisting of 56,931 PTEs at a cost of \$53,458. Additional information is included in Appendix C.

During 2012 the cabinet worked with Simpson County to complete the remediation of a tire processing facility that went bankrupt in the early 1990s. At that time, there was a significant fire at

the site that was extinguished by cabinet contractors. However, a significant amount of shredded tires remained on the site until recently. To alleviate fire potential and to protect human health and the environment, the cabinet awarded a grant for an illegal open dump (using Kentucky Pride funds) to Simpson County to remove and properly dispose or recycle the tire shreds. A total of 804,728 PTEs were removed at a cost of \$814,483.

4. Public Health Benefits

The two tables shown summarize the continued low incidence of the West Nile Virus in Kentucky, some portion of which was likely attributed to the continued removal and disposal of millions of mosquito “incubators” in the form of waste tires in the environment.

Equine West Nile Virus		
Year	Reported Cases	Reported Deaths
2001	8	6
2002	513	137
2003	102	35
2004	8	4
2005	9	3
2006	7	0
2007	3	2
2008	5	1
2009	8	1
2010	6	3
2011	1	0
2012*	13	NA*

Cabinet for Health and Family Services Report on West Nile Virus ¹	
Year	Reported Cases
2008	3
2009	2
2010	3
2011	4

Additionally, cases of West Nile Equine have dropped dramatically since 2002²; and while increased immunizations are the main reason for the decline of the disease afflicting horses, it is noteworthy that the reduction of tire piles has reduced the potential for mosquito breeding.

*As of Dec. 7, 2012, no death statistics were available.

PROGRAM CHALLENGES

1. Fiscal Issues

There were other challenges with the current waste tire program:

- It is highly likely that some percentage of retailers were collecting disposal fees and then stockpiling waste tires until the amnesty program was conducted in their areas.
- Some retailers were suspected of transferring tires to an unpermitted hauler who then illegally dumps them on a roadside or elsewhere. Discovery of such a pile required a response from county or state government to recover the tires at taxpayers’ expense.
- Approximately 20 to 30 percent of the PTEs generated annually in Kentucky were managed via the Commonwealth’s waste tire amnesty program. The remaining 70 to 80 percent of the

- PTEs were processed through commercial scrap tire collectors and processors. Should there be a significant decrease in the amount of waste tires managed by the commercial processors; the Waste Tire Trust Fund would be insufficient to manage the increase in number of tires that would result.
- 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. Also, these tires, or a portion thereof, have been later mismanaged and dumped into the environment which burdened counties with continued waste tire management issues. The WTWG provided advice and input to the cabinet on a core fee concept to address individuals taking their used tires home.
 - It was reported that some tire retailers charged a higher fee of \$3-3.50 to discourage individuals from leaving waste tires with the retailer, instead of the average \$1.50-2.00 tire disposal/recycling fee charged by most retailers. As an alternative, this situation could be improved by requiring the disposal price to be included in the sale price or list the actual state wide average disposal rate on a notice and let the free market handle the situation.
 - KRS 224.50-868(3) gives the Department of Revenue the authority to collect the waste tire fee. Statute requires up to \$50,000 per year be transferred to DOR for collection of the fee. This neither provides enough money or incentive for DOR to enforce the collection. States that have specified a percentage to be awarded to the collection agency have a higher collection rate.

2. Tire Disposal

- Waste tires generated in salvage yards were sometimes brought to tire amnesty, dumped along roadsides or more often placed in the auto body before being sent to an auto shredder.
- 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 fixed this problem by banning all tire material, including cut or shredded tires from landfills, except for pre-approved constructive civil engineering applications within landfills.

3. Tire Derived Fuel (TDF)

During CY 2012, the cabinet through its field inspections noted an increased number of permitted tire accumulators and tire processors that apparently were having difficulty in selling their recycled tire products. This was based on the fact that four permitted tire processors and accumulators were amassing a significantly higher number of PTEs than allowed under their permit. The cabinet assumed this to be the result of losses in the TDF and other shredded product markets for Kentucky processors. While the cabinet cannot quantify changes in the TDF market, the inspection process has resulted in Notices of Violation issued to a number of processors primarily because of an over accumulation of tires that has led to:

- Exceeding the bond amount to cleanup and close the site; and
- Decreased space on-site, or a failure to maintain proper tire pile height and fire lanes.

A worst-possible outcome arising from this situation led to an emergency at the King Tire Recycling facility located in Stearns, Kentucky. The company had begun struggling to sell its shredded tire product and accumulated tires beyond what was allowable under its permit. The cabinet issued a Notice of Violation (NOV) on July 25, 2012 requiring compliance by August 25, 2012. The owner had more tires onsite than allowed by the bond of \$100,000 which set the limit at 100,000 PTEs. The facility had eight other violations related to fire lanes, proper storage pile size, buffer zones to nearby residential properties and other permit items. At around 2:00 pm on August 15, 2012 a fire began apparently in the tire grinding machinery area. Due to the large number of tires on-site, the fire was fairly significant and difficult to extinguish.

The cabinet contractor removed 1,151,087 PTE's (which included both whole tires and tire shreds) at a cost of \$649,049.73 to the Waste Tire Trust fund. The owner of a landfill 18 miles away in Tennessee was able to dispose of the chips which greatly lowered the price. If the nearby landfill had not been available and the cabinet had used its normal contract price, which includes recycling, the cost would have been \$1.55 per PTE.



“Employees of King Tire Recycling work to move equipment away from a blaze which broke out in the processing facility” according to Janie Slaven of the McCreary County Record, August 23, 2012. Photograph courtesy of Janie Slaven of the McCreary County Record.



