

Novel approaches to waste crime

A report examining the UK tyre market, waste tyre crime and a series of case studies evaluating public sector led novel approaches to tackling waste tyre crime

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Overall EPOW Objectives

The overall purpose of EPOW is to demonstrate how EU regions can develop and introduce successful programmes that lead to zero waste to landfill in their region. As targeted in the revised Waste Framework Directive, EPOW aims to develop a recycling society with a high level of resource efficiency in the South East of England.

The principle objectives of the EPOW programme are to demonstrate:

- the European value of end-of-waste quality protocols through the developing three new protocols and embedding existing protocols throughout a region;
- **the effectiveness of novel public sector led approaches to reducing waste crime which will support emerging new business markets for the reuse of recovered materials;**
- how the demand for products and services with lower waste impacts can be stimulated through Green Public Procurement (GPP) in a region, and how green procurement can be expanded to the private sector;
- how markets for end-of-waste materials can be developed through establishing a pilot commodity market with EU trading links;
- how the development of regional waste infrastructure can be supported through partnership working, and how it can address the EC's new Raw Materials Initiative;
- how innovative electronic tools and means of communications can be used to help businesses reduce their waste impact;
- how voluntary sectoral agreements supported by one-to-one business advice can disseminate best practice and help businesses contribute to the goal of zero waste in a region; and
- and how new methods of collecting, converting and presenting data and information on waste can stimulate progress towards a recycling society.

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Executive Summary

The European Pathway to Zero Waste (EPOW) programme has eight actions, five of which are led by the Environment Agency and three by WRAP who took over from the South East England Development Agency in April 2011. One of the actions under the programme is assessing and reporting on novel approaches to tackling waste crime which aims to demonstrate the effectiveness of new public sector led approaches to reducing waste crime and supporting new markets for the reuse of recovered materials. This study reports on the outcomes from a pilot of the best novel approaches.

Environmental crime is a high priority area for European Member States; tackling the issue are international networks, working groups and organisations that include the European Commission, Interpol, Europol, Member State regulatory agents and a wide range of specific task force groups. These bodies are set up to deliver programmes that address and implement waste crime reduction measures. In its 2014 EU Organised Crime Threat Assessment Report¹ however, Europol notes that “substantial intelligence gaps [in the area of waste crime] preclude comprehensive assessment of organised crime activity in this area”. The intelligence on European waste crime notes:

- Illegal waste activities within the EU are organised and sophisticated networks with clear division of roles with some organised gangs making billions of Euros per year;
- Waste brokers feeding these networks can also be part of and embedded within the legal waste management system, appearing to be operating legitimate businesses;
- Complexity in the legal waste management system facilitates rather than prevents criminal activity; and
- There are substantial financial burdens borne by affected Member States (e.g. those where the illegal dumping and disposal are occurring), which intelligence suggests to be south-east and eastern Member States plus those countries that share a border with these Member States (e.g. Albania).

As a consequence of globalisation, enhanced market development and trade outside the EU, the flow of waste around Europe and outside its borders has become larger, more complex and significantly more costly to police. Rises in the number of conventions, Directives and state laws have, to some degree and with varying success, been instruments to ensure proper re-use, recovery, recycling and disposal of wastes. Waste recovery, management and disposal remains a sector where illegal activity and criminal organisations freely operate, often making large financial gains from their activities to the detriment of legitimate businesses, the common market and society at large.

This document, focusing on the reused and recovered waste tyre market, reports on the current size of the EU, UK and South East of England tyre market, followed by a number of public sector led case studies illustrating novel approaches to reducing waste tyre crime. This study has identified that there are several commonly accepted motivators for tyre crime including: financial gain, convenience, opportunism, market dynamics/demand, lack of a threat of being caught and lenient sentences/punishment for offences.

¹ https://www.europol.europa.eu/sites/default/files/publications/octa_2011.pdf

The novel approaches identified as part of this study commonly use an intelligence-led approach, whereby data gathered proactively is used to tackle crime on a number of fronts. Novel approaches can involve new partnerships, new approaches and intervention points, sharing of information and multi-agency collaboration, targeting different players in the supply chain and pairing crime enforcement action with awareness raising to stop crime occurring. It also involves mechanisms to support secondary waste market development, tackling one of the key sources – the waste itself – making it a valuable resource rather than a material to discard at lowest cost.

The intelligence-led approach is now a widely accepted methodology for profiling organised waste crime and coordinating surveillance, awareness-raising and ultimately building a case for enforcement and prosecution. The case studies examined within this report use this intelligence-led approach to help tackle waste crime – they go beyond reactive policing. The demonstrable advantages of this approach include multi-agency collaboration giving access to pooled resources with greater breadth and depth, sharing intelligence and information to take fast action on emerging crime problems, engaging with and gathering knowledge from the general public and businesses and making decisions on allocating resources where the best outcomes can be anticipated.

Motivators for Waste Tyre Crime

There are a wide range of illegal activities taking place within the UK relating to used tyres and tyre crime can occur in any part of the chain of activity. The list including activities such as illegal baling, unregistered storage and abandonment, illegal landfill operation where used tyres are being dumped, unregistered collection and subsequent illegal disposal (e.g. flytipping), setting piles of tyres alight, illegal export of used tyres and re-sale of used tyres unfit for use according to UK law.

There are several commonly accepted motivators for tyre crime including, but not limited to, financial gain, convenience, opportunism, market dynamics/demand, lack of a threat of being caught and lenient sentences/punishment for offences.

Motives on the waste producer side include the macro-economic conditions, particularly pressure to cut costs (the cheaper the better) and where a lack of competition from legitimate collectors can fuel the growth in illegal collections. The analysis has shown many of the waste tyre producers do acknowledge basic requirements to abide by the Duty of Care Regulations, however as the trial data showed, many fail to provide, on demand, evidence that they are in compliance. There is apathy in some cases to apply due diligence when contracting collections or consigning their waste tyres.

Motives on the illegal collector side are money and profit. In late 2011, a successful prosecution was brought against a single individual operating four illegal dumps estimated to contain 800,000 used tyres. On the basis that a profit of around 50 pence can be made per tyre, this is £400,000, made over a period of around 15 months. Specific factors such as demand, market dynamics and pricing, density of producers to treatment facilities all play their part but the research indicates the primary motive to be financial gain. Common to the range of illegal disposal routes is that they require low capital investment and the gains can be made, in certain circumstances, at a (perceived) low risk.

It has been suggested that where organised criminal enterprises operate illegal waste disposal they are also likely to have other waste operations. These waste operations may be legally compliant within themselves. However, they are often indistinct from those belonging to the legitimate waste management sector in the UK. This further complicates the separation of motives relating to the illegal aspect of waste management practice from the legitimate. The ability to ‘make a little extra’ from piggybacking an illegal operation

onto a legal one remains a motive that should be considered as highly relevant however this aspect has not been covered within this report.

These motives are in keeping with wider EU-level intelligence, e.g. from Europol, which indicates perceived level of risk (low), the simplicity with which profits can be made, lack of traceability of the tyres themselves and visibility of enforcers are key factors.

Incentives to Reduce Tyre Crime

The limited information available, due to the sensitive nature of data and information around waste crime, shows that the majority of the illegal waste tyre crime activity begins when the collectors pick up the used tyres from the producers and get paid. By targeting interventions at waste producers (such as education campaigns), it makes it more difficult for illegal collectors to 'make a quick buck'. The result of such interventions could reasonably be anticipated to be a reduction of the number of tyres disposed of illegally; the evaluation of the case studies confirms as much. It is by no means the only method of reducing waste tyre crime but it is widely applied. Others include:

- Use of information and awareness campaigns involving on-site visits to producers;
- Greater publication of known criminal activities and perpetrators;
- Gathering intelligence through public information portals or helplines;
- Greater levels of scrutiny and compliance checks;
- Greater depth of analysis of waste tyre movements across the tyre life cycle (the waste stream approach);
- High financial and custodial penalties, which work as a disincentive to waste crime;
- Wider use of the Proceeds of Crime Act 2002 (as amended), which enables recovery of the proceeds from criminal activities including by confiscation order (upon conviction by the courts) or civil recovery.
- Fiscal incentives and rewards which have been shown to help encourage intelligence sharing on illegal activity and gather more information on criminal activities;
- Support to develop thriving markets of secondary materials from recycled and recovered waste;
- Systems of producer responsibility and fee-free tyre collections, removing the exchange of money at point of collection and disincentivising illegal activity; and
- Better tyre management and accountancy over the tyre lifecycle.

Lessons Learnt

Research on the case studies identified some weaknesses in the design and execution of the campaigns, in particular lack of consistency and standardisation in the type and format of data collected. This rendered an evaluation of cost effectiveness impossible and made comparative assessment of the outcomes less effective. Selected key observations for those seeking to implement interventions on waste tyre crime using novel approaches include:

- When a campaign is being developed, it is important to agree on an aim or set of aims and set-out clear objectives that can then be used to help determine the main success criteria and relative importance (the weighting).
- Allow sufficient time within the campaign to set the baseline and to set mechanisms and resources to continue to collect data once the campaign has finished.

- There were significant advantages noted to joint or collaborative programmes yet there were also issues that resulting in less effective delivery and evaluation – this included:
 - A consistent approach to briefing the team together with adequate control throughout the operational period.
 - Agree on the data to be collected and ensure what actually is collected is standardised and comparable as far as reasonably practicable.
 - Ensure that sufficient resource is allocated to retrieving the data from dispersed teams.
- Set aside sufficient time and resources to effectively evaluate the campaign and to save time, be clear about what is to be evaluated, against what criteria and how the results should be presented.
- The programme and timetable needs to have sufficient flexibility within it to account for delays in data returns and in processing it into a format from which a useful evaluation and analysis can be undertaken.
- Crime affects the wider society and therefore building adequate consultation with members of the public and businesses before and after the campaign into the programme is necessary to inform and disseminate the results (where issues of confidentiality and protection of sensitive information allows).

The most pertinent points for agencies wishing to replicate or adopt public sector led novel approaches as identified from the case studies in this report are:

- Working jointly and in collaboration across authorities, agencies and regulatory bodies.
- Building sufficient time in to the campaign programme to allow for key design, planning, execution, analysis and evaluation phases.
- Working with prominent national campaigning or tyre processing organisations to achieve industry buy-in and help in promoting the messages.
- Consider working with a range of public bodies but delivery of a campaign doesn't need to have just regulatory agents; local residential groups, environmental charities and community organisations can support.

