

End of life tyres

A valuable resource with growing potential
2010 edition



About ETRMA

ETRMA is the Voice of European tyre and rubber manufacturers, representing 4,200 companies in EU27, employing 360,000 individuals, with an industry turnover exceeding € 49 bn.

In 1989, a Used Tyres Group dedicated to the management of end of life tyres was set up under the strategic guidance of the ETRMA's Tyre Steering Committee. This Group is composed of experts from the main tyre manufacturers producing in Europe, which are **Apollo Vredestein, Bridgestone Europe, Continental, Good-year Dunlop Tires Europe, Hankook Tire Europe, Marangoni, Michelin and Pirelli Tyre.**

The Used Tyres group mission is to:

Promote the environmentally and economically sound management (recovery and recycling) of end of life tyres in those countries where tyres are still diverted to landfill, and proactively pursue Producer Responsibility with a dedicated financing scheme;

Provide the necessary assistance in EU Member States in the achievement of the provisions of the EU Landfill Directive for end of life tyres from 2006;

Promote the principle that end of life tyres are a resource that can be used in a wide array of applications;

Propose a "downstream management" for tyres coming from end of life vehicles;

Develop procedures to ensure that end of life tyres exported do not go into illegal reuse.

The activity of the Used Tyres Group covers all the Member States of the EU, plus Candidate Countries such as Turkey.

The European tyre industry is committed to assist in promoting environmentally and economically sound end of life management practices for its products. The industry continues to promote the development of appropriate markets for end of life tyres, provides technical and policy information regarding end of life tyres management, and advocates a legislative and regulatory framework that contributes to the achievement of these goals.

ETRMA undertakes action to host European, international and national conferences for authorities and advocates for sound EU programs to address end of life tyre issues.

ETRMA does not represent and does not have any vested interest in the processing of end of life tyres or in any product made from end of life tyres.

ETRMA promotes the principle that end of life tyres are a valuable resource with growing potential.

This edition is the **3rd report** on end of life tyres management in Europe published by ETRMA as part of the tyre manufacturers' continued commitment to promote the best available techniques for the effective recycling and recovery of end of life tyres.

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This ETRMA report presents the situation of end of life tyres (ELTs) in Europe for 2009 and sets out to demonstrate the progress that has been made over the last decade by the European tyre manufacturers to address, in a responsible manner, the challenges posed by the end of life tyres, which include:

- No landfill option as from 16 July 2006;
- Guaranteeing an ecological treatment of the entire chain;
- Promoting efficient and sustainable economical solutions.

>> I. ELT RECOVERY IN EU27

I. INCREASING VOLUMES TO BE TREATED WORLDWIDE

¹ JATMA report 2010 (2008 figure for PC & CV tyres)

About 1.4 billion tyres¹ are sold **worldwide** each year and subsequently just as many fall into the category of end of life tyres. Despite an increase in the service life of tyres and the economic slowdown in Europe, US and Japan further to the financial crisis, these volumes are about to increase because of the projected growing number of vehicles and increasing traffic worldwide.

ELT recovery rate for 2009 (metric tonnes)			
	ELT RECOVERY	ELT ARISING	
EU27+CH+NO	2,494,000	2,621,000	95%
US (2007)	4,105,800	4,595,700	89%
Japan	737,000	814,000	91%

In 2009 the EU27 was faced with the challenge of managing, in an environmentally sound manner, more than 3.2 million tonnes of used tyres (including tyres for retreading and reuse/export), respectively a 5% reduction compared to 2007 and 2.5% compared to 2008. After sorting, an estimated 2.6 million tonnes of ELTs remained on the EU market for recovery and recycling.

In Europe, the estimated annual cost for the management of ELTs is estimated at € 600 million.

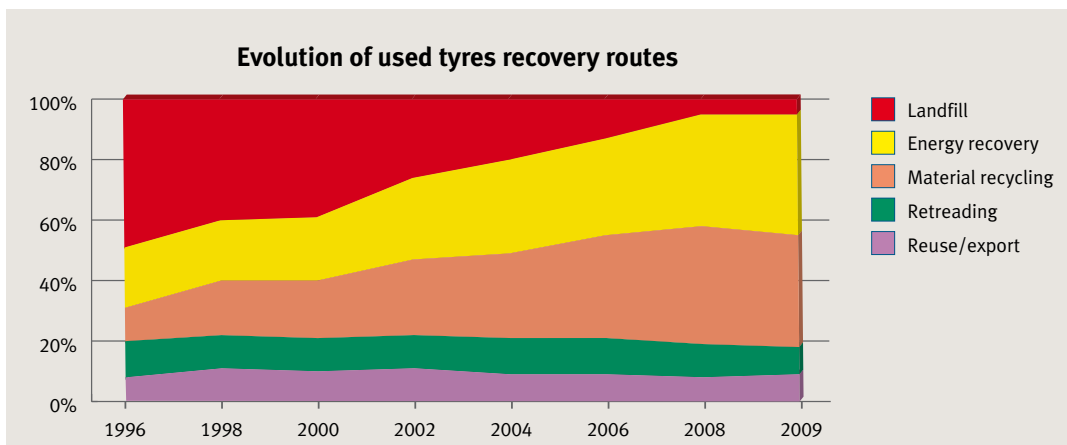
In addition the EU has millions of used tyres that have been illegally dumped or stockpiled. The inadequate disposal of tyres may, in some cases, pose a potential threat to human health (fire risk, haven for rodents or other pests such as mosquitoes....) and potentially increase environmental risks. The current estimate for these historic stockpiles throughout the EU stands at 5.5 million tonnes (1.73 times the 2009 annual used tyres arising).