The contractor placed soil over the tire fire at King Tire Recycling in an effort to extinguish the fire. (EEC Photograph)

FEE RECEIPTS

Kentuckians buy approximately 3,700,000 replacement tires each year. Subtracting about 5% for internet sales, the Commonwealth could be collecting about \$3.35M per year.³ Kentucky is receiving on average \$2.66 million per year, or approximately 79% of the money that could be collected. The table at right shows tire fee receipts for the last seven years:

Tire Fee Receipts	
Fiscal Year	Amount
2006	\$2,698,851.56
2007	\$2,690,102.51
2008	\$2,734,917.85
2009	\$2,590,443.21
2010	\$2,673,255.12
2011	\$2,621,464.29
2012	\$2,591,606.43

There are a number of possible explanations for the fact that not all of the fees are being collected, including:

- Not all retailers are collecting and remitting the proper amount of tire fees.
- No fee is being paid by trucking companies when purchasing large numbers of tires through fleet sales from wholesalers.

EXPENDITURES

During FY 2012 the cabinet expended waste tire funds to conduct amnesties, provided funding directly to counties for the transport and disposal or recycling of waste tires, and remediated tire piles. The cabinet spent \$1,216,251 to recycle 1,161,931 PTEs for amnesty events. Counties spent \$259,484 on transportation and disposal or recycling of 252,883 PTEs from grant monies awarded by the cabinet. In addition, the cabinet spent \$53,458 to clean up 56,931 PTEs collected from tire piles. Overall, state and county government efforts represented 27% of the total PTEs sent to market. The private sector handled the remaining 73% of waste tires.

The table below outlines expenditures from the Waste Tire Trust Fund from FY2009 through FY2012.

Waste Tire Expenditures					
Expenditures	2009	2010	2011	2012	Total
DWM Administrative costs	\$1,076,913	\$917,224	\$584,934	\$537,604	\$3,116,675
Reimbursement to Revenue	\$50,000	\$50,000	\$50,000	\$50,000	\$200,000
Amnesties	\$774,776	\$1,445,838	\$660,641	\$1,216,251	\$4,097,506
Crumb Rubber Grants	\$199,458	\$299,954	\$400,000	\$269,547	\$1,168,959
TDF Projects	\$785	\$20,941		\$8,788	\$30,514
Davis Property	\$23,940				\$23,940
Tire Grants to counties			\$351,000	\$336,000	\$687,000
Refunds to Revenue	\$1,189	\$1,919	\$4,340	\$3,255	\$10,703
OSBD -EEC Deferral				\$25,900	\$25,900
TOTAL	\$2,127,061	\$2,735,876	\$2,050,915	\$2,447,345	\$9,361,197

COST ISSUES

The King Tire fire in McCreary County erased one of the major waste tire processors for the southeastern part of the Commonwealth. Remediation of the fire cost the Waste Tire Trust Fund \$649,050 and the Hazardous Waste Management Fund about \$350,000 during late CY2012. Since the fund averages about \$2.66 million per year in receipts, this was a major expense and could have cut into crumb rubber grants and market development. The Hazardous Waste Management Fund is primarily paid by heavy industry and otherwise not related to waste tires. Since the cabinet removed 1,151,087 PTEs and the company forfeited a \$100,000 letter of credit, this represented a cost to taxpayers of \$850,000 or \$0.78 per PTE. If the nearby landfill had not been available and cabinet had used its normal contract price, which includes recycling, the cost would have been \$1.55 per PTE. One other processor has approximately 1.9 million PTEs in storage with no immediate market in sight. The owner has a Notice of Violation for exceeding the storage bond. If this site were to catch fire, site remediation and tire removal costs could exceed \$3,000,000, essentially wiping out the WTTF for the year. To help offset the expenditure of taxpayers' monies on cleaning up any future site that experience business problems leading to failure or a tire fire; a bond amount increase could be considered. The bond amount could be increased from \$1.00 per tire to \$1.50 to cover all clean-up costs.

The law requires the WTTF be used to reimburse DOR for its costs incurred in assessing and collecting fees, not to exceed \$50,000 per year. Currently the payment to DOR is considered to be an administrative cost to the cabinet, and thus a portion of the cabinet's 25% allotted for administration of the program. The statute could specifically exclude DOR's reimbursement from being a portion of the cabinet's administrative costs since this funding is not made available to the cabinet.

The cabinet should continue to receive 25% for administration of the waste tire program. Any future reductions of the administrative funding could negatively impact the program. Given the unknown future of this program, there may be a time when the 25% limit is a hindrance. This is especially true if enforcement were to take a bigger role in the management of waste tires.

III. EFFECTIVENESS OF THE WASTE TIRE PROGRAM IN DEVELOPING MARKETS FOR WASTE TIRES

WASTE TIRES GENERATED IN 2011

Kentuckians generated 5,590,000 PTEs in 2011. There is no known statistical database for waste tires generated in individual states, therefore this was an estimate drawn from national data prorated based on the Commonwealth's population, gasoline consumption and number of motor vehicle registrations. Statistics for CY 2012 were not available at the time of creating this report, so 2011 replacement tire sales were used.