Recommendations

Development of evaluation criteria: Developing evaluation criteria and a framework for evaluating waste crime interventions is a vital step in being able to successfully evaluate the cost effectiveness of any intervention or campaign. Internal engagement, perhaps in the form of a workshop built around the outcomes of this study, to determine the parameters and structure of such a framework would help to establish some common formats and metrics for cost effectiveness assessment.

Point of intervention: The research showed that financial gain was the strongest driver for waste tyre crime and illegal collection, storage and export. By targeting interventions at the point where the money changes hands, one of the key drivers can be removed. The tyre industry with government and the Environment Agency should explore how the legal collection and management of scrap tyres could be further incentivised to marginalise criminal activity.

Multiple partnerships: The evaluation of the case studies noted the benefits of collaboration and collaborative working between different authorities and agencies. It is judged that these benefits mostly outweigh any costs however it is important to set out the roles and responsibilities of individual partners at an early stage in the planning. Where multiple partnerships are likely for specific interventions on waste crime, developing and agreeing terms of references on pre-operational, operation and post-operational activities will strengthen delivery of intelligence and provide better quality data for analysis.

Data comparability: None of the case studies evaluated had comparable data, which made examining the benefits of adopting one approach over another difficult. Collection of data around waste crime interventions needs common formats and requires additional standardisation. The Environment Agency should seek to develop a set of common evaluation metrics (possibly within the framework mentioned above) in order to enable the cost effectiveness and success of different interventions to be accurately compared.

These recommendations have been supported by the development of a draft 'campaigns framework', distilling the key points from this study for conducting successful campaigns and setting them in the context of the new Waste Stream Approach, which forms the basis for regulatory intervention on waste crime for the foreseeable future. This framework is presented in Appendix D.

This document is out of date. Withdrawn 26 February 2019.

1.0 Overview of work undertaken

1.1 EU Tyre Market

According to the 2010 – 2011 European Tyre and Rubber Manufacturers Association (ETRMA) annual report there are 4200 European Tyre & Rubber Manufacturers operating in the EU and this includes 12 headquarters, 91 tyre manufacturing facilities and 15 research and development centres. Three of the top five global tyre companies operate within the EU, this includes Group Michelin in France (€13.7 billion), Continental A.G. in Germany (€4.54 billion) and Pirelli & C.S.p.A in Italy (€3.84 billion)².

Used tyres are managed differently across Europe and there are currently 3 main schemes (models) operating within Member States that are aimed at dealing with these tyres³:

1) Tax model:

Countries such as Denmark and Slovak Republic operate a tax system for the recovery and recycling of the used tyres. The system works through taxes paid by the tyre producers to the state; this cost is then passed on to the customers. The state bears responsibility for the administration of the system downstream and pays the operators in the recovery chain.

2) Free market model:

The free market system is operated in Austria, Bulgaria, Croatia, Germany, Ireland, Switzerland and United Kingdom⁴. Under the scheme all the operators in the recovery chain contract under free market conditions and act in compliance with legislation. Some of the countries may introduce a voluntary cooperation between companies to promote best practices.

3) Producer responsibility model:

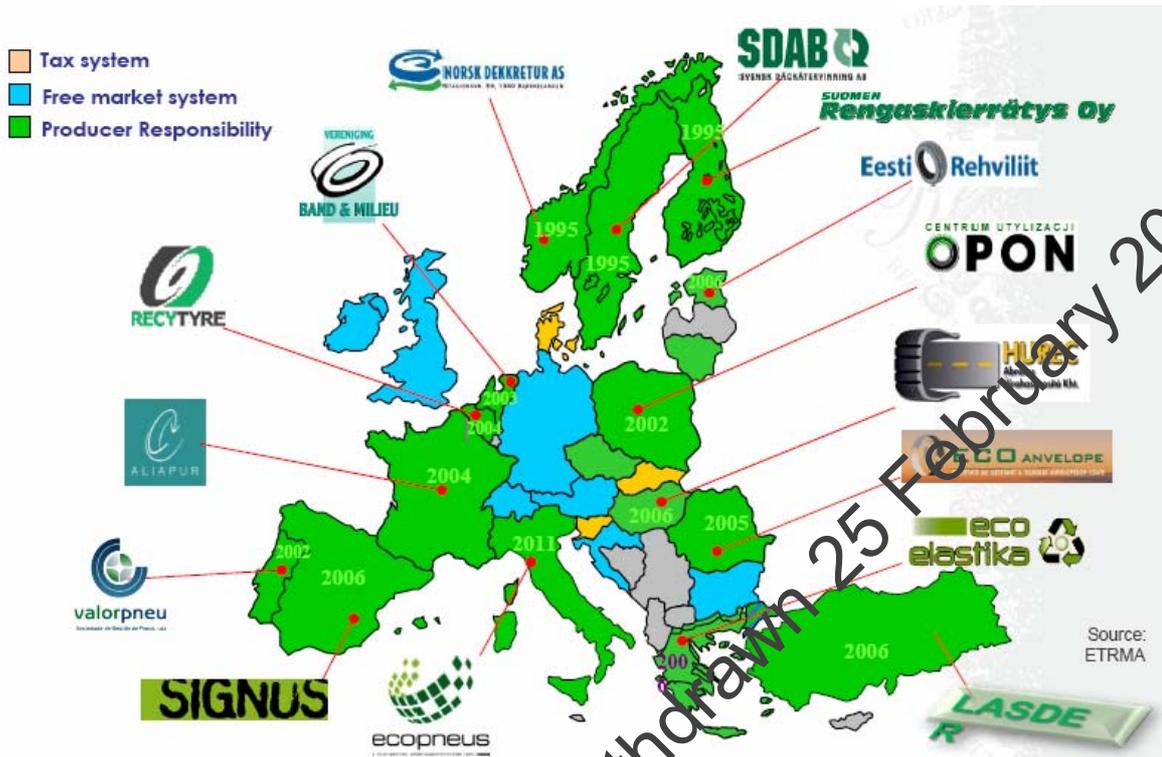
There are 15 end of life tyre management organisations operating in the EU and Turkey (as shown in appendix B) under the producer responsibility principle, including Belgium, Estonia, Finland, France, Greece, Hungary, the Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Sweden and Turkey. Italy is also considering introducing an end of life tyre management scheme in 2011 (see case study 6 in section 2.4). The not for profit organisations are set up by the tyre manufactures, the principal of the schemes is that they organise the management chain of the used tyres including the collection and treatment. The scheme is financed by the organisations setting an environmental fee; the price is the same regardless of the location of the collection points.

² Total revenues from tyre sales for 2009 – Euros based on a Euro-Dollar exchange rate of €1 = \$1.43 at 01.09.11

³ ETRMA (2010) End of life tyres: a valuable resource with growing potential, available from <http://www.etrma.org/>

⁴ A supporting (voluntary) responsible recyclers scheme (administered by the Tyre Recovery Association) also operates in parallel to the free-market model within the United Kingdom.

Figure 1.1 Map showing the different approaches to ELT management in the Europe region⁵



1.1.1 New Tyres Arising

It was estimated by the ETRMA that the 2009 turnover for the EU27 tyre and rubber manufactures was €43 billion, with the tyre corporate companies estimated at €23 billion. It is estimated that 1.4 billion tyres are produced world wide each year; the table below illustrates the number of tyres produced in the EU each year from 2005 to 2010⁶.

Table 1.1 New Tyres arising in Europe 2005 to 2010⁷

Year	Million Tonnes
2010	4.5
2009	3.6
2008	4.7
2007	5.1
2006	4.9
2005	4.6

The number of new tyres produced appears to have been fairly consistent since 2005, all being over 4 million tonnes apart from in 2009. The reason for the drop in figures in 2009 is widely quoted as being influenced by the global economic downturn and reduced market demand for new vehicles.

⁵ Figure courtesy of ETRMA

⁶ The Tyre Recovery Association has noted that the ETRMA figures may understate the total airings

⁷ ETRMA (2011) Annual Report 2010-2011, available from <http://www.etrma.org/>

1.1.2 Waste Tyres Arising

Since 1996 the number of tyres sent to landfill has continuously declined from 32% of used tyres arising to 4% in 2009⁸. This would be expected as the EU Landfill Directive prohibited the landfilling of whole tyres from 1st July 2003 and banned the landfilling of shredded tyres in July 2006, meaning that the other markets for used tyres grew. Also Directive 2000/53/EC on end of life vehicles (applying to cars and light goods vehicles) sets rising reuse, recycling and recovery targets which acts as an additional incentive. Together, these act as powerful legislative instruments for alternative treatment of waste tyres.

With the exception of UK and Germany, the ETRMA data reflects the producer responsibility obligation on ETRMA members. The data for each country other than the UK and Germany, therefore do not reflect national arisings. ETRMA have been working to produce national arisings data for each EU Member State to address this issue. Based on ETRMA data, the main route for disposal since the landfill ban was introduced for tyres has been through energy recovery and material recovery, which in 2009 accounted for 45% and 41% of the tyre recovery route. The number of tyres treated via retreading and reuse and then export has stayed fairly constant since 1996 to 2009⁹.

It is estimated that 3.2 million tonnes of used tyres are produced in Europe every year, with approximately 2.6 million tonnes of tyres recovered or recycled. Data does also exist on the size of the EU used tyre market for individual countries. However it should be noted that not all EU countries will report their used tyre figures in the same way, which is partially down to the variation in regulations and policing in different countries. This therefore makes it hard to compare the figures arising from different countries.