Ultimately, the improved economic performance of the end of life tyre business should mitigate in favour of an earlier and more effective approach to tackling historic stockpiles.

The annual estimate for used tyres from end of life vehicles amounts to 320,000 tonnes which represents around 10% of the annual used tyres arising.

III. A CONTINUOUS DECLINE IN LANDFILLING

Since 1996, there has been a continuous decline in landfilling used tyres from 32% of used tyres arising to 4% in 2009, while the combined recycling, recovery (material & energy recovery), reuse and retreading routes now contribute to a substantial 96% used tyres recovery. The major markets in 2009 were energy recovery 45% and material recovery 41%.



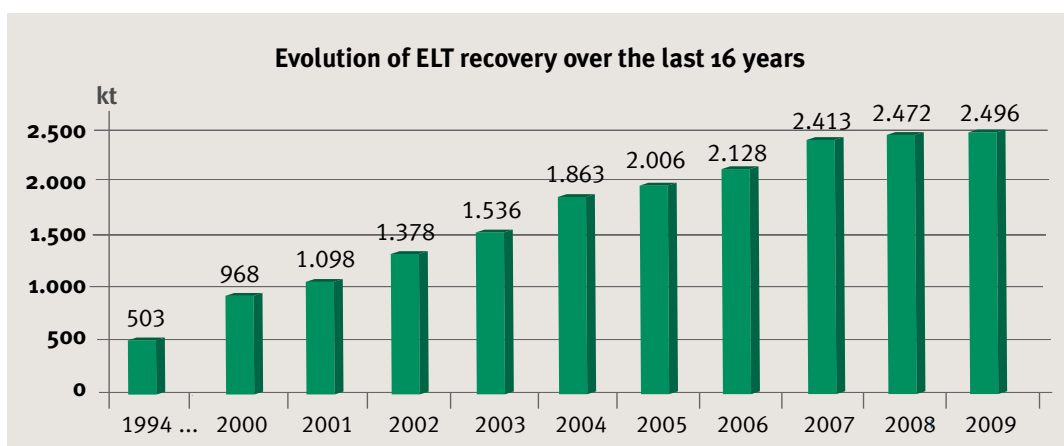
IV. ELT RECOVERY IN EUROPE

After sorting used tyres for retreading and reuse/export (which in total represents about 581,000 tonnes of used tyres), there remains a flow of end-of-life tyres of 2.6 million tonnes which enter multiple recovery routes.

Since 1996, more than 20 million tonnes have been recovered through energy or material recovery.

In 2009, an impressive 95% of end of life tyres arising on the EU market were successfully diverted from landfill. This is a 2% points increase vs. the previous year achievement. This also promotes Europe as one of the most advanced regions in the world in the recycling and recovery of ELTs.

All in all, about 2.5 million tonnes of end of life tyres were collected to enter recycling and recovery processes. This represents a five-fold increase of the recovered quantities over the last 16 years and an average annual increase of 25%.



This new benchmark has been achieved thanks to the continuous commitment of the EU tyre industry despite the dramatic contraction of the EU tyre replacement market, with even a 1% (i.e. more than 20,000 tonnes) increase in the ELT recovered quantities compared to 2008.

ELTs MANAGEMENT IN EUROPE IN 2009

ARISING	USED TYRES				END OF LIFE TYRES
	PART-WORN TYRES				ARISING
	TOTAL	REUSE	EXPORT	RETREADING	
	KT	KT	KT	KT	KT
3.202	581	173	122	286	2.621



END OF LIFE TYRES	END OF LIFE TYRES RECOVERY			LANDFILL & UNKNOWN	ELT RECOVERY RATE
ARISING	MATERIAL	ENERGY	TOTAL ELT RECOVERY		
KT	KT	KT	KT		
2.621	1.203	1.293	2.496	125	95%

>> II. ELTs MANAGEMENT SYSTEMS IN EUROPE

What are the issues facing the tyre industry in the realm of end of life tyres?