2011 U. S. Generation (Millions)			
Type	Replacement Tires	PTEs	Total PTEs
Auto	198.0	1.0	198.0
Light Truck	28.6	1.5	42.9
Medium Truck	17.3	5.5	95.2
Subtotal	243.9		336.1
Salvage (10%)	24.4		33.6
Total	268.3		369.7

A waste tire is generated for each replacement tire sold. A waste tire is most commonly measured in 20-pound units or Passenger Tire Equivalent (PTEs), which is the approximate average weight of a passenger automotive tire. A light truck tire is 30 pounds or 1.5 PTEs, while a medium truck tire, such as a tractor-trailer tire at 110 pounds, is 5.5 times heavier than an automotive tire, or 5.5 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. The Kentucky Waste Tire Generation Calculations table defines the quantity of waste tires generated in 2011, expressed as tire units and as PTE.⁴

Waste tires are also generated from vehicle salvage operations. Junked vehicles generally have tires, some of which are recovered and resold as used tires while others are eventually disposed of as waste. The quantity of vehicles removed from service is available in “Wards Motor Vehicle Facts and Figures”, but the assumed quantity that is waste tires per vehicle is debatable. If two tires per passenger vehicle and three tires per truck or bus are considered waste, then waste tires from vehicle salvage operations represent approximately 10% of replacement tire sales. Therefore, total waste tire generation in 2011 was estimated to be 268.3 million units representing 369.7 million PTEs. Sales and generation data vary by year based on economic conditions. An average benchmark of one waste tire per person per year is often cited, but there was a 10-20% variation based on economic conditions. In 2011, actual generation was 14% below this citation on a unit basis and 18% above on a PTE or weight basis.

Waste tire generation is considered to be dependent upon population, gasoline consumption and vehicle registrations. The quantity of waste tires generated in Kentucky can be estimated by calculating Kentucky’s percentage of each of these parameters. The sources are cited in each calculation.

Kentucky Waste Tire Generation Calculations	
2011 Gas Use (1,000s Barrels)	
KY	53,200 ⁴
U.S.	3,126,225 ⁵
%	1.70%
2010 Motor Vehicle Registration ⁶	
KY	3,589,118
U.S.	242,60,545
%	1.48%
2011 Population ⁷	
KY	4,369,356
U.S.	311,591,917
%	1.40%

For Kentucky, the average percentage is 1.5% and the variation is plus or minus 11% from the average. This is comparatively good agreement and provides a sound basis for the estimate.

Number of KY Waste Tires based on U.S. Generation				
	Tires (Millions)		PTE (Millions)	
	U.S.	KY (1.5%)	U.S.	KY (1.5%)
Replacement	243.9	3.7	336.1	5.0
Salvage	24.4	0.4	33.6	0.5
Total	268.3	4.1	369.7	5.6

The estimated number of tires generated in Kentucky in 2011, counting a heavy truck tire as one tire, is about **4.1 M** tires or **0.94** tires per person per year. The total quantity expressed as PTE is 5.6 million. The estimated number of replacement tires sold in Kentucky in 2011 is 3.7 M tires.

CY 2012 MARKETS

The statewide recycling rate remained steady at 80% for 2012 compared to 81% for 2011. This figure is below the 89% in the U.S. for 2011, the latest available national data.⁸ The Commonwealth could increase its recycling rate in the short-term by working to increase the in-state Tire Derived Fuel (TDF) market and in the long-term through the diversification of markets.

TDF applications included 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 fossil fuel usage. These facilities operated in full compliance with all applicable federal, state and local environmental regulations.

WASTE TIRE PROGRAM

The largest ground rubber applications included playground safety cushioning, colored landscape mulch, and athletic fields.

The cabinet conducted several steps to gather information about the Commonwealth’s waste tire recycling markets, including:

- Obtained recycling market information from each major in-state processor;
- Compiled total tonnage of waste tire disposal from each landfill;
- Differentiated tires collected in Kentucky from those collected out-of-state based on the processors’ records and knowledge;
- Identified and contacted out-of-state processors believed to collect tires from Kentucky; and
- Contacted users of the tire products to verify the receipt of processed tires and the landfill owners to verify disposal amounts.

As the cabinet compiled the numbers in mid-December, a projected amount of tires was used by averaging the first eleven months.

Since the processors and landfill owners have no knowledge of open tire dumps, the cabinet did not include the number of waste tires at open dumps in the recycling report. However, the cabinet estimated about 2.1% of waste tires were illegally disposed based on the national average of unreported markets for waste tires.⁹

KY Waste Tire Collections 2012 (Tons)			
	Tires Generated		
	Kentucky	Other States	Total
In-State Facility Owners	37,265	45,925	83,190
Out-of-State Facility Owners	171	-	171
Amnesty	12,300	-	12,300
Total	49,736	45,925	95,661

The 2012 Kentucky Waste Tire Market Report follows below:

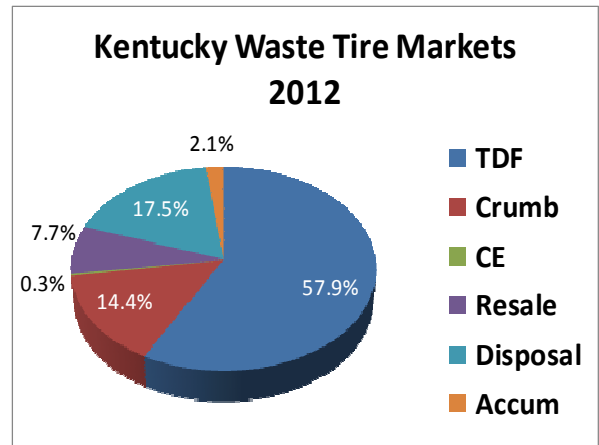
Kentucky Waste Tire Markets 2012 (Tons)								
	Recycled					Accum	Disposal	TOTAL
	TDF	Crumb	Civil Eng.	Resale	Subtotal			
In-State	19,960	3,735	0	3,850	27,545	1,025	8,695	37,265
Out-of-State	0	0	171	0	171	0	0	171
Amnesties	8,850	3,450	0	0	12,300	0	0	12,300
TOTAL	28,810	7,185	171	3,850	40,016	1,025	8,695	49,736
Percentage	57.9%	14.4%	0.3%	7.7%	80.5%	2.1%	17.5%	100.0%

The 2012 Kentucky recycling market was compared to the 2011 U.S. Market, the latest available, demonstrated in the chart below.¹⁰ “Other” U.S. markets on the chart include: Electric Arc (Steel) Furnace

1.3%, Exported 5.9%, Agricultural reuse 2.3%, Land reclamation projects 1.0%, and punched or stamped products 0.7%. Accumulation includes baled tires without market at 0.7%.