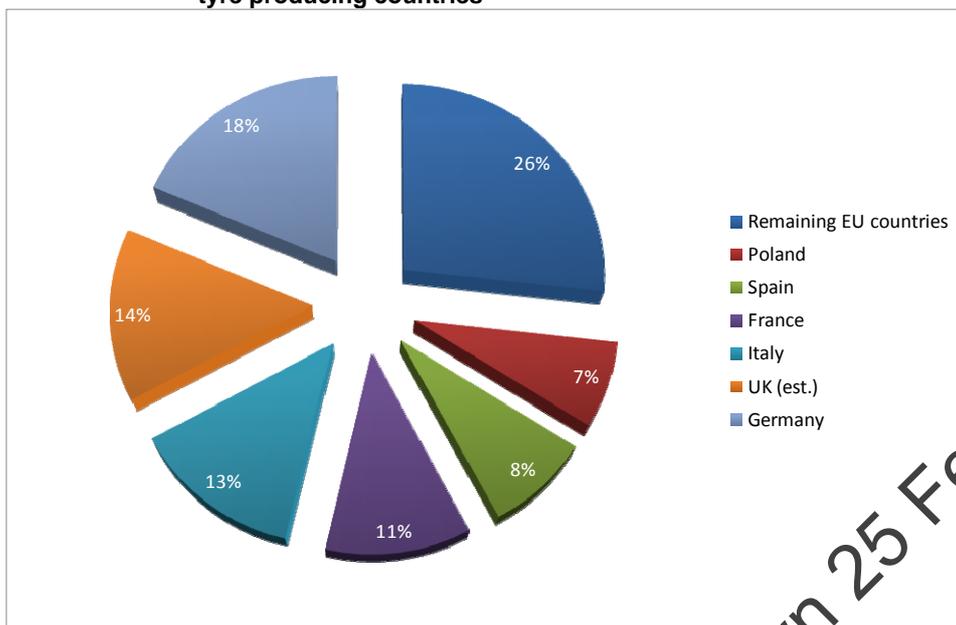
The ETRMA has produced data illustrating the number of used tyres, part worn tyres and end of life tyres in Europe for 2010. Although this data provides an understanding of the current end markets in the EU, it may not be wholly comparable, as highlighted above. Based on the ETRMA data the largest producers of used tyres are Germany, UK, France, Italy, Spain and Poland, with between 239 to 614 thousand tonnes arising per year. The remaining EU countries produce less than 100 thousand tonnes per year¹⁰, as shown in Figure 1.2.

⁸ Data referring to EU performance

⁹ ETRMA (2011) Annual Report 2010-2011, available from <http://www.etrma.org/>

¹⁰ ETRMA (2010) End-of-life tyres: a valuable resource with growing potential (2010 edition), available from www.etrma.org/

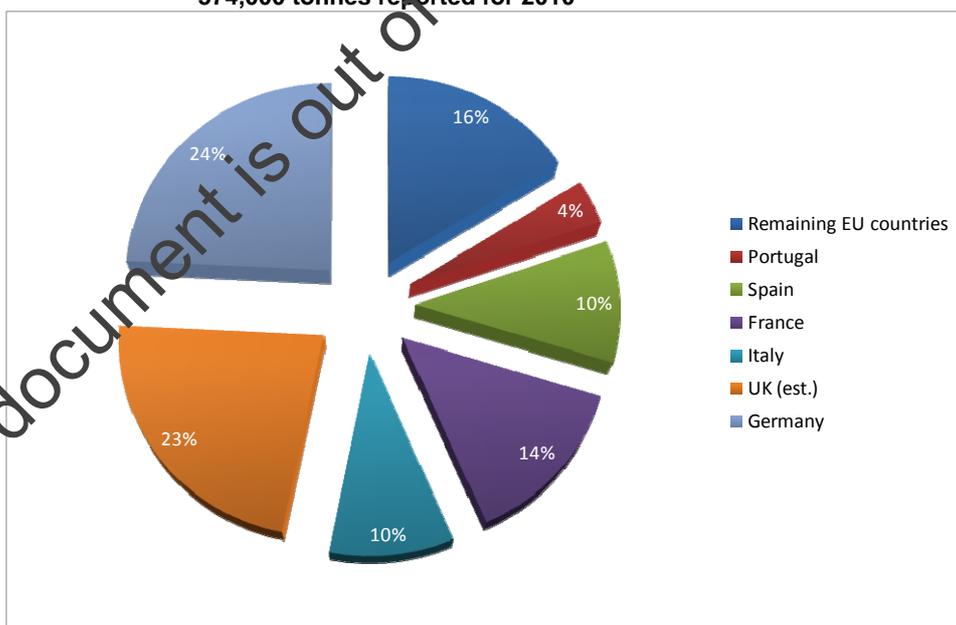
Figure 1.2 Percentage of the total 3,273,000 of used tyres produced in 2010 for the top 6 used tyre producing countries



Data taken from ETRMA press release 11 July 2011 available from www.etrma.org

Reuse includes tyres that have been reused in the same country, exported for reuse and also re-treaded tyres. The UK reused the highest number of tyres in 2010 at 44,000 tonnes and was the second highest exporter at 54,000 tonnes, with Germany reported to have exported 84,000 tonnes and re-treaded 45,000 tonnes which was the highest number of tyres, as shown in Figure 1.3. Spain and France were also among the top 6 countries reusing tyres, although both of these countries, based on the ETRMA data, did not export any of their tyres for reuse.

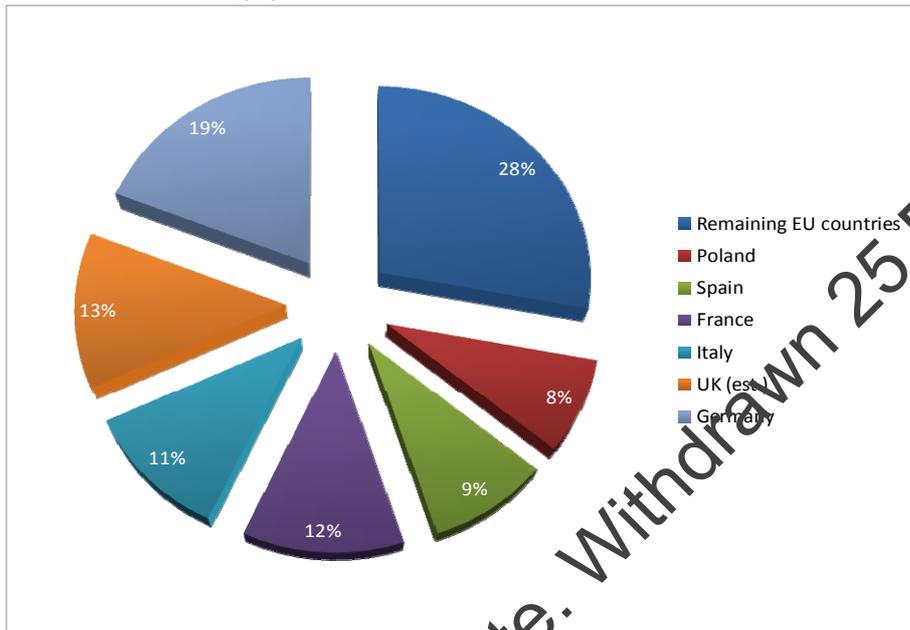
Figure 1.3 Percentage of top 6 countries reporting reusing tyres as part worn of the total of 574,000 tonnes reported for 2010



Tyres that have been recovered include tyres that have been used for civil engineering, public works & backfilling, recycling and energy recovery. Out of the EU countries, the UK (for 2010) was reported to have used the most used tyres for civil engineering, public works & backfilling, using 75,000 tonnes followed by Finland using 40,000 tonnes. The

remaining countries that were reported to use tyres for civil engineering, public works & backfilling used less than 40,000 tonnes in total. Germany was reported to have used the most used tyres for recycling and energy recovery in 2010; processing over 400,000 tonnes. The UK, France and Spain were reported to have recycled the next highest number of tyres; each of them processing above 100,000 tonnes. They were also reported to be sending over 100,000 tonnes of used tyres for energy recovery along with Poland and Italy.

Figure 1.4 Percentage of top 6 countries reporting recovered tyres 232,100 total tonnes reported in 2010



The ETRMA data also included 7 countries from the EU that had a proportion of their used tyres sent to landfill or the destination as unknown. Greece had the highest figure at 91,000 tonnes all the other 6 countries reported below 20,000 tonnes. The figures above illustrate that the largest producers of tyres are also the countries that are reusing or recovering the most tyres based on the ETRMA data and the top 5 countries which are present in all of the charts include Spain, France, Italy, UK and Germany.

1.1.3 Collection

The cost and payment method of the collectors of used tyres can vary depending on the type of scheme operating within the individual country. For example, in a free market scheme the collectors can offer any price they choose to the used tyre producers as they compete in the marketplace with other collectors. In countries operating a producer responsibility scheme, the collectors do not receive their payment until the tyres are sent to recycling or energy recovery. In Portugal this payment is reported to be a fixed fee of 23 euros per tonne¹¹. Finland and Belgium also operate producer responsibility schemes where the fee is paid by the consumer when they purchase the tyre. In a 2006 report the recycling fee was €1.85 per tyre in Finland and in Belgium a fee of €2.40 for small cars to €12.46 for buses and trucks has been added to tyre prices¹².

The size of collection operations varies between and within countries. Collectors can range from a single individual in a vehicle targeting the small-scale producer of tyres

¹¹ Ferrao.R, Ribeiro.R,& Silva.R (2008), A management system for end of life tyres: A Portuguese case study, Waste Management, 28, 604–614

¹² ETAP (2006), Finland Recycles almost 100% of its Used Tyres, http://ec.europa.eu/environment/etap/inaction/pdfs/sept06_finish_tyre_recycling.pdf

(garages/repair centres) to national companies operating fleets of collection vehicles, often within the framework of a national collection contract for the major tyre fitters.

In countries that share a land border, there is the opportunity for cross border movement of tyres. If the tyres are taken across borders illegally, the impact will be potentially more illegal disposals and also inaccuracy in the reported figures for tyres. The cost associated with the clean-up and remediation of illegal tyre storage, dumping or landfills can be extremely high; the state being required to pay for this to avoid continued pollution potential and avert safety concerns.

1.1.4 End Markets

The tyre industry uses 70% of all natural rubber produced worldwide and it is predicted that this use could increase significantly in the next 30 years¹³. Alongside this, the availability for natural and synthetic rubber may become less available as synthetic rubber is made from fossil fuels. Both of these factors may result in there being a greater demand for recycled rubber, reused tyres and also retreaded tyres.

Truck tyres contain proportionally more natural rubber in comparison to synthetic rubber used to make car tyres. Industry members also identified that it is easier to extract the rubber from the truck tyres and for the same amount of effort as a car tyre the recyclers can get more rubber from a truck tyre. Truck tyres are also more commonly used for retreading purposes, meaning that both for the recycling and retreading route truck tyres tend to be more popular. Commentary from the UK's Used Tyre Working Group (UTWG)¹⁴ indicates that UK market demand for truck tyre casings (the tyre carcasses ready for re-treading) is high and still growing.