EU Member States have to be in compliance with the EU legislation in transposing the Directives into local legislation. They are free to set national initiatives to reach the EU targets. In regard to the development of waste management policies at national level, the landfill of waste Directive⁴ has been a major driver for setting ELT management systems in Europe.

Tyre manufacturers are also facing growing environmental pressure from the general public and other stakeholders concerning illegal dumping and historic stockpiles.

For all these reasons it is in the interests of the tyre industry to continue being proactive and take responsibility collectively for end of life tyres.

⁴ EC Directive 1999/31 on the landfill of waste of 26 April 1999, which bans whole tyres from landfill from July 2003 and shredded tyres from July 2006

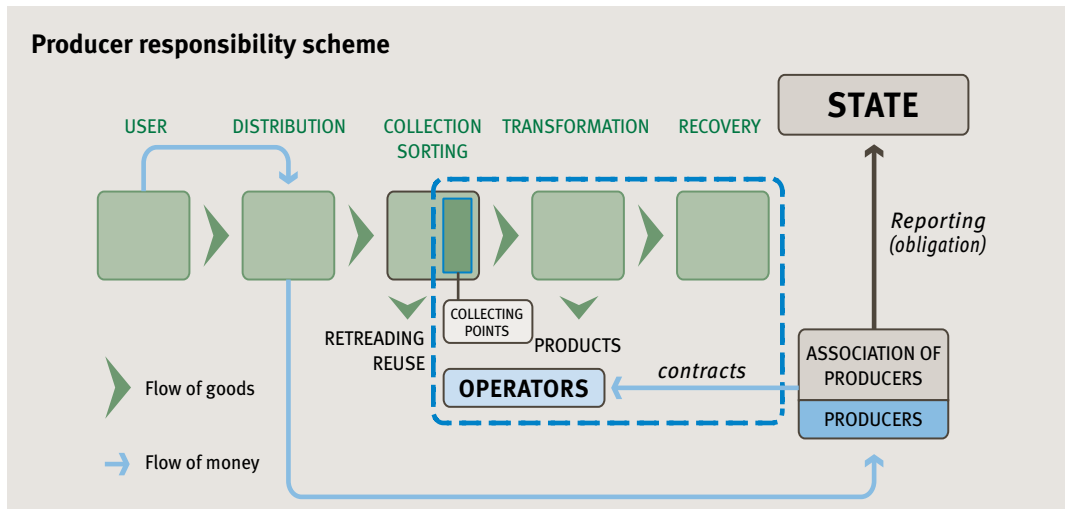
- Producer responsibility
- Tax system
- Free market system

Country specific implementation and ELT management companies



This led to the setting-up of a not-for-profit company financed by tyre producers aiming at managing collection and recovery of end of life tyres through the most economical solutions. A reporting obligation towards the national authorities provides a good example of clear and reliable traceability. In addition, these companies are able to develop high-level knowledge on technologies and build up additional R&D capacities. The annual investment in R&D is around € 5 million. For the end user, this system guarantees transparency of costs through a visible contribution, clearly indicated on the invoices. The members of these companies usually include the national manufacturers and the main importers. For example in Portugal, Continental is the national tyre manufacturer and all other companies are importers.

This system appears to be the most suitable and robust for addressing and resolving end of life tyre arisings, in a sustainable manner for the long term, and to achieve a 100% recovery rate, in the most economical way. On the whole the European tyre manufacturers have demonstrated a clear preference for this system and have deployed determination and commitment to take this route. Currently, this system is adopted in 13 EU countries. Italy is expected to be operational in 2011 and other EU Member States are set to follow in the near future.



Countries: Belgium, Estonia, Finland, France, Greece, Hungary, the Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Sweden and Turkey.

Despite a still quite heterogeneous situation in Europe the remarkable progress that has been achieved is due largely to the **proactive attitude of the profession**. Even prior to the passing of the Directive on the landfill of waste in 1999 the industry had been active in promoting the organisation of the different players in the recovery chain with the creation of ELTs management companies/associations at national level.

The national associations, voluntary consortia, joint companies and boards that were set up jointly by tyre producers/importers to take responsibility for end of life tyres are financed in different manners according to the legal system prevalent in the country and these organisations in turn independently organise and manage the end of life recovery chain in different ways.

By professionalising the service providers – collectors, sorters and reprocessors – the goal is to significantly improve the recovery rate and traceability and develop applications with added value which utilise the full potential of the properties of rubber.

PROMOTING PRODUCER RESPONSIBILITY

Country arisings and recovery rates demonstrate that producer responsibility achieves more robust results than the purely market driven approach as well as the ultimate objective of 100% recovery whereby not only the annual arisings are recovered but the historic stockpiles are also progressively eliminated.

In 2009, 48% of end of life tyres arisings on the European market were collected and treated by an operating Producer Responsibility scheme.