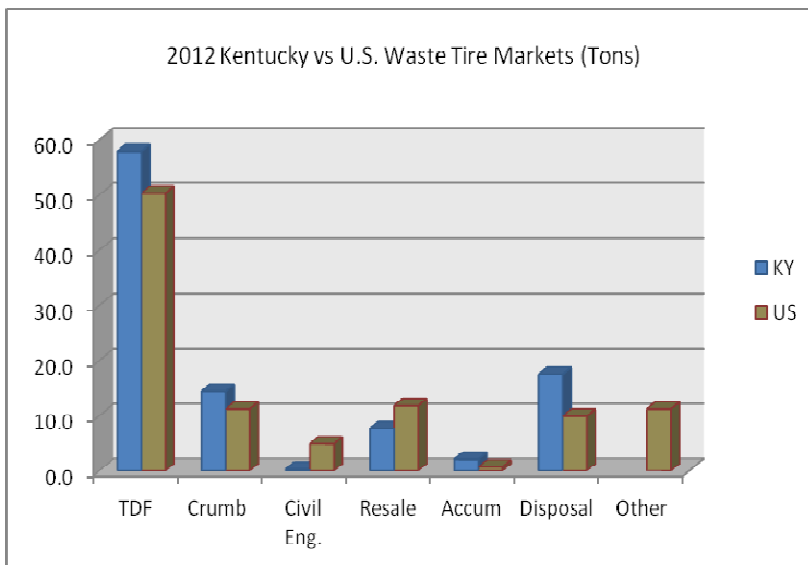
When comparing Kentucky to other national markets, the biggest differences were:

- Higher reliance on TDF, which is typical for the Southeast and averages 71%;¹¹
- Greater reliance on playground mulch and ground rubber;
- Less use in civil engineering applications; and
- More landfill disposal.



The ground rubber market is a higher-end market than TDF, as the properties of the original tire is carried forward to the new product rather than using the one-time energy value of the waste tire.

There is a difference between the 4,973,600 PTEs reportedly handled by the waste tire processors and the 5,590,000 PTEs predicted by the earlier analysis. Some reasons for the approximately 600,000 PTEs discrepancy may include:



- Nationally, about 2.1% of all waste tires are dumped in tire piles.¹² For Kentucky, a direct extrapolation would yield 117,000 waste tires per year illegally disposed in open dumps. Kentucky's unique waste tire program offers amnesties and an option to remediate newly discovered tire piles when no viable responsible party exists (landowner without preventative measures or no evidence of a dumper). The cabinet remediated four tire piles in FY 2012. Also, in late CY 2012, the cabinet funded

remediation at the Simpson County site with 804,728 PTEs and King Tire Recycling in McCreary County with 1,151,087 PTEs. Remaining known tire piles exist in Monroe and Hardin County.

- In FY 2012 the cabinet made available to counties \$3,000 to properly dispose or recycle illegally dumped tires. The grant funding allowed 112 counties to remove 252,883 PTEs from the environment. In addition to the \$259,484 provided by the cabinet, counties reported spending an additional \$74,357 of fiscal court monies cleaning up tires.

- Some tires go to out-of-state landfills. Kentuckians disposed of 8.2% of their solid waste in non-Kentucky facilities in 2011.¹³ Based on that percentage, 458,000 PTEs flowed out of state, including the 23,300 PTEs going a monofill in West Virginia.
- Some Kentuckians bought tires in the surrounding seven states. When comparing tire fees, the neighboring states charged: Indiana at \$0.25, Missouri at \$0.50, Virginia at \$0.50; Ohio at \$1.00, Tennessee at \$1.35, and Illinois at \$2.50. West Virginia collected a \$5.00 tire fee on each auto registration. Conversely, some out-of-state consumers bought replacement tires in Kentucky. On the whole, this may balance out.
- Kentucky tires may be going to out-of-state processors that are unknown to the cabinet. Kentucky does not require waste tire reporting by retailers.
- The steel cube or residual fluff that results from compacting or shredding a vehicle at a salvage operation sometimes included the waste tires. The volume would not be identified as waste tire material during the market analysis.
- The method for estimating tire generation was not based on actual sales but on corresponding automotive necessities including fuel, registration and number of potential drivers. This could have led to a fairly wide variance.



A screen in the left foreground sorts tire chips. Then a conveyor dropped product into a pile at Liberty Tire in Jefferson County. “Fluff” from shredding tires, the fabric material, is in the right foreground. The muddy chips in the background were from the Simpson County tire fire remediation.



Two belt magnets to the right of the picture removed loose wire at Liberty Tire in Jefferson County. Liberty Tire is the largest supplier of tire derived products in the Commonwealth. (Photographs courtesy of Terry Gray, TAG Resource Recovery, November 2012).

TDF MARKET DEVELOPMENT

In 2001, Kentucky spent \$454,276 on capital equipment to assist Owensboro Municipal Utility (OMU) in using TDF. Although the contract expired in 2004, OMU still used 362,000 PTEs in 2012. In 2006 NewPage, located in Ballard County, was granted \$750,000 to make improvements to its process infrastructure in order to use 3,750,000 PTEs by 2012. To date, NewPage has used 1,500,000 PTEs and requested an extension to the initial deadline to meet the goal. Including out-of-state use, rubber fuel use has increased from approximately 1.1 million PTEs per year in 2001 to approximately 3.0 million in 2012. In 2001, all Kentucky-generated waste tires went to out-of-state TDF markets. Currently, about 2.1 million Kentucky-generated PTEs are annually used in-state.

Kosmos Cement is a whole tire TDF user in the manufacture of cement.