The EU revised waste framework directive (2008/98/EC) introduces the concept of end of waste criteria, by which selected waste streams, including tyres, could cease to be considered a waste if they comply with set end of waste criteria¹⁵. The Directive also establishes a clear position on how Member States should take account of the waste hierarchy when seeking to reduce waste materials. The UK has already taken a lead in this area having developed a Quality Protocol and associated Publicly Available Specification (PAS) for the production and storage of size-reduced tyre materials in higher value end market applications¹⁶. Setting industry standards helps provide the end users of the product with confidence in the quality of the material produced. The CEN TS 14243 sets the standard for 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 was introduced in 2010.

The end use for used tyres appears to be similar in countries across the EU. They can be used for a range of applications, for example industrial flooring, sports fields and roads. A news article released in 2007 suggested that Spain would be introducing regulations that would increase the proportion of rubber from waste tyres recycled into roads¹⁷.

Tyres can also be used as an alternative fuel source, typically being burnt in cement kilns as an alternative to fossil-fuels. The French tyre industry has already committed to the disposal of one third of their historic volume of waste tyres through a government agreement. The intention is that the majority of the historic tyre waste would be burnt to

¹³ ETRMA (2011) Annual Report 2010-2011, available from www.etrma.org/

¹⁴ UTWG meeting, London, 14.07.11

¹⁵ ETRMA (2011) Annual Report 2010-2011, available from www.etrma.org/

¹⁶ http://www.wrap.org.uk/recycling_industry/information_by_material/tyres/pas_107.html

¹⁷ Ends (2007), Spain to require recycling of tyres into roads, www.endseurope.com/13437/spain-to-require-recycling-of-tyres-into-roads

recover the energy¹⁸. The table below illustrates the main uses of used tyres within the EU in 2009 and 2010 based on ETRMA data.

Based on Table 1.2, the end uses of the tyres for 2009 and 2010 were similar, with a slight increase in the number of tyres recovered in 2010. However this may be expected as there was a reported increase in the number of new tyres sold in 2010. There is only a small tonnage difference between the numbers of tyres used for recycling compared to those used for energy recovery across Europe as a whole.

Table 1.2 Main uses of used tyres within the EU in 2009 and 2010

	Year	Tonnes (000's)	Application
Material recycling	2009	1201	Civil engineering (estimated ETRMA 20%)
			Product Applications: Flooring, Paving blocks, Roofing materials (estimated ETRMA 80%)
	2010	1315	Civil engineering (estimated ETRMA 19%)
			Product Applications: Flooring, Paving blocks, Roofing materials (estimated ETRMA 82%)
Energy	2009	1293	Power plant/ co-incineration (estimated ETRMA 3%)
			Cement Kilns (estimated ETRMA 97%)
	2010	1248	Split Unknown

ETRMA (2011), Annual Report 2010-2011

1.1.5 Tyre Crime in Europe

There is the opportunity for tyre crime (illegal recovery) to occur in any country however in countries that operate a free market system (essentially where cash exchanges hands at the point of collection) for their tyre disposal there are greater opportunities for criminal enterprises to make a 'quick buck' at the recovery end of the tyre lifecycle. It is recognised however that there is not a proven correlation (positive or otherwise) between tyre crime and the model used for recovery. Factors such as how agencies and authorities tackle the issue, the amount of funding set aside to support growth in higher-value end use markets (e.g. through the end of waste and research) and penalties imposed for offenders all contribute to the level of illegal operations within a country. In a free market system (like the UK) the collector can collect the tyres directly from the producers and get paid. Once money has exchanged hands, the subsequent management of the used tyres relies on responsible operations that comply with the country laws. Given that money has changed hands in many cases at this point, the opportunity for illegal storage (often in unregistered warehouses or industrial units), illegal dumping or baling and exporting of tyres poses a more substantial threat than in other models.

Work on waste crime in Europe and beyond its borders is being coordinated by Interpol and Europol with the cooperation of Member States and other countries. In some regions, specific task forces have been set up to collaborate on tackling illegal criminal activity such as illegal transfrontier shipments and illegal landfilling. In considering waste tyre crime within the EU, it is important to place it in context of the waste crime area more broadly. Effective action, particularly against well organised, well financed and well informed criminal groups, requires planning and cooperation across a range of areas, waste tyre crime being one of these. Measures to tackle tyre crime must therefore be part of an integrated solution and not viewed, in all cases, in isolation as distinct and separate.

¹⁸ Ends (2008), France to tackle "historical" waste tyres, www.endseurope.com/14742/france-to-tackle-quot-historical-quot-waste-tyres

As highlighted in the ETRMA annual report (2010-2011) countries operating a management system can also have issues with illegal tyre disposal. For example the increase in internet sales means that tyres are being imported and some companies or individuals are not declaring these tyres. Therefore they are not paying the financial contribution required when tyres are bought in to the countries. The lack of a contribution creates an imbalance within the producer responsibility system; more tyres are sent for recovery than are paid for having a negative effect on the overall integrity of the model. The French government has introduced administrative fines for producers not following regulatory obligation to try and discourage this type of activity; the producers can be fined up to €7,500. Other countries using this producer responsibility model should also be making similar provision to further discourage undeclared imports.

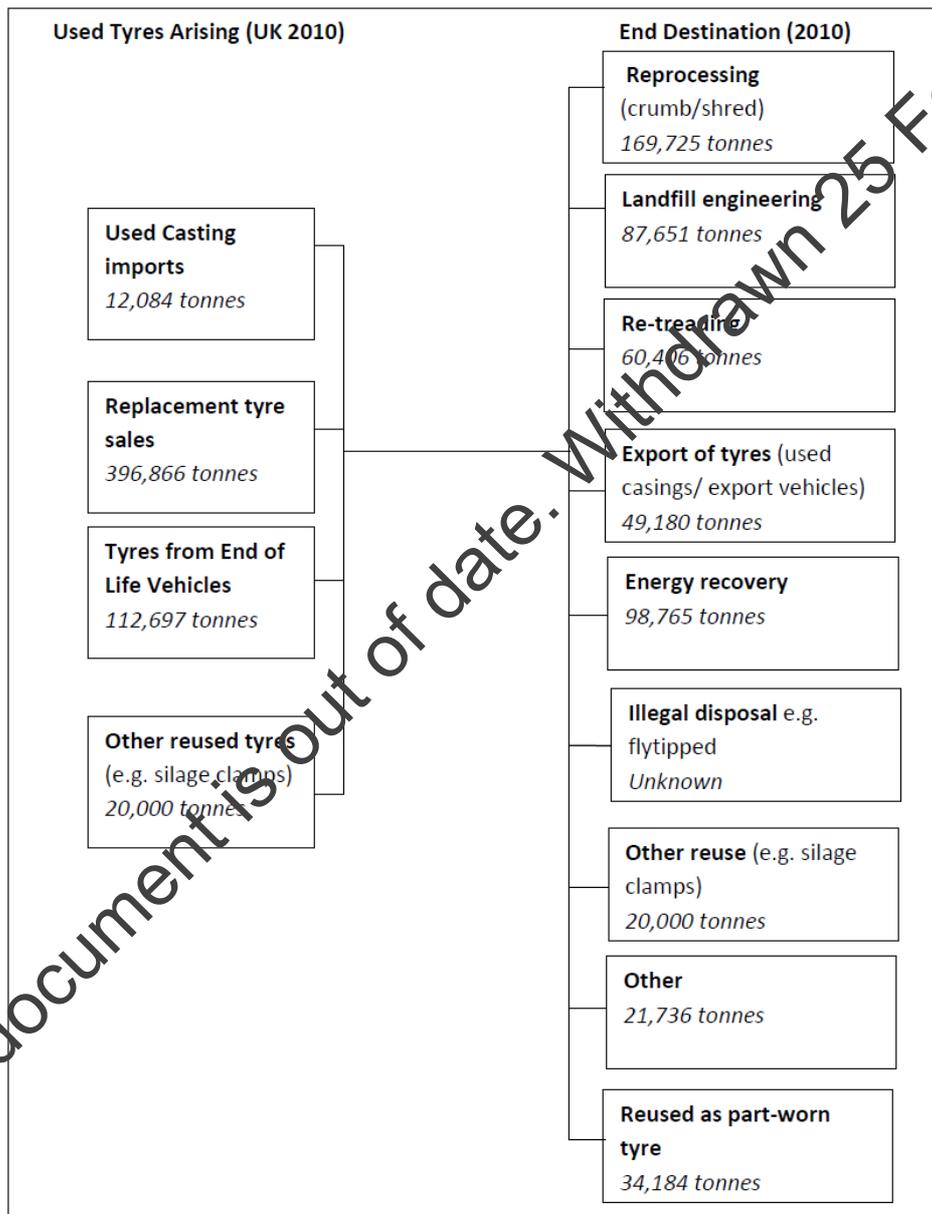
This document is out of date. Withdrawn 25 February 2019.

1.2 The UK and South East England Tyre Market

1.2.1 UK Market Summary

In 2003 around 85,000 tonnes of waste tyres were reported to have been disposed of to landfill¹⁹, which accounted for approximately 20% of the used tyres produced in the UK. Following the landfill ban companies were forced to find new outlets for the used tyres or current outlets had to be further utilised and the market for end products needed to grow. Figure 1.5 below illustrates the flow of tyre production in 2010 and the potential end uses.

Figure 1.5 Simplified waste tyre market material flow diagram illustrating 2010 data (Data source UTWG 2010)



The tonnage data shown in Figure 1.5 is based on the information gathered each year by the UTWG, the sources for the data is shown below in Table 1.3. There is an end destination in Figure 1.5 called 'other' which represents 21,736 tonnes of used tyres in

¹⁹ Information from the UTWG

2010. This figure is used as a balancing figure due to the difficulties in getting an accurate figure for the number of tyres currently in storage.

Although this data may not be completely accurate, for example the 'balancing figure' excludes historic and illegally stored and exported tyres, it is the most comprehensive data identified.