ELT management companies set up by the tyre manufacturers are mandated to collect and organize the treatment of an equivalent amount (according to the principle ‘one new tyre sold one worn tyre recovered’) of the volumes of tyres sold collectively by these companies. The process is financed through an environmental fee generally applied to the product price, regardless of the location of the collection point. Thanks to the success of the scheme, this fee has decreased over time. The chain is managed by the ELT companies, from collection to recovery or recycling, with the support of a reliable and transparent traceability or auditing system.

II. TAX SYSTEM

Under the tax system each country is responsible for the recovery and recycling of the end of life tyres. It is financed by a tax levied on (tyre) production and subsequently passed on to the customer. This is an intermediate system whereby the producers pay a tax to the State, which is responsible overall for the organisation and remunerates the operators in the recovery chain.

Countries: Denmark, Slovak Republic

III. FREE MARKET SYSTEM

Under this system the legislation sets the objectives to be met but does not designate those responsible. In this way all the operators in the recovery chain contract under free market conditions and act in compliance with legislation. This may be backed up by voluntary cooperation between companies to promote best practices.

Countries: Austria, Bulgaria, Croatia, Germany, Ireland, Switzerland. Although operating under a free-market system, United Kingdom features an hybrid system as collectors and treatment operators have to report to national authorities.

>> III. A WEALTH OF ELT-DERIVED END MARKETS

I. ALMOST AN INFINITE NUMBER OF POTENTIAL APPLICATIONS

The tyre is a complex and high-tech safety product representing a century of manufacturing innovation, which is still on-going. The tyre comprises many materials, the very best the metallurgical, textile and chemical industries can produce. There is no room for even the slightest defect and it is an extremely complex process to develop and manufacture the product.

From a materials point of view, the tyre is a mixture of synthetic and natural rubber, to which are added a range of specific substances to ensure performance, durability and safety. These include mineral oil, reinforcing fillers (carbon black and silica) and vulcanising agents (sulphur) which act as catalysts to accelerate the vulcanization process.

These characteristics contribute in many ways to enabling the development of a variety of recovery routes and end markets.

II. MATERIAL RECOVERY

Whole tyres used in civil engineering applications - Those applications vary from coastal protection, erosion barriers, artificial reefs, breakwaters, avalanche shelters, slope stabilisation, road embankments and landfill construction operations, sound barriers, insulation. This market is for the moment confined to single projects and therefore fairly small scale. It is an application, which is under-utilised and that could represent a significant growth area for end of life tyres.



Shredded tyres - Whole tyres are mechanically sheared into shreds ranging in size from 25-300 mm. Tyre Derived Aggregate is used as foundation for roads and railways, as a draining material replacement for sand and gravels, landfill construction, subgrade fill and embankments; backfill for walls and bridges and subgrade insulation for roads.

Advantages of Tyre derived Aggregate

Tyre derived aggregate is lighter by 30-50%; drains 10 times better than well graded soil and provides 8 times better insulation than gravel.

Crumb and powdered rubber - After the removal of the steel and fabric components the remaining rubber is reduced to granular rubber.

Applications include moulded rubber products such as wheels for caddies, dustbins, wheelbarrows and lawnmowers, urban furniture and sign posts.

Crumb and powdered rubber are also to be found as flooring for playgrounds and sports stadiums, as shock absorbing mats for schools and stables, as paving blocks or tiles for patios and swimming pool surrounds as well as roofing materials.

A promising use of crumb rubber is in the construction of artificial turf for example in football fields.

Rubber modified asphalt takes advantage of the elasticity and noise absorbing characteristics of the rubber. Although this increases the life span of the road surface, reduces the noise pollution and increases safety in wet road conditions, it is still relatively underutilised (a few hundred kilometres of roads in total) despite its many advantages.

Electric Arc Furnaces – Shredded tyres can be used in steelworks equipped with electric arc furnaces as a substitute for anthracite and scrap metal. This application has been validated for industrial use in Belgium and in France where more than 7,000 tonnes of end of life tyres are consistently used. This is encouraging as the application uses both the carbon and steel content of the tyres. Such use is already under development in the US and will most certainly follow a similar trend in Europe in the years to come.

The use of ELT derived products in steel plants confirmed that carbon and iron contained in tyres may be used partly or entirely to substitute the use of anthracite during the manufacturing of steel at 1,650 degrees. Indeed 1.7 Kg of ELTs is equivalent to 1 Kg of anthracite. The environmental impacts are positive regarding dust and gaseous effluents. Overall there are no significant differences in the total environmental impact due to the use of tyres or anthracite. The capacity is nearly unlimited.

EMERGING OPPORTUNITIES

Pyrolysis/Thermolysis - Thermal treatment technologies – pyrolysis, thermolysis and gasification – are some of the emerging solutions for recovering value from end of life tyres.