Major Benefits of TDF include:

- Incorporates metal from tires directly into clinker product;
- Supports Louisville Metro’s green initiatives;
- Decreases Nitrogen Oxides (NO_x), Sulfur Dioxide (SO₂) and Particle Material, less than 10 microns (PM₁₀) coal emissions;
- Tire ash is incorporated in product.^{15, 16}

Kosmos Cement, a partnership between CEMEX and Lone Star Cement, used 83,100 PTEs in 2010 and has

increased each successive year. The company uses a unique tire machine, similar to a baseball or softball 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, were reduced 37% when using TDF with coal.¹⁴ Kosmos desires to begin using chips in addition to whole tires to increase its capacity for recovering the energy from tires. The project

IN-STATE TDF USAGE (PTEs)		
Company	2011	2012
Kosmos	1,116,800	1,295,000
OMU	358,500	362,000
NewPage	218,200	410,000
TOTAL	1,693,500	2,067,000

would increase Kentucky's reuse rate. For more information, please read the following *Courier-Journal* article: <http://blogs.courier-journal.com/watchdogearth/2012/11/26/tires-pitched-into-cement-kiln-at-85-mph/> For a video of the tire machine, watch this! <http://bcove.me/r3jsu2bz>

The cabinet submitted a letter in support of East Kentucky Power Cooperative's (EKPC) petition to the Public Service Commission to use the Fuel Adjustment Clause for TDF. Use of the clause would allow for faster recover of TDF cost from the electrical customer and make the use of alternative fuels more economical. EKPC could use 1.4-2.8 M PTEs/yr if 2-4% of total BTUs were TDF.

The use of TDF helps further the use of coal as it makes the fossil fuel more environmentally friendly. According to the U.S. EPA Green House Gas (GHG) has been reduced as a co-benefit of the use of secondary materials—the GHG rate associated with the combustion of scrap tires is approximately 0.09 MTCO₂ E per million BTU of scrap tires combusted, while the GHG emissions rate for coal is approximately 0.094 MTCO₂ E per million BTU. Combined with the avoided extraction and processing emissions 0.006 MTCO₂ E/million BTU for coal, the total avoided greenhouse gas is 0.010 MTCO₂ E per million BTU. Also, substituting TDF for coal would avoid an estimated 0.246 Lbs/million BTU of particulate matter associated with the extraction and processing of the coal.¹⁷ Multiplying the annual use of 20,670 tons TDF with coal in Kentucky by these factors shows a savings of over 7,000 tons carbon dioxide (CO₂) and 79 tons particulate matter not emitted each year.

GROUND RUBBER MARKET DEVELOPMENT

The ground rubber market has remained steady over time. Since 2004, the Commonwealth has awarded 315 grants totaling \$6.8 million, primarily to schools and municipalities, for crumb rubber uses. The uses were crumb rubber spread on athletic fields to increase turf life and playgrounds to reduce injuries. A listing of crumb rubber grantees for FY 2012 is included in Appendix A.

Manufacturing of ground rubber and mulch from Kentucky tires increased from near zero in 1998 to 768,500 PTEs per year in 2012. Liberty Tire (formerly Martin Tire) in Union County manufacturers a large quantity of colored mulch for outlets such as Lowes, Home Depot and Wal-Mart. Dalton Tire Recycling in Boyd County produced ground rubber for playground and horse arenas. Porter Tire in Carter County has the machinery in-place to produce ground rubber. King Tire formerly made an intermediate product for shipping out-of-state that was finished as playground mulch. However, King experienced a major fire and is now closed.

Rubberized Asphalt

- Rubber asphalt is a “blend of asphalt cement, reclaimed tire rubber, and certain additives in which the rubber component is at least 15% by weight of the total blend and has reacted in the hot asphalt cement sufficiently to cause swelling of the rubber particles”¹⁹.
- Mixes can vary; a two-inch thick overlay of rubberized asphalt mix will use approximately 2,000 tires per lane mile.
- The reduced thickness of rubberized asphalt can save on the amount of aggregate required to resurface a road.
- Rubberized asphalt can provide up to 50% reduction in road noise.²⁰

Kentucky produced more TDF and ground rubber than the national average. However, it produced less ground rubber for synthetic turf, molded rubber products, and rubber modified asphalt. Eventually, the free market should direct waste tires to ground rubber manufacturing over TDF use. Kentucky could focus on two new emerging ground rubber markets while maintaining the playground mulch and athletic field grants:

1. Automotive Industry

In 2010, Kentucky ranked third in the U.S. for auto industry employment.¹⁸ The Commonwealth could assist the three major automotive manufacturers inside its borders in using waste tire ground rubber in molded automotive parts to broaden this important potential application.

2. Rubberized Asphalt

The Transportation Cabinet could consider the use of rubberized asphalt. Unfortunately, the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 mandated that state DOTs add ground rubber to asphalt projects as a way to recycle waste tires. This edict resulted in many “unsuccessful” trials and a general aversion to rubberized asphalt by most state highway engineers. The edict was rescinded but the unpleasant perception remained. Twenty-one years later, the rubberized asphalt industry has matured and waste officials recognize that it is not the sole answer for waste tire recycling. Instead, several states, Canadian provinces and countries such as Sweden have found that it has certain specialized uses:

- The use of ground rubber, polymers or hybrid combinations in open-graded friction course asphalt (the top wear layer of the road) allows rain water to drain through the pavement surface rather than on the surface, dramatically reducing hydroplaning and impaired vision from spray. Accidents have been significantly reduced by using open-graded asphalt on accident-prone sections of roads.
- In gap-graded overlays, the addition of ground rubber can increase pavement strength and longevity, resulting in better drivability for a longer period of time.²¹

Consideration of this technology by the Transportation Cabinet could benefit highway performance and safety in selected locations as well as create an additional high value market for ground tire rubber.