Table 1.3 UTWG tonnage data source new tyres and waste tyres

New Tyres Category	Data Source
Retread importers	Customs and Excise figures
Retread manufacturers	British Tyre Manufacturers' Association & Retread Manufacturers Association figures
Tyres on new vehicles	The Society of Motor Manufacturers and Traders (SMMT) figures.
Replacement tyre sales	Tyre Industry Federation data including British Tyre Manufacturers' Association, Imported Tyre Manufacturers Association & Tyre Wholesaler Group figures
Waste Tyres Category	Data Source
Used casing imports	Customs and Excise total figures
Replacement tyre sales	New, retread & part-worn tyre sales taken as proxy for used tyres taken off vehicles. BTMA, Imported Tyre Manufacturers Association, Retread Manufacturers Association & Automotive Consortium on Recycling and Disposal figures*
Tyres on end of life vehicles (ELV)	Modelled from Society of Motor Manufacturers and Traders (SMMT) and Driver & Vehicles Licensing Agency (DVLA) figures
Exports of used casings and vehicles	HM Revenue & Customs figures
Other reuse	Assumption: silage clamps, dock fenders, etc
Material recovery (crumb)	Returns from industry
Energy recovery	Returns from industry - cement kilns
Landfill engineering	Returns from industry
Other	Balancing figure representing the difference between used tyre casings and the total of the various categories covering reuse, recycling and recovery.

*This group is now defunct: they provided intelligence to model part-worn rates from ELV vehicles.

Waste return data from the Regional Attached Tonnage System (RATs) collated by the Environment Agency is based on data returned from permitted waste sites. It does not include exempt sites as they are not required to report waste tonnages. The data provides an understanding of how waste is managed at permitted sites but does not represent a completely accurate picture of the waste tyre stream.

The tonnage of waste tyres arising according to the UTWG data and Environment Agency's RATs data varied by approximately 4,300 tonnes, though the recovery rate reported for the UTWG data was just under 20 tonnes higher than the Environment Agency data. It is hard to compare the two sets of data; for example re-treading is an exempt activity and therefore the Environment Agency data will not include this. However, the percentage split between the two sets of data is similar.

The Environment Agency RATs data shows the fate of waste tyres for 2009 was 49.7% going to recycling/reprocessing, 20.7% to incineration, 6% to landfill and 23.6% to an unknown destination. As the UTWG data showed 48% of waste tyres going to landfill engineering and recycling, 22.5% to energy recovery and 28.2% to reuse and retreading, this is not hugely dissimilar to the Environment Agency data. Neither the UTWG nor the Environment Agency data provided a breakdown of the flow of waste in the South East region of the UK.

Although the UK does operate a free market for used tyres there is the Tyre Industry Federation (TIF) responsible recycler scheme operating, which was introduced in 1999. The aim of the scheme is to help ensure end of life tyres are disposed of in accordance with the law, including the DoC. The scope of the scheme was initially aimed at the tyre collectors; however it was seen as a success and expanded to recyclers and reprocessors and the scheme currently has around 80% of the tyre recovery operations in the UK as members. The companies are regularly audited under the scheme to ensure they are in line with current regulatory requirements and hold the correct documentation and permits. The remaining 20% of the operators collecting (and storing/processing) used tyres arising in the UK are not members of the TIF scheme.

Through discussion with industry it has been suggested that 10% of used tyres arising per year are dealt with through illegal disposal²⁰. Identifying the exact numbers of used tyres dealt with illegally is fraught with difficulty, mainly because not all of the used tyres arising will be identified, some are in long-term illegal storage and some dumped in illegal sites but as yet not discovered by the authorities. Although a 'best guess', the 10% compares favourably to Italy, which reports an estimate of 25% of used tyre arisings being managed through illegal disposal.

The disposal of illegal tyres can result in an unfair commercial advantage over legitimate operators and the increasing costs of waste disposal to the legitimate companies means that illegal disposal of tyres can be extremely profitable. There are also significant costs borne by the authorities in investigation and clean up of illegal tyres.

1.2.2 New Tyres Arising

National

The production of new tyres meets the demand from the production and sale of new cars and also from replacement tyre sales, which can be new or re-treaded tyres. Car tyres accounted on average for 57% of the total volume of new tyres (including re-treaded tyres) coming on to the market between 2001 and 2010.

Table 1.4 Tonnes of new and re-treaded tyres arising from 2006 to 2010 (figures in 000's)

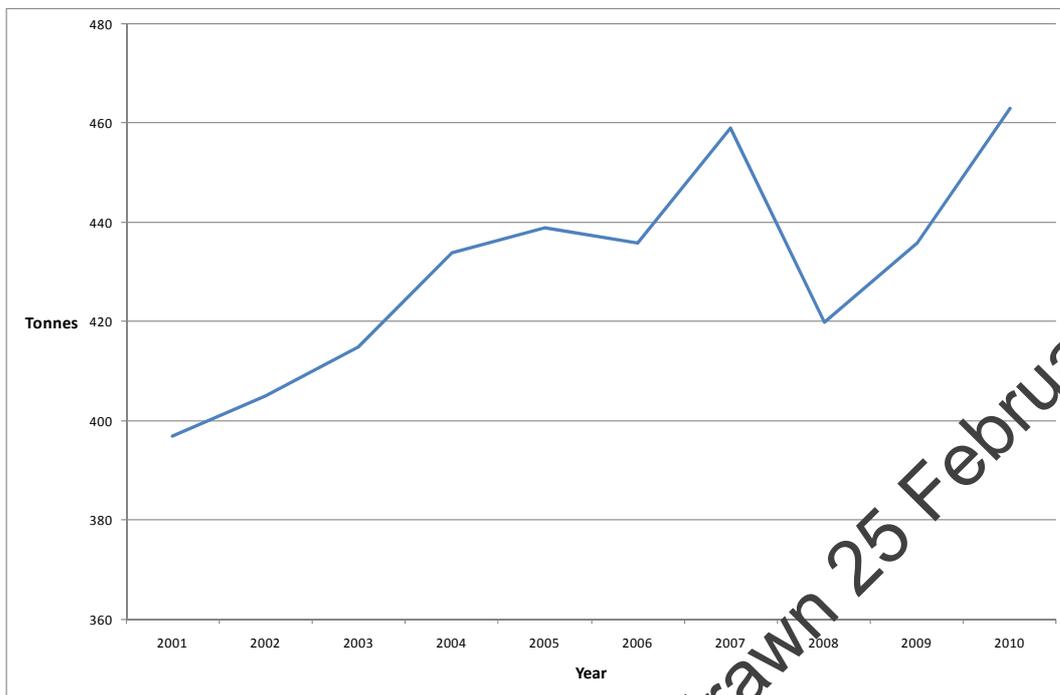
Consumer	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Car	221	224	232	251	234	234	253	243	276	273
4x4	13	14	16	17	19	19	22	23	28	28
Van & light truck	36	40	39	38	46	50	49	44	41	44
Truck and Buses	127	127	128	128	140	133	135	110	91	118
Total	397	405	415	434	439	436	459	420	436	463

* Data source UTWG.

UK total tyre sales increased steadily until 2005 with a slight dip in 2006, rising to a peak in 2007 with another dip in 2008 and a slight rise again in 2009 and 2010, as shown in Figure 1.6. The annual variation in the tonnage between 2001 and 2010 is modest, with numbers consistently over 400,000 since 2002.

²⁰ There is no published data to confirm that 10% of used tyres arising per year are dealt with through illegal disposal and this figure has been challenged in peer review by the TRA however no better sources exist at present.

Figure 1.6 Tonnes of new and re-treaded tyres arising from 2001 to 2010 (figures in 000's)



South East

There were no publicly available aggregated figures accurately establishing the number of new tyres sold just in the South East. To establish this would require significant additional new market survey work across a very wide network of replacement tyre outlets and vehicle garages.

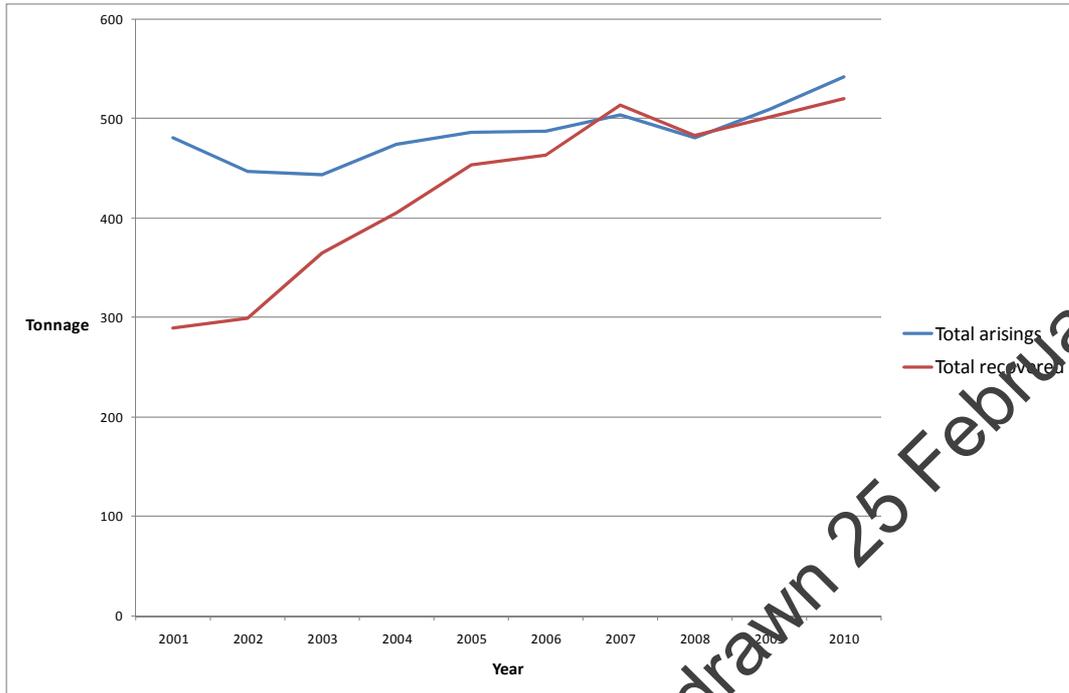
1.2.3 Waste Tyres Arising

National

Figure 1.7 shows the total arising of used tyres for recovery and disposal in the UK since 2001. The table shows that the used tyres arising for recovery and disposal in the UK has not varied a great deal from 2001 to 2010, with the trends in arisings roughly tracking tyre sales. The lowest number of waste tyres arose in 2003 with the highest number in 2010. The number of tyres sent for recovery has steadily increased from 2001 with a slight dip in 2008; the rise in recovery will partially be due to the introduction of the landfill ban on tyres. The data from the UTWG has been developed using a number of different sources of information, as shown in Table 1.3.