Tyre pyrolysis involves the thermal decomposition of end of life tyres into intermediate substances such as gas, oil and char. The economic viability of this alternative route for high temperature resource recovery from tyres is hampered by the fact that the prices obtained for the by-products often fail to justify the process costs.

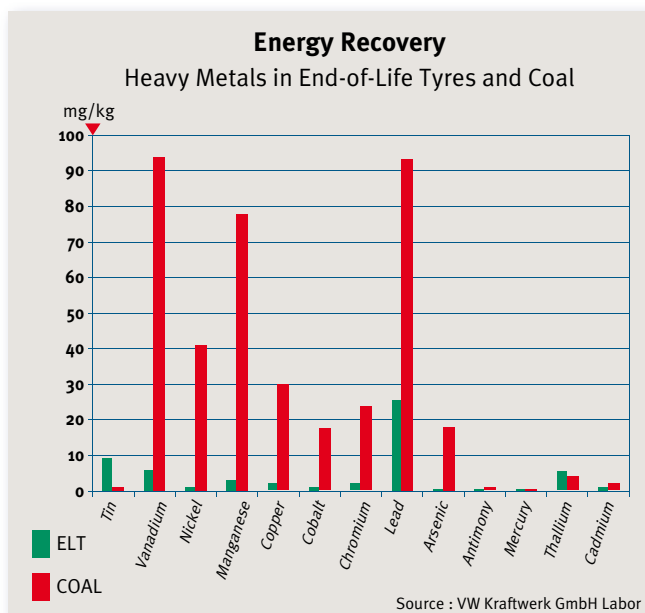
Under current market conditions the economic viability of these options has yet to be proved (there are few or no large-scale plants currently in operation) but they have the merit to offer scope for increasing recycling rates.

III. ENERGY RECOVERY

With a **calorific value** equivalent to that of good quality coal, end of life tyres are used as an alternative to fossil fuels. The increase in the price of oil and the necessity to preserve resources could favour the development of this type of application.

The specifications are:

- The calorific power of 1 passenger car tyre is equivalent to 7.6 litres of oil (lower sulphur content);
- ELT have a similar calorific value as a high quality coal, with the advantage that the emissions of (heavy) metals are much lower (see graph below);
- The incineration residue can also be used as replacement for other raw materials (e.g. raw material in clinker for cement industry);
- The biomass effect on ELTs combustion:
 - 20% of the weight of ELTs is latex
 - Latex is polyisoprene (C₅H₈): it is composed of 88 Carbon atoms
 - for a complete combustion, 1 tonne of ELTs generates 647 kg of CO₂ from biomass



Energy Recovery

“Biomass effect”
on ELTs combustion

- 20% of the weight of ELT is latex
- Latex is polyisoprene (C₅H₈) : it is composed of 88 of Carbon atoms
- 1 ton of ELT generates 647 kg of CO₂ from biomass

**For the complete combustion
1 ton of ELT is equivalent
to 647 Kg of CO₂**

CASE STUDY : ELTs BIOMASS CONTENT AND CALORIFIC VALUE

Comparable calorific value, Less CO₂ emissions than traditional fossil fuels

A three-year study by Aliapur, the French ELT management company, released in July 2009, has proven what the cement industry has known since the 1970s – used tyres as fuels have high calorific value with less environmental impact than traditional fossil fuels. Unlike coal and petroleum coke, used tyres when burned produce carbon-neutral CO₂ emissions due to their organic components, e.g. natural rubber, rayon, and stearic acid.

ELTs when burned emit less fossil carbon dioxide due to their biomass components. Used passenger car tyres, according to the study, have biomass fractions between 17% to 20% while used truck tyres are 28% to 30% biomass.

PARAMETER	USED PASSENGER CAR TYRES	USED TRUCK TYRES	COAL	PETROLEUM COKE
BIOMASS	17-20.3% (μ 18.3%)	28.6-29.7% (μ 29.1 %)	0%	0%
CARBON	67.5 – 70.1% (μ 69.0%)	59.7-62.6% (61.1%)	64-68%	84-97%
NCV (MJ/KG)	29.5 – 30.6 (μ. 30.2)	26.1 – 26.7 (μ 26.4)	26	32

The biomass fraction of the used tires was quantified through ASTM D6866, which is a standard method based on radio-carbon dating techniques. ELTs were also characterized by measuring their calorific values (amount of heat released during combustion) and carbon, hydrogen, oxygen, nitrogen, sulphur, chlorine, fluorine, and bromine content.

The study aimed to establish reference values and provide details on the chemical properties of used tyres. Results are used by France's State Department for the Environment as reference for calculations of CO₂ emissions from cement plants. As a result, industrialists that use tyres as an alternative source of fuel take advantage of reductions in their declarations of CO₂ emissions.

Source : Positioning of ELTs among traditional fuels, Reference values and characterization protocol, Aliapur R&D, 2009

Cement kilns - The cement sector is the main application for energy recovery and new kilns are increasingly equipped to use end of life tyres as supplementary fuel. This is not astonishing since ELTs offer a high net calorific value comparable to petroleum coke and even higher than coal.