There was good news regarding rubberized asphalt at the end of 2012, according to the *Scrap Tire News* December edition.

First, the National Center for Asphalt Technology (NCAT) found that using recycled tire rubber in asphalt pavement produced longer lasting surfaces, reduced maintenance, lowered road noise, shortened braking distances and lowered long-term costs. The study found that there is no significant difference between cryogenic (frozen) or ambient (ground) rubber if using particles of 30-mesh size or smaller. The study also recommended a minimum of 10% ground rubber be added to the asphalt mix.

Second, The American Association of State Highway Transportation Officials (AASHTO) Subcommittee on Materials approved several changes in August for testing standards that would allow Recycled Tire Rubber (RTR) into the widely-used “performance grade asphalt” used by state DOTs. The recommended change has been submitted to AASHTO for balloting in December. Interest in RTR accelerated in other states in 2008 when a shortage of virgin polymers and its attendant price increase occurred. Louisiana DOT was one of the agencies that substituted RTR for virgin polymer in 2008.

IV. SHOULD THE FEE BE EXTENDED BEYOND JUNE 30, 2014

The waste tire program exemplifies the cabinet's mission of protecting human health and the environment and encouraging waste reduction, reuse, and recycling. It conducts tire amnesties, remediates large tire piles, and develops markets for TDF and ground rubber. If the waste tire fee is not extended, program funds will not be available to conduct amnesties or remove illegally dumped tires. The cabinet would no longer be able to provide assistance in developing ground rubber and TDF market. Due to shortfalls in the general fund budget, it is unlikely that another source of funds would be available to operate the program.

In states that have discontinued their waste tire programs, illegal waste tire dumps soon reappeared. The states were faced again with a reoccurrence of the original emergency situation which necessitated the fee, including remediation of large tire piles and fires. Legislatures and governors were asked to remedy a problem that was previously solved.

The cabinet recommends that the General Assembly extend the waste tire fee.

V. COST OF TIRE DISPOSAL BY COUNTIES

The cabinet learned from waste tire processors that their charge for tire pick-up is generally from \$1.00 for cutting and landfilling to \$1.50 for recycling.

To help the counties defray some of their expenses, the cabinet offered \$3,000 per county for waste tire disposal, somewhat similar to what had been offered for Commonwealth Clean-up Week. The cabinet gave \$259,484 from the Waste Tire Trust Fund to 112 counties to pick up and dispose or recycle an additional 252,883 PTEs. A total of \$336,000 was offered but \$70,516 was returned to the cabinet. This partial funding return may have indicated that counties remediated most of the tire piles in certain areas. Additionally, some counties spent \$74,357 on waste tire remediation in conjunction with the cabinet grants.

The cabinet also allowed some use of the litter money from the PRIDE fund to be used to pick up waste tires along roads and highways.

VI. OTHER ISSUES

- HB 433 in the 2011 session attempted to “close the loop” regarding accountability for waste tires placed into the disposal or recycling system. Before 2011, each transporter who picked up tires from a retailer merely left a copy of the waste tire receipt with the tire retailer. Then, the processor left a copy of the receipt with the transporter. There was no requirement that the processor return a receipt to the tire retailer showing that the waste load had reached its destination and that the retailer was receiving the service that it expected. The return of a final receipt or copy of a manifest from the processor is mandated by most states. The language in KRS 224.50-874(2) was amended as follows:

A retailer, an automotive recycling dealer, and a person required to register as an accumulator, transporter, or processor who transfers waste tires to another person shall obtain a receipt for the waste tires. The final processor or a transporter who arranges for disposal or recycling out-of-state shall return a copy of the receipt for disposal or recycling to the retailer within thirty (30) days of receiving the waste tires. If the retailer does not receive the receipt from the final processor or transporter showing proof of who took final custody of the waste tires and disposed of the tires in accordance with KRS 224.50-856(1) and (2), the retailer shall notify the Division of Waste Management.

The language could be interpreted to only close the loop for retailers sending their tires out of state for disposal. In order to clarify that the language “closes the loop” regarding accountability for waste tires, in-state processors could also be required to return a copy of the receipt to the original generator, the language could read (with inserted commas underlined):

The final processor, or a transporter who arranges for disposal or recycling out-of-state, shall return a copy of the receipt for disposal or recycling to the retailer within thirty (30) days of receiving the waste tires.

- The free market handled 73% of the PTEs in Kentucky, with state-funded programs paying for 27%. Coverage of all areas by processors is necessary for the free market to work. Transportation distance translates into higher costs for certain areas if a good tire processor is not reasonably near. Appendix D contains a map showing the locations of waste tire processors in the Commonwealth. The greatest change was the closure of a processor in McCreary County due to a fire, and the addition of a processor in Carroll County.
- The reporting requirement in KRS 224.50-872 could be more efficient if the requirement was for a report every two fiscal years. This would allow for changes to the program to be realized before a report was due. It would also place reports in conjunction with the state budget cycle.
- The Waste Tire Working Group could be expanded in order to examine more thoroughly how the program might be improved. The workgroup currently consists of the members required by statute: Two cabinet members, two SWaCK members, a representative of the Kentucky Department of Agriculture, one county Judge-Executive, one Mayor and one member of the tire retail establishment. Additional representatives might come from the Department of Revenue, tire wholesalers, scrap tire experts, Rubber Manufacturers Association, tire processors, tire accumulators, tire transporters, TDF users, Kentucky Trucking Association, County Clerks, salvage yards, school districts, and others as necessary. The trucking association is important because trucks use about half of all rubber, by weight, in the tire market. TDF users consume most of the waste tire rubber in the Commonwealth. School districts use crumb rubber on playgrounds and athletic fields.
- A change to how the Department of Revenue is reimbursed could help close the gap between the possible \$3.4 million that could be collected and the \$2.6 million actually received.