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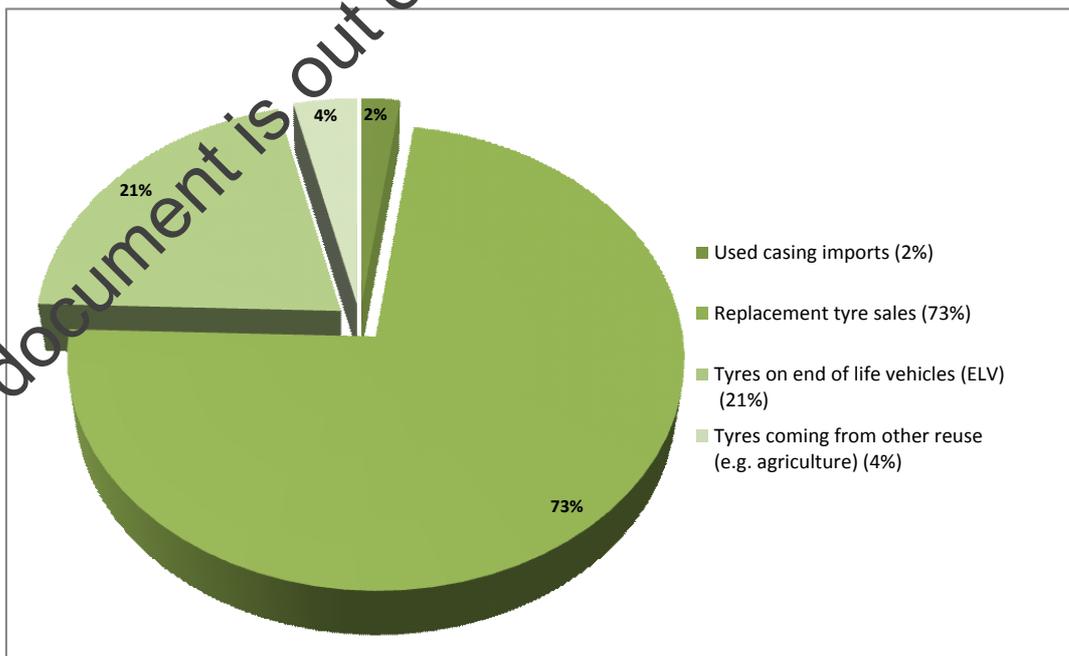
Figure 1.7 Total tonnes of used tyres arising for disposal and recovery in the UK (figures in 000's)



* Data source UTWG.

Waste tyres are mainly produced as a result of replacement of vehicle tyres (end of life or damaged). In 2010, car tyres accounted for 73% of waste tyres produced (data source UTWG). Other sources of used tyres include end of life vehicles (ELVs) and tyres that have been reused and then come back in to the waste tyre stream. Figure 1.8 illustrates the main source of used tyres produced in 2010 for the UK.

Figure 1.8 Main sources of used tyres produced in 2010 for the UK



(Data source UTWG)

South East

It was estimated in a 2005 South East England Development Agency (SEEDA) report that between 50,000 and 80,000 tonnes of used tyres are produced in the South East region each year. It is predicted that at the lower end of the scale, this figure is likely to rise to around 67,000 tonnes by 2012²¹.

1.2.4 Collection

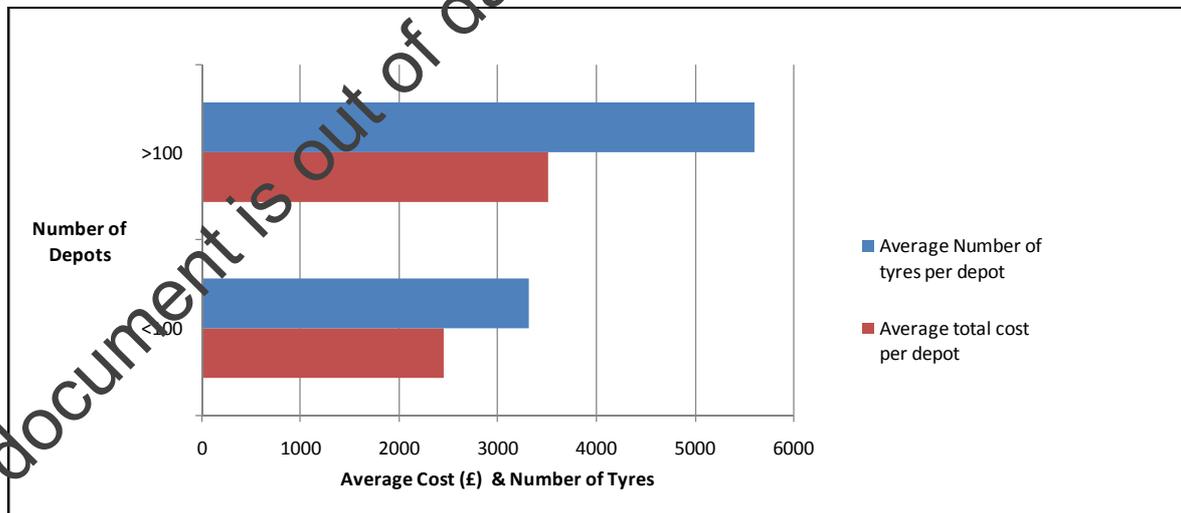
National

Based on the 2011 National Tyre Distribution Association (NTDA) annual report, there are 4 companies operating in the UK that have over 100 tyre depots with the largest company operating 665 tyre depots. There are 2 companies operating 50-100 tyre depots and all other companies operate less than 50 tyre depots. The total number of depots operating in the UK was impossible to identify because there is a large number of companies operating with just 1 depot²².

The free market system operating in the UK means collection companies can either set up a contract with a dedicated company or they can just charge a fee when they collect the tyres. For example one of the top 5 biggest companies operating in the UK identified they have an official contract set up with one waste management company to deal with all of their waste tyres; the charge per tyre is the same across all their depots. However another of the top 5 biggest companies contacted highlighted that each depot deals with their own waste tyres and there is no central contact, therefore collection charges vary by location.

Figure 1.9 below illustrates the cost of tyres based on the data gathered from the Environment Agency's trial in the Thames North East area and also data from one of the top 5 tyre companies operating in the UK.

Figure 1.9 Average Cost (£) and Number of Tyres per Depot per year



Note: Data based on 1 year aggregated DoC: waste transfer notes. Data for the less than 100 depots is focused on companies operating in the South East of England (Thames North East trial) however the data for greater than 100 depots is based on a National company.

The graph illustrates the variance in collection costs between the larger and the smaller companies. The average price for the company with over 100 depots was between 60 pence and 65 pence per tyre. The average price for companies with less than 100 was

²¹ SEEDA (2005), Market development data research scoping study

²² The NTDA has a list of all of the companies that are members in their annual directory.

higher, between 55 pence and 85 pence per tyre; therefore the trial data suggests that smaller companies are likely to be paying more per tyre for disposal. One of the reasons for this may be that larger companies are more likely to hold national used tyre management contracts, which benefit from scaling to reduce the 'per tyre' price. Having to pay a higher price introduces an incentive to reduce costs, leaving the smaller business more vulnerable to being 'talked-into' illegal collection, where the illegal collector can demonstrate savings can be made. The lack of any coherent strategic or contractual management around used tyres in smaller businesses heightens the risk of fuelling illegal collection as decisions about who collects the tyres is ad-hoc.

The Environment Agency campaign in the Solent and South Downs area identified the average collection cost range to be between 98 pence and £2.98. The lowest reported collection cost was 50 pence, the highest £10.00 (likely to be for truck or other large tyres). It also appears, from the cost data submitted from 191 companies, that those producing greater quantities of tyres pay slightly less on average than those producing smaller volumes. The data was however only a spot sample and not based on annual aggregated values.

The average charge for the collection of waste tyres varies depending on the region in the UK. A 2007 WRAP report provided indicative waste tyre collection charges for each region within the UK as shown in Table 1.5²³. The figures in the WRAP report are based on a survey carried out in each region of the UK with an average of 7 responses for each region (with a range of 5-14 respondents). Intelligence gathered from the research suggests that illegal waste collectors typically undercut legitimate market prices (sometimes only marginally) and lower collection costs can be an indicator of illegal collection, management or disposal.

Table 1.5 Indicative average cost ranges of tyre collection in the UK and region

	Car tyres (£)	Truck and buses (£)
UK	0.40 - 1.50	3.00 - 10.50
North East England	0.40 - 0.80	5.00 - 10.50
North West England and North Wales	0.55 - 1.50	4.95 - 8.95
Midlands	0.60 - 1.00	4.75 - 6.75
South Wales	0.60 - 1.00	N/A
Anglia	0.65 - 0.75	2.65 - 10.00
South East England	0.70 - 0.75	5.00 - 8.00
South Central England	0.70 - 1.00	3.00 - 7.50
South West England	0.75 - 1.50	4.50 - 7.50
Northern Ireland	0.80 - 1.10	5.00 - 8.50
Scotland	0.80 - 1.00	8.00 (No range)

(Source WRAP (2007))

South East

The collection cost for the South East region of England per car tyres in Table 1.6 is similar to the cost identified in the Thames North East Environment Agency trial. Discussions with the used tyre management industry highlighted the number of reprocessing facilities in the South East and in the South West (lower than in some regions) as being a factor contributing to a collection charge that is higher than in some regions. The data also indicates that, particularly for car tyres, the range of prices for collection is very low, varying by just 5 pence, the lowest range of all regions analysed. There was no additional evidence or reasons given in WRAP's report but the fact the range is so low suggests that illegal collection and disposal operators might be charging significantly more in the South East to collect tyres in response to general demand. This

²³ WRAP (2007), Waste tyre disposal and collection cost data. Industry has expressed concern that this data may be out of date however nothing as comprehensive has been done (that was provided to the study team) as yet.

makes it more difficult in this region for analysts to spot pricing trends that could signal (by way of a lower than typical market collection cost) illegal collectors operating.

SEEDA published a number of reports in 2006 following a scoping review of recycling and reprocessing infrastructure in South East England²⁴. The summary presentation from this project identified that there was a well established collection network set up in the South East of England region, with a 140 collection points identified and 182 tyre dealers²⁵. It should be noted however that many end of life processing facilities (including cement kilns) are generally in central and northern England and therefore some distance from tyre arisings in the South East increasing logistics costs.