Energy-intensive industries use ELTs to reduce their fuel expenses and comply with air quality and pollution control regulations. ELTs are cheaper than coal and petroleum coke; thus, ELTs use generates savings. Many countries around the world now require companies to annually report their CO₂ emissions. Using ELTs as fossil fuel alternative enables companies to report lesser fossil CO₂ emissions. Moreover, companies participating in cap-and-trade schemes like the European Union Emissions Trading Scheme can also obtain carbon credits when they have low fossil CO₂ emissions. Carbon credits have monetary value and can be sold or traded.

Assuming all ELTs that were energy recovered in 2009 would be co-incinerated in cement kilns, 1.95 million tonnes⁵ of CO₂ equivalents are saved annually.

The cement sector requires 30 million tonnes of fuel equivalent per annum and the total annual arising of tyres is 3.2 million tonnes! Even if all Europe's end of life tyres were sent to cement kilns they would only represent 10% of the total amount of fuel required by the cement industry. Even if for technical reasons, tyre derived products should not exceed 20%, this still leaves great leeway for this market sector.

⁵ based on a greenhouse gas credit of about 1.5 tonnes of CO₂ eq. per tonne of ELT used in cement kilns

⁶ Scrap Tire Markets in the United States, 2009 Edition (Preliminary data), Rubber manufacturers Association, (April 2010)

Thermal power stations - This particular application is underdeveloped in the EU but much more widespread in the US.

Pulp and paper mills - Again the elevated cost of energy could create openings for use of tyre derived products in this sector. At present this application is not developed in Europe but it is quite common in the US (this represents 17.6% of US 2009 ELT markets⁶).

Market outlook for tyre derived products

The various market segments face different challenges and the rising cost of energy will no doubt remain a critical factor and stimulate market growth for tyre derived products used as an alternative fuel.

>> IV. TOWARDS END OF WASTE STATUS FOR ELT DERIVED MATERIALS

The European tyre manufacturers have been active over the years to make the intrinsic qualities of end of life tyres recognized to obtain eventually end of waste status for their derived products.

The **revised Waste Framework Directive** (2008/98/EC) introduces the concept of end of waste, by which selected waste streams could cease to be considered as waste if they comply with end of waste criteria.

- A market or demand for ELT derived materials should exist (see Part III A wealth of ELT end markets)
- ELT derived materials should be commonly used for specific purposes and meet related technical requirements (see Part III A wealth of ELT end markets)
- ELT derived materials should meet existing legislation and standards applicable to products
- The use of ELT derived materials should not lead to overall adverse environmental or human health impacts

I. CHARACTERIZATION OF ELT DERIVED PRODUCTS THROUGH STANDARDS

The on-going development of quality standards for ELT derived materials at CEN level (TC366) together with high ELT recycling and recovery performance achieved throughout Europe is a major step towards getting the end of waste status for ELT derived products.

Furthermore, the development of EU standards contributes to a significant increase of the level of quality of tyre derived products while opening the market to new applications, promoting technology exchanges and access to know-how and innovation and protecting the environment.

A case in point is the publication in May 2010 of CEN TS14243 "Materials produced from end of life tyres – Specification of categories based on their dimension(s) and impurities and methods for determining their dimension(s) and impurities". This Technical Specification aims at characterizing the different materials derived from end of life tyres in terms of dimensions (ELT cuts, shreds, chips, granulates and powders) and impurities (steel & textile) using harmonized methods of sampling and testing.

II. ENVIRONMENTALLY & HUMAN HEALTH SOUND ELT RECOVERY ROUTES

In order to be awarded the end of waste status, the use of ELT derived materials should not lead to overall adverse environmental or human health impacts.

To demonstrate the environmentally friendliness of ELT recovery routes, the most commonly used tool is Life Cycle Assessment (LCA). Life Cycle Assessment is a method for assessing the overall environmental impact of a product from cradle to grave.

CASE STUDY – ALIAPUR’S LCA OF 9 RECOVERY METHODS FOR END OF LIFE TYRES

At a time when several used tyre recovery methods have achieved a certain maturity, Aliapur performed a comparative environmental evaluation of 9 recovery alternatives for end of life tyres.

The 9 selected routes, that are representative of the main recycling and recovery routes are:

- Recovery in Civil engineering applications (public works): Retention & infiltration basin
- Energy recovery route: Cement kilns and urban heating
- Material recycling: Steel works, foundries, moulded objects, synthetic floors, equestrian floors.