Footnotes:

¹ John Poe, State Public Health Veterinarian, Kentucky Cabinet for Health and Family Services, Department for Public Health, (personal communication, January 3, 2013)

² “West Nile Equine Summary Information”, Equine Infectious Diseases and Emergency Response, Kentucky Department of Agriculture, <http://www.kyagr.com/statevet/equine-infectious-diseases.html>

³ U.S. Census Bureau News, November 17, 2011,
http://www.census.gov/retail/mrts/www/data/pdf/ec_current.pdf

⁴ U.S. Energy Information Administration, Independent Statistics & Analysis, U.S. States, Kentucky, Data, 2011,
<http://www.eia.gov/state/state-energy-profiles-data.cfm?sid=KY>

⁵ U.S. Energy Information Administration, Total Energy, Annual Energy Review, Table 5.13c Petroleum Consumption Estimates: Transportation Sector, 1949-2011,
<http://www.eia.gov/totalenergy/data/annual/showtext.cfm?t=ptb0513c>

⁶ U.S. Department of Transportation, Federal highway Administration, Policy Information, Highway Statistics 2010, State Motor Vehicle Registrations,
<http://www.fhwa.dot.gov/policyinformation/statistics/2010/mv1.cfm>

⁷ United States Census 2011 State & County QuickFacts, <http://quickfacts.census.gov/qfd/states/21000.html>

⁸ Scrap Tire Update, Michael Blumenthal, VP, Rubber Manufacturers Association, May 22, 2012, p. 2.

⁹ Rubber Manufacturers Association, U.S. Scrap Tire Management Summary 2005 -2009, October 2011, p.2.

¹⁰ Scrap Tire Update, Michael Blumenthal, VP, Rubber Manufacturers Association, May 22, 2012, p. 6-7.

¹¹ Scrap Tire Markets in the United States: 9th Biennial Report, May 2009, Rubber Manufacturers Association, p. 67.

¹² Rubber Manufacturers Association, U.S. Scrap Tire Management Summary: 2005-2009, October 2011, p.2.

¹³ Kentucky Division of Waste Management Annual Report Fiscal Year 2012, “Municipal Solid Waste Disposal in Kentucky (Tons)” p.8,
<http://waste.ky.gov/Annual%20Reports/DWM%20Annual%20Report%20for%202012.pdf>

¹⁴ Cement Kiln Burns Scrap Tires, *The Courier-Journal*, November 26, 2012.

¹⁵ CEMEX Kosmos Cement Company, “Tire Derived Fuel Project Solid Waste Permitting Overview”, May 5, 2010

¹⁶ Particulate Matter less than 10 microns in size. Factor of 0.00192 lbs. per PTE derived from Section 2.2, “Test Report for the Kiln Tire-Derived Fuel Compliance Demonstration Test Performed at the Cemex-Kosmos Plant”, URS, Sept. 28-Oct. 1, 2009.

¹⁷ 76FR15494, 40 CFR Part 241, EPA, Identification of Non-Hazardous Secondary Materials That Are Solid Waste, Final Rule, March 21, 2011 *Federal Register*.

¹⁸ 2012 Kentucky Automotive Industry, Kentucky Cabinet for Economic Development, Office of Research and Public Affairs; http://thinkkentucky.com/kyedc/pdfs/KY_Auto_Industry.pdf

¹⁹ ASTM International (formerly the American Society for Testing Materials), D8-12 Standard Terminology Relating to Materials for Roads and Pavements.

²⁰ Rubber Pavement Association, “FAQ”, available at <http://rubberpavements.org/index.html>

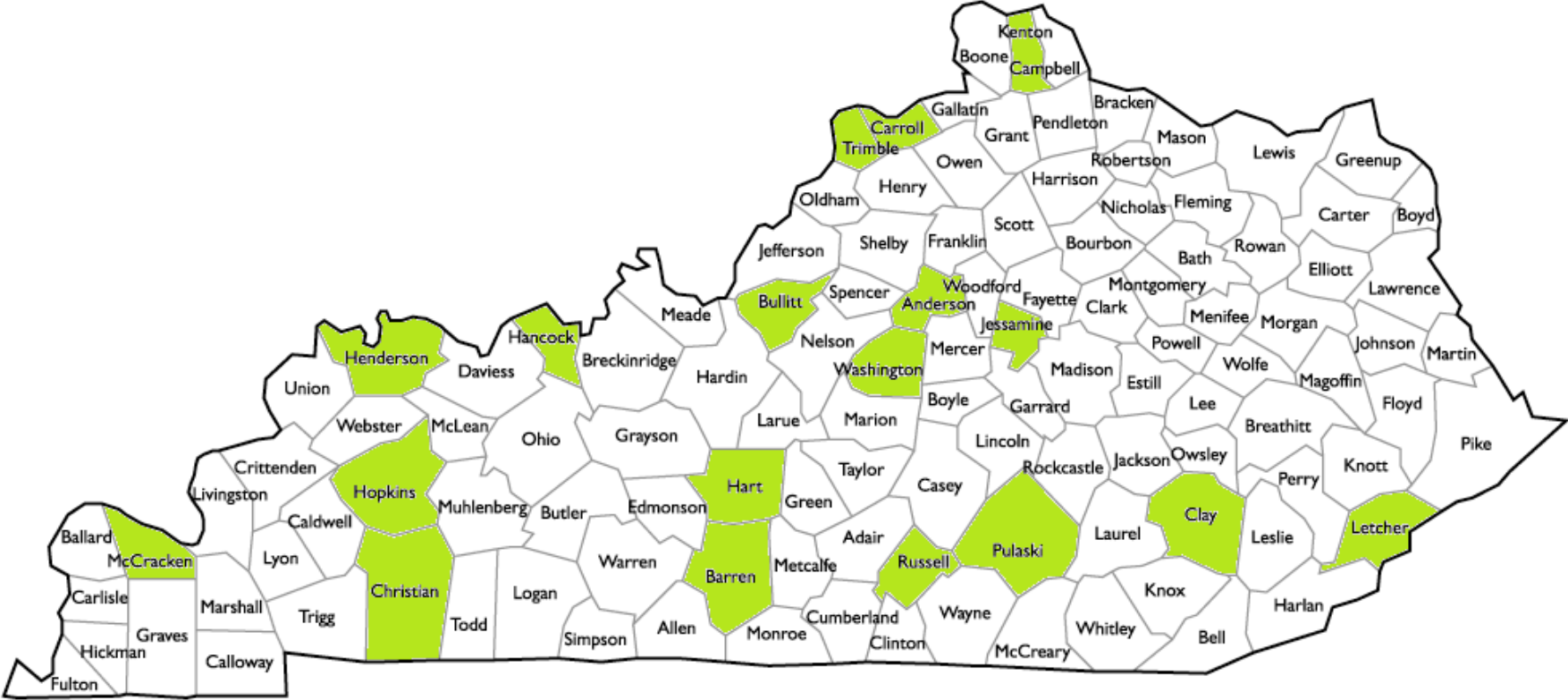
²¹ “Life Cycle Analysis: Conventional vs. Asphalt-Rubber Pavements, Jung, et al, AZ DOT, Library, Rubber Pavement Association, <HTTP://rubberpavements.org/Library.html>