The Environment Agency's trial in the Thames North East area used data from industry to help identify illegal waste tyre collectors and which illustrated the level of awareness of illegal tyre collection, management or disposal amongst the industry appears to be high. In support of this, a South East company interviewed as part of this research highlighted knowledge of a number of local companies collecting tyres and baling them, which may not be in line with the regulations. This company charges 85 pence per car tyre and £1 for larger 4x4 tyres for collection. However, they highlighted other companies (potentially operating illegally) are undercutting them at 50 to 60 pence per tyre. They saw this as a competitive threat that could result in putting legitimate tyre companies out of business. These findings conflict with the figures in WRAP's 2007 report suggesting only a very small range in collection costs.

An industry representative contacted by the research team highlighted illegal tyre collectors can charge in the range 5 to 10 pence less than the legitimate companies. The representative also identified that as a consequence of illegal collectors approaching producers with lower prices, legitimate companies may be forced to reduce their prices to try and compete with the illegal tyre collector.

The outcome from this element of the research is that analysis of tyre collection pricing offers significant intelligence on the potential level of illegal activity around tyre collection and disposal. Trends such as a sudden drop in collection charges or industry feedback indicating legitimate collectors are cutting tyre collection costs may indicate rises in illegal activity in specific areas.

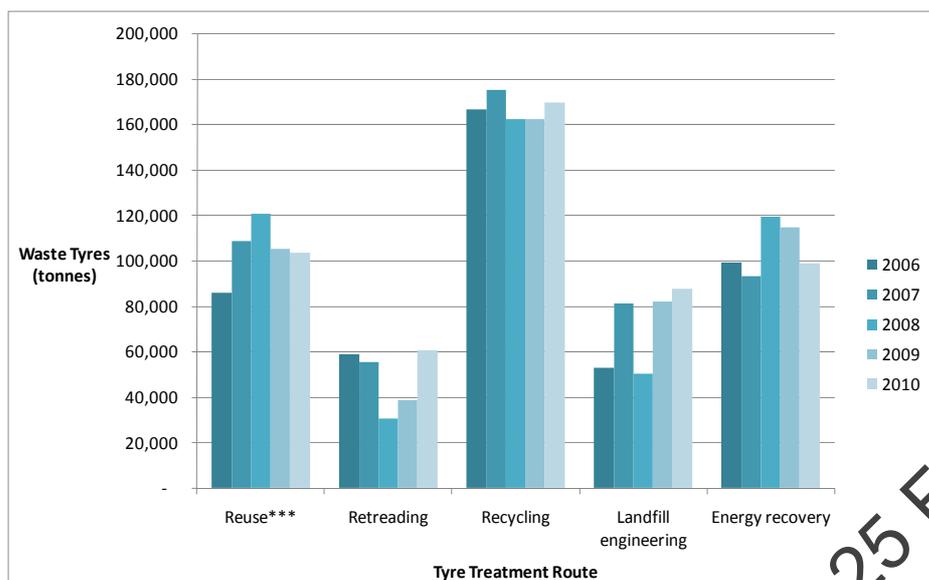
1.2.5 Current End Markets

Figure 1.10 breaks down the recovered material end markets since the landfill ban came in to force in 2006 up until 2010 in more detail (as reported in data provided by the UTWG). The results show that recycling was the main outlet for the waste tyres from 2006 to 2010.

²⁴ SEEDA (2006) Scoping Review of Recycling and Reprocessing Infrastructure in SE England.

²⁵ SEEDA (2006) Scoping Review of Recycling and Reprocessing Infrastructure in SE England, Stage 3: Context Review

Figure 1.10 Total number of waste tyres reported for disposal and recovery in the UK (UTWG)



*** Reuse includes other reuse which is an assumption for silage clamps, dock fenders etc.

Trends in the treatment routes used over time?

The tonnage of tyres that have been reported as being for reuse, as shown in Figure 1.10, includes other reuse which for each year equates to ~20,000 tonnes of tyres. Other reuse is defined as tyres that are used for “silage clamps, dock fenders etc”. This figure is an estimate and often these tyres are only used for a temporary purpose and will be returned to the waste stream when they no longer offer a serviceable solution.

Following discussions with industry and the Agency and as highlighted previously, it was suggested that there are limited number of outlets to treat waste tyres in the South East. This was also identified in the SEEDA study carried out in 2006 as detailed below. This does not mean there is a lack of infrastructure within the UK; it is how the geography of the infrastructure was historically developed. It was highlighted that the highest concentrations of tyre reprocessing and recovery facilities are located in the Midlands and in the North West.

The various markets for the treatment of waste tyres are discussed further below; this includes any information on the number of facilities operating in the South East of England which was limited.

1) **Reuse:** This includes the exporting of tyres and re-used tyres as part worn, many of which may be taken from vehicles that have been scrapped (where the tyre life may be significant). Part worn tyres as defined by the Environment Agency can be exported from the UK “if the tyres are not deemed as a waste”²⁶ and can legally be used in the destination country²⁷. The reason for this is often the standards in other countries are not as stringent as the UK and though the tread on the tyres may be on or very close to the UK legal limit (min. 1.6 mm across 75% of the central tread width), this may not be the case in the destination countries.

2) **Retreading:** This involves removing the old tread from the worn tyres that are below the UK legal limit and replacing this with new tread, this can then be sold on for reuse.

²⁶ Tyres that are still legal and suitable for use on the UK roads can legally be resold or reused. They must be described and sold as part worn, free from damage and must have minimum tread depth of 1.6 mm over three quarters of the road surface.

The re-treading of tyres appears to be more popular with truck tyres based on the UTWG data. The average of the 2006 to 2010 UTWG data illustrated that 86% of the used tyres that were sent for re-treading were truck tyres (including light trucks) and the remaining were car tyres. The number of tyres sent for re-treading in the UK from 2006 to 2008 declined from 59,000 tonnes to 31,000 tonnes; however in 2009 and 2010 the tonnage of tyres sent for re-treading increased, as shown in Figure 1.10.

The Environment Agency introduced an exemption in 2010 called T8 – Mechanical treatment of end of life tyres, which the re-treading of tyres can fall under so that they can be reused as a tyre. Other example activities which fall under this exemption include:

- Baling end-of-life tyres for use in construction;
- Granulating end-of-life tyres for use in a horse ménage; and
- Further granulating previously granulated end-of-life tyres where the granulate is oversized or requires further processing to comply with PAS 107

Companies registered under the exemption can store and treat up to 60 tonnes of truck tyres and 40 tonnes of any other tyre over any 7 day period²⁸.

An industry representative identified that retreading of truck tyres is an established market, meaning the waste can still have a residual value when used. The retreaded car tyre market is much less significant, which as suggested by industry is due to the economics of retreading car tyres and also the (historical) public perception of using retreaded tyres. However an industry representative did highlight that due to the rise in the natural rubber and fossil fuel prices (fossil fuels are used to make synthetic rubber for car tyres) this may result in an increased demand for retreaded tyres (including cars). It may also increase the demand for recycled rubber material. The Retreading Manufacturers Association (R.M.A) identified that there are approximately 30 companies in the UK currently that are re-treading tyres.

The Retreading Manufacturers Association (R.M.A) indicate that the cost associated with re-treading of tyres can vary, depending on where in the country the waste tyres are produced. For example, there are national re-treading companies that operate all over the UK but there are also smaller companies that only operate in one area. Therefore where there are both national and smaller local companies operating, the price will be lower than where there are just national companies operating. Also if a company has a large fleet then they may provide their own casing therefore reducing the cost. However, this is unlikely to apply to the South East region as highlighted previously due to the lack of companies operating in the region. The demand for retread tyres is also linked to the cost of new tyres; if the flow of cheaper imported tyres continues, there is unlikely to be an increase in the demand for retreaded tyres.

The most recent published data on the cost of retreading tyres is from 2007 where a study focusing on light commercial vehicles identified that average price for a typical new “215/75R 17.5” light truck tyre ranges from £75 - £142 whereas a re-treaded tyre ranges from £53 - £92 plus £10 to £15 for the casing²⁹. Therefore, if a company has their own casing, there is a saving of up to £50 per tyre. More up to date cost data was not available. A WRAP case study on the costs and benefits of using retread tyres identified that on average retreaded tyres are 10% cheaper than new tyres³⁰.

²⁸ Environment Agency (2010) T8 – Mechanical treatment of end of life tyres.

²⁹ WRAP (2007), Promoting Retread Tyres for Light Good Vehicles.

³⁰ WRAP (2008), The costs and benefits of using retread tyres.

3) **Recycling:** This involves shredding or crumbing of the tyres. As already highlighted there is more value in recycling truck tyres to car tyres because truck tyres have a higher proportion of natural rubber, a lower proportion of fibre and a greater wall thickness. Car tyres are made primarily of synthetic rubber, have a higher proportion of steel and fabric (plies and belts) and are therefore less profitable to re-process³¹.

The UTWG data from 2006 to 2010 showed this as the most popular method of recovery for used tyres and this has remained static over time. There were 3 ELV shredder sites in the South East of England operating when the SEEDA 2006 report was written. Contact with a shredding company in the South East area supported the information reported in the SEEDA report that “there are not many companies shredding the material however there are a lot of collectors”. They shred the material they collect and then send it on to other companies for reprocessing in the North of England. As highlighted previously the increase in the price of the raw rubber material may result in the demand for recycled material to increase.

The Environment Agency has introduced a number of Quality Protocols (QP) which set end of life criteria for certain materials. The criteria set out in the QP are “considered sufficient to ensure the fully recovered product may be used without undermining the effectiveness of the Waste Framework Directive and therefore without the need for waste management controls”³². A QP for tyre derived rubber was published in 2009 for England and Wales. The QP sets the requirement that size reduced tyre materials must meet the specifications set out in PAS107:2007. It is estimated that between the period of 2008 to 2016 the QP for tyre derived rubber could save business £934,000 in waste management costs and simulate recycle markets worth over £15.4 million³³.