In addition to comparing the different alternatives, this environmental evaluation aimed at identifying the strengths and weaknesses of each recovery method, and of the management of used tyres as a whole. This evaluation was based on the Life Cycle Assessment approach and conformed to the methodological prescriptions developed in ISO 14040 and ISO 14044 standards. It was carried out by PricewaterhouseCoopers Ecobilan in 2009, a consulting firm specialising in life cycle assessments, and was reviewed by a committee of European LCA experts and interested parties.

THE MAIN CONCLUSIONS OF THE STUDY

Globally positive results

The LCA made it possible to identify that, under present conditions, **all** the recovery methods studies provided net environmental benefits, regardless of the environmental impact considered.

Justified investment in the preparation stages

The study also revealed that the impact of the collection, sorting and shredding/granulation stages is secondary in relation to the benefits obtained from the recovery process.

The hierarchy of recovery methods brought into doubt

The LCA shows that the environmental assessment of material recycling methods is not systematically better than that of energy recovery ones. End use applications must be assessed on a case-by-case basis. Hence the recovery routes for ELTs are both economically and environmentally relevant and play a role in changing the status of end of life tyres from waste to products.

Source : Lifecycle analysis of 9 ELT recovery routes, Aliapur R&D, June 2010

>> V. CONCLUSIONS

TOWARDS GETTING EU RECOGNITION OF ELT DERIVED MATERIALS AS A PRODUCT

The revised EU Waste Framework Directive is providing potential for obtaining end of waste status for ELTs derived materials, down the supply chain. This mid-term target seems to be increasingly within our reach thanks to industry efforts in further characterizing the environmental, quality and economical aspects of ELT based applications.

The establishment of industry standards applicable to ELTs under the aegis of CEN TC366 not only increases the credibility of tyre derived applications but also contributes to a significant increase of the level of quality of tyre derived products while opening the market to new applications, promoting technology exchanges and access to know-how and innovation and protecting the environment. Those efforts should for example help further develop the use of ELTs in rubberized asphalt in road construction, which offers high growth potential in Europe.

Results of recently conducted Life cycle assessments (LCAs) demonstrate that under present conditions, all the recovery methods provide net environmental benefits, regardless of the environmental impact considered. Hence the recovery routes for ELTs are both economically and environmentally relevant. The LCA also allowed to comparatively assess the benefits of using ELTs in its multiple applications compared to alternatives.

Furthermore, the characterization of tyre derived fuel in terms of net calorific value, emissions and biomass fraction provide reference values to favourably position ELTs amongst other traditional solid fuels. As a result, industrialists that use tyres as an alternative source of fuel take also advantage of reductions in their declarations of CO₂ emissions.

Ever spiralling energy and raw material costs could have a positive impact on the end of life market, especially for tyre derived products used as raw materials for recycling and/or as alternative fuel. As a matter of example, the tyre industry uses 70% of all natural rubber produced worldwide⁷ and estimates for the next 30 years predict that consumption will double. It is therefore critical to manage that source of secondary raw material in a sustainable way and all applications that recycle or recover rubber will help to preserve this valuable resource.

To conclude, ETRMA members are committed to pursuing the promotion of their efficient strategy traceable down to the supply chain to encourage the development of the best available techniques for the recycling and recovery of end of life tyres in the EU Member States and beyond.

Brussels, 22 December 2010

⁷ IRSG (International Rubber Study Group)

Annexes

ANNEX I: USED TYRES RECOVERY IN EUROPE (EU27, NO+CH) IN 2009

UT/Part Worn Tyres/ELT's Europe - Volumes Situation 2009

COUNTRY	NOTE	KT PR	UT				ELT	ELT RECOVERY (B)		LANDFILL & UNKNOWN (C)	UT TREATED %
			ARI- SING	REUSE	EXPORT	RETREADING	ARISING	MATERIAL	ENERGY		
			A+B+C	A1	A2	A3	A4	B1	B2		(A+B)/UT
AUSTRIA	(e)	0	53		2	3	48	22	26	0	100%
BELGIUM		1	78	1	1	7	69	46	22	1	99%
BULGARIA	(e)	0	32				32			32	0%
CYPRUS	(e)	0	8				8			8	0%
CZECH REP	(e)	0	48			2	46	8	24	14	71%
DENMARK		0	40		1	1	38	38		0	100%
ESTONIA		1	6				6	3	2	1	83%
FINLAND	Additional stock treatment	1	41	0	0	10	31	31	0	0	100%
FRANCE		1	364	32		23	309	128	180	1	100%
GERMANY	Expansion of capacity cement and granules plants	0	571	10	69	49	443	177	266	0	100%
GREECE		1	61		0	2	59	32	15	12	80%
HUNGARY		1	40			1	39	20	19	0	100%
IRELAND	(e)	0	32	3	1	2	26	22		4	88%
ITALY		0	416	4	18	79	315	90	180	45	89%
LATVIA	(e)	0	6				6	3	2	1	83%
LITHUANIA	(e)	0	7				7	4	2	1	86%
LUXEMBURG		0					0			0	
MALTA	(e)	0	1		1		0			0	100%
NL	(PC only)	1	59	10		4	45	34	11	0	100%
POLAND	Additional stock treatment	1	259			16	243	53	190	0	100%
PORTUGAL		1	89	1	2	19	67	49	22	-4	104%
ROMANIA		1	49	1		1	47	17	28	2	96%
SLOVAK REP	(e)	0	19			1	18	17	1	0	100%
SLOVENIA	(e)	0	13			1	12	6		6	54%
SPAIN		1	280	20		22	238	122	115	1	100%
SWEDEN		1	70		2		68	27	41	0	100%
UK	(e)	0	479	91	16	41	331	216	115	0	100%
NORWAY		1	44		1		43	32	9	2	95%
SWITZERLAND	(e)	0	37		8	2	27	4	23	0	100%
EU(PR)	13		1440	65	6	105	1264	594	654	16	99%
				5%	0%	7%		41%	45%	1%	
TOTAL			3202	173	122	286	2621	1201	1293	127	96%
				100%	5%	4%	9%		37%	40%	4%