WASTE TIRE PROGRAM

Appendix A: Crumb Rubber Grant Awards

COUNTY	APPLICANT	PROJECT	PROJECT AREA	REQUESTED	AWARDED
ANDERSON	Anderson County BOE	Ezra B. Sparrow Early Childhood Center	Playground	\$47,559.92	\$37,502.00
BARREN	Barren County BOE	Park City Elementary School	Playground	\$6,020.25	\$6,020.00
BULLITT	Bullitt County BOE	Cedar Grove Elementary School	Playground	\$8,039.25	\$7,964.00
CARROLL	City of Worthville	Worthville City Park	Playground	\$8,105.00	\$8,105.00
CHRISTIAN	City of Crofton	Gordon Park	Playground	\$7,898.00	\$7,898.00
CHRISTIAN	City of Lafayette	Lafayette City Park	Playground	\$5,500.00	\$5,500.00
CLAY	City of Manchester	Bert T. Combs Park	Playground	\$8,800.00	\$8,780.00
HANCOCK	Hancock County Fiscal Court	Vastwood Park	Playground	\$18,630.00	\$17,465.00
HART	Hart County BOE	Hart County Elementary Schools (5) - Bonnieville, Cub Run, Munfordville, LeGrande, Memorial	Playground	\$35,287.00	\$33,215.00
HENDERSON	Henderson County Fiscal Court	Smith Mills Park	Playground	\$16,575.00	\$13,200.00
HOPKINS	City of Dawson Springs	Dawson Springs City Park	Playground	\$5,385.00	\$5,385.00
JESSAMINE	Jessamine County Fiscal Court	City/County Park	Playground	\$17,150.00	\$17,150.00
KENTON	City of Independence	Sterling Staggs Park	Playground	\$12,905.00	\$12,905.00
LETCHER	LKLP Head Start (Letcher, Knott, Leslie, Perry)	Colson Head Start	Playground	\$6,555.75	\$6,555.00
MCCRACKEN	Paducah Day Nursery	Paducah Day Nursery	Playground	\$12,280.50	\$12,280.00
PULASKI	St. Patrick Episcopal Church	St. Patrick Preschool	Playground	\$13,344.19	\$13,344.00
RUSSELL	Kentucky State Parks	Lake Cumberland State Resort Park - Campground Area	Playground	\$7,507.50	\$7,507.00
TRIMBLE	Trimble County Public Schools	Bedford Elementary School	Playground	\$45,664.65	\$45,664.00
WASHINGTON	Melanie Smith	Cute As A Button Daycare	Playground	\$3,108.75	\$3,108.00
GRAND TOTALS				\$286,315.76	\$269,547.00

Appendix B: FY2012 Crumb Rubber Grant Locations



Appendix C: Waste Tire Amnesties and Other Remediation and Amnesty Schedule

Waste Tire Amnesties and Other Remediation			
Description	# PTEs	Cost	Cost/PTE
County Amnesties:			
Fall 2011	524,792	\$492,780	\$0.94
Spring 2012	637,139	\$723,471	\$1.14
Fall 2012	358,712	\$407,317	\$1.14
Subtotal	1,520,643	\$1,623,568	\$1.07
FY 2012 Grants to Counties:			
# Counties	252,883	\$259,484	\$1.03
FY 2012 Pile Remediation:			
County: Site			
Bracken: Mini Farms	15,575	\$14,625	\$0.94
Anderson: Walker	23,862	\$22,406	\$0.94
LaRue: C. T. Walker	14,008	\$13,154	\$0.94
Meade: Ball Farm	3,486	\$3,273	\$0.94
Subtotal 2012 Remediation	56,931	\$53,458	\$0.94
Total	1,830,457		

Amnesty Schedule			
Time	Area Development Districts		
Fall 2011 (23 counties)	Purchase (8)	Cumberland Valley (8)	KIPDA (7)
Spring 2012 (26 Counties)	Barren River (10)	Pennyrile (9)	Green River (7)
Fall 2012 (17 Counties)	Bluegrass (17)		
Spring 2013 (18 Counties)	Lincoln Trail (8)	Cumberland (10)	

Appendix D: Kentucky Waste Tire Processor Locations