ANNEX II: EUROPEAN LEGISLATION IMPACTING TYRE RECYCLING

- 1975 Directive on Waste** 75/442/EEC; amended by Directive 2008/98EC
End of life tyres are classified as « non hazardous waste ».
- 1993 Regulation on supervision and control of trans-border shipment of waste** 259/93/EEC
- 1999 Directive on the Landfill of Waste** - 1999/31/EC
 → Ban on used tyres (whole tyres) in landfill starting July 2003
 → Ban on shredded tyres in landfill starting July 2006
- 2000 European Waste List** - 2000/532/EC and further amendments
End of life tyres are classified under code '16 01 03'
- 2000 Directive on Incineration of Waste** - 2000/76/EC
 → Fixes emission standards for all cement kilns starting in 2002
 → Older cement kilns prohibited from burning end-of-life tyres after 2008
 → From December 2008, new provisions apply to cement kilns co-incinerating waste including end of life tyres. The cement kilns currently burning ELT in Europe are already complying with this Directive.
- 2000 Directive on End of Life Vehicles (ELV)** - 2000/53/EC
85% of scrap cars to be recovered starting 2006
tyres to be dismantled from vehicles
- 2001 EC Decision on EU list of wastes** - 2001/118/EC, end of life tyres are classified under entry 16.01.03. This text applies from 1st January 2002 in EU Member States.
- 2005 EC Thematic strategy on prevention and recycling of waste** - COM(2005)666 final
 → provides an holistic analysis of the major achievements in the waste management area for the past 30 years. It stresses a need to further developing approaches for the determination of best environmental options and for the setting of targets for recycling and recovery of waste, taking into account the differences between products and materials and the possible alternative.
 → encourages the principle of producer responsibility - strategy proactively applied by the tyre manufacturers since late 90's in anticipation of EU regulatory requirements.
- 2008 Revised Waste Framework Directive** - 2008/98/EC
 → sets the basic concepts and definitions related to waste management and lays down waste management principles such as the "polluter pays principle" or the "waste management hierarchy".
 → introduces the concept of end of waste, by which selected waste streams could cease to be considered as waste if they comply with end of waste criteria.

ANNEX III: INTERNATIONAL BODIES RECOMMENDATIONS ON TYRE RECYCLING

- 1999 UNEP Basel Convention**
Technical Guidelines on Hazardous Wastes: Identification and Management of Used Tyres (SBC NO. 99/008, October 1999)
- 2004 OECD Environment Policy Committee**
Improving Markets for Secondary Materials: Case Study Report on Rubber (ENV/EPOC/ WPNEP (2004)2, 30 April 2004)
- 2009 UNEP Basel Convention**
Technical Guidelines on Environmental Sound Management of Used Tyres (currently under revision).

ANNEX IV: NATIONAL ELTs MANAGEMENT COMPANIES

BELGIUM		Chris Lorquet: www.recytyre.be
ESTONIA		Kaur Kuurme: www.rehviliit.ee
FINLAND		Harry Sjöberg / Risto Tuominen: www.rengaskierratys.com
FRANCE		Eric Fabiew: www.aliapur.com
GREECE		Giorgios Mavrias: www.ecoelastika.gr
HUNGARY		István Muzsay: www.hurec.hu
ITALY		Giovanni Corbetta: www.ecopneus.it
NL		Cees van Oostenrijk: www.recybem.nl
NORWAY		Hroar Braathen: www.dekkretur.no
SPAIN		Jesús María Núñez Imaz: www.signus.es
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PORTUGAL		Climénia Silva : www.valorpneu.pt
ROMANIA		Florin Brabete: www.ecoanvelope.ro
SWEDEN		Lars Åman : www.svdab.se
TURKEY		Bahadır Ünsal: www.lasder.org.tr



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