The most recent published data was from the 2007 technical report for the Quality Protocol on Tyre Derived Rubber. This included estimated costs based on a small number of responses from some of the consultees. It highlighted the price to the end user of shredding can cost £50-75 per tonne depending on the end users, crumbing can cost £150-300 per tonne depending on the grade, but averages around £150 per tonne and smaller grade granulate costs around £300 per tonne. The financial impact assessment for the QP for tyre derived rubber provides assumed average prices per tonnes for tyre derived rubber material sold in the end market for 2007. For sports and play surfaces the price is £120 per tonne and modelled products up to £300 per tonne³⁴.

In 2007 it was estimated that the gate fees for baling, shredding, granulation or as a fuel for cement kilns for a whole tyre paid by the collectors and dealers in the South East was £60 to £85 per tonne. This again was the most up to date published data identified³⁵.

4) **Landfill Engineering:** Waste tyres can also be used for landfill engineering. In 2006 there was 1 company in the South East that was producing baled tyres that were used for euro blocks for landfill drainage³⁶. Landfill engineering usually occurs in the summer and therefore the companies that bale tyres can often have issues with the number of tyres they are allowed to store. There are only a small number of business that are a member of the TIF scheme (approximately 5 or 6) that bale tyres for landfill engineering, however they all operate another disposal method such as shredding which means they have an outlet in the winter. The estimated cost for baled tyres can range from £10 - £31 per bale

³¹ WRAP (2007), Composite construction products from waste tyres.

³² Environment Agency (2009), Quality Protocol: Tyre derived rubber materials

³³ Environment Agency, Tyres <http://www.environment-agency.gov.uk/business/topics/waste/114455.aspx>

³⁴ Environment Agency (2008), Partial financial impact assessment of a quality protocol for the production and use of tyre-derived rubber.

³⁵ WRAP (2007), Waste tyre disposal and collection cost data.

³⁶ SEEDA (2006) Scoping Review of Recycling and Reprocessing Infrastructure in SE England, Stage 2: Materials Review

with an average cost of £22 per bale based on a recent market survey carried out for WRAP.

5) **Energy Recovery:** Cement kilns: When the complete ban of tyres to landfill came in to effect in 2006, the market for using the tyres in cement kilns increased, supported by the increase in fossil fuel prices³⁷. Car tyres have a very high calorific value and therefore when tyres are burnt as a co-fuel, they can reduce the cost by replacing some of the fossil fuels used³⁸. The 2006 SEEDA study identified that overall there were 15 cement kilns operating in the UK and of the 15 kilns operating, 1 is situated in the South East of England³⁹. However more recent information indicates that this cement kiln is no longer operating.

In 2007 it was estimated the cost of processing whole tyres to fuel quality chips is between £30 and £35 per tonne and the net disposal fee at the point of delivery to the cement kilns for the tyre derived fuel is between £5 and £15 per tonne⁴⁰.

Cement kilns are also able to take other types of waste and not just car tyres and therefore the gate price can be competitive. Talking with industry has identified that the recession has had an impact on the industry resulting in the cement companies reducing the amount of waste they are accepting (including tyres) as their cement output has fallen as a result of reduced market demand from the construction sector. Since 2005, the cement kilns have accepted upwards of 85,000 tonnes and indications from the market are that this remains a viable route for tyre disposal but that gate fee prices have risen from 2007 prices.

Market factors influencing end markets

There are a number of factors that will influence the tyre market and some of these are categorised below.

Possible environmental policy and legislative controls:

- bans on landfilling;
- increased environmental or waste management taxes;
- financial incentives for energy production from non-fossil fuel sources;
- government support for Energy from Waste schemes;
- restrictions on stockpiling of tyres; and
- increasing investment in flood defence.

New technologies and processes:

- new emerging technologies which provide alternative outlets to traditional management routes;
- acceptance of waste tyre crumb as alternative materials in building and construction projects;
- longer tyre life/lighter tyres;
- the increasing adoption of valorisation of tyre derived fuels; and
- increasing uptake of pyrolysis and cryogenic reprocessing facilities.

Condition in related markets:

- global vehicle sales;
- demand for new/retread tyre sales;
- reduced demand for tyres in landfill engineering applications;

³⁷ WRAP (2008) An assessment of WRAP's tyre programme and a forecast of the UK's used Tyre Market up to 2015.

³⁸ Tyre Recovery Association, <http://www.tyrerecovery.org.uk/page/used-tyre-management/>

³⁹ SEEDA (2006) Scoping Review of Recycling and Reprocessing Infrastructure in SE England, Stage 1: Infrastructure Review

⁴⁰ WRAP (2007) Waste tyre disposal and collection cost data

- increased use of public transport and reduced private car use; and
- rising energy prices and resulting cost increases for oil derived materials.

Table 1.6 provides a summary of the findings of a WRAP (2008) study which provided a forecast of the UK's used tyre market up to 2015 (for more detail see appendix C). The study suggested the following forecast for 2009-2015 (Table 1.7).

Table 1.6 Predicted End uses up to 2015

Option	Forecast
Re use (including other reuse and reuse as part worn)	Remains constant (13%) till 2015
Re-treading	Remains constant (12%) till 2015
Energy recovery	Increase (22%) till 2015
Material recovery	Increase (37% in 2012 and 38% in 2015)
Landfill engineering	Decrease (11% in 2012 and 10% in 2015)
Export	Decrease (5%) till 2015
Landfill	No forecast but close to 0% in 2015

1.2.6 Illegal Waste Disposal

As a consequence of globalisation, enhanced market development and trade outside the EU, the flow of waste exported around Europe and outside its borders has become larger, more complex and significantly more costly to police. Rises in the number of initiatives, Directives and state laws have, to some degree and with varying success, been instruments to ensure proper re-use, recovery, recycling and disposal of wastes. Waste recovery, management and disposal remains a sector where illegal activity and criminal organisations freely operate, often making large financial gains from their activities to the detriment of legitimate businesses, the common market and society at large. A recent briefing note from Europol⁴¹ indicates the illegal dumping of waste is rising across Europe, notably from the North West and North East European Member States. Criminal groups are taking advantage of the rising costs of legitimate waste disposal, as the implementation of new laws require tighter controls and treatments that invariably have a direct cost, meaning the end producer must pay more.

The same briefing by Europol, whilst not specifically focused on tyres, notes some pertinent points of intelligence on illegal waste trafficking and disposal, which can be summarised as:

⁴¹ OC-SCAN Policy Brief 2521-88, June 2011
30

- Illegal waste activities within the EU are organised and sophisticated networks with clear division of roles;
- Waste brokers feeding these networks can also be part of and embedded within the legal waste management system, appearing to be operating legitimate businesses;
- Complexity in the legal waste management system facilitates rather than prevents criminal activity; and
- There are substantial financial burdens borne by affected Member States (e.g. those where the illegal dumping and disposal are occurring), which intelligence suggests to be south-east and eastern Member States plus those countries that share a border with these Member States (e.g. Albania)

The main outcomes from EU-level analysis are the development and continued (growing) use of information exchanges (e.g. EnviCrimeNet) and adoption of multi-agency approaches, including environmental authorities, local authorities and policing departments. Illustrative case studies within this report demonstrate how projects run in different Member States are applying these recommendations.

Specifically focusing on tyre crime, there are a wide range of illegal activities taking place within the UK relating to used tyres. The list includes activities such as: illegal baling; unregistered storage and abandonment; illegal landfill operation where used tyres are being dumped; unregistered collection and subsequent illegal disposal (e.g. flytipping); setting piles of tyres alight; illegal export of used tyres; and re-sale of used tyres unfit for use according to UK law.

Motives for Tyre Crime

There are several commonly accepted motivators for tyre crime including, but not limited to, financial gain, convenience, opportunism, market dynamics/demand, lack of a threat of being caught and lenient sentences/punishment for offences. Tyre crime can occur in any part of the chain of activity, from re-selling of illegally exported tyres through to abandonment of huge unregistered tyre dumps⁴².

Motives on the producer side are cost (the cheaper the better) and convenience, where a lack of competition from legitimate collectors can fuel the growth in illegal collections. Many of the waste tyre producers do acknowledge some basic requirements to abide by the Duty of Care Regulations however as the trial data showed, many fail to provide, on demand, evidence that they are in compliance. There is apathy in some cases to apply due diligence when contracting collections or consigning their waste tyres.

Motives on the collector side are money and profit. Taking the recent example highlighted in the Guardian newspaper⁴¹, the illegal dump was estimated to contain 400,000 tyres, with a further 400,000 from three other illegal sites. On the basis that a profit of around 50 pence can be made per tyre, this is £400,000, made in this case by a single individual over a period of around 15 months (£26,666 per month on average or more than the average annual wage⁴³ in Britain). Specific factors such as demand, market dynamics and pricing, density of producers to treatment facilities all play their part but the overriding motive is financial gain. These motives can be applied equally to

⁴² <http://www.guardian.co.uk/environment/2011/nov/08/man-jailed-tyre-dump>

⁴³ 12 October 2011, £24,076 (source: <http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-222441>)

- a single individual using a van to collect tyres and fly tip them;
- more organised collections which could include baling of the tyres, unregistered storage in warehouses and abandonment when full;
- well organised criminal networks (potentially operating behind a legitimate waste business) using sham exemptions, illegal mass storage and illegally exporting containers of baled tyres.

Common to each of the illegal disposal routes is that they require low capital investment to make money from and the gains can be made, in certain circumstances at a (perceived) low risk.

It has been suggested that where organised criminal enterprises operate illegal waste disposal they are also likely to have other waste operations. These waste operations may be legally compliant within themselves. However, they are often indistinct from those belonging to the legitimate waste management sector in the UK. This further complicates the separation of motives relating to the illegal aspect of waste management practice from the legitimate. The ability to ‘make a little extra’ from piggybacking an illegal operation onto a legal one remains a motive that should be considered as highly relevant.

These motives are in keeping with wider intelligence, e.g. from Europol, which indicates perceived level of risk (low), the simplicity with which profits can be made, lack of traceability of the tyres themselves and visibility of enforcers are key factors.

South East Tyre Crime

There are a limited number of outlets to treat waste tyres in the South East. This drives up the cost of having the tyres collected and increases the potential for greater returns to be made from illegal tyre disposal compared to other parts of the UK. Illegal tyre companies may not commonly charge well below the cost of the legitimate companies meaning it is not always obvious to the producer that they are operating illegally. In some cases the producers will use both a legitimate company to collect their tyres and an illegal company so if they are checked they can show the legitimate company details. However this can be identified because the volume of tyres produced does not add up.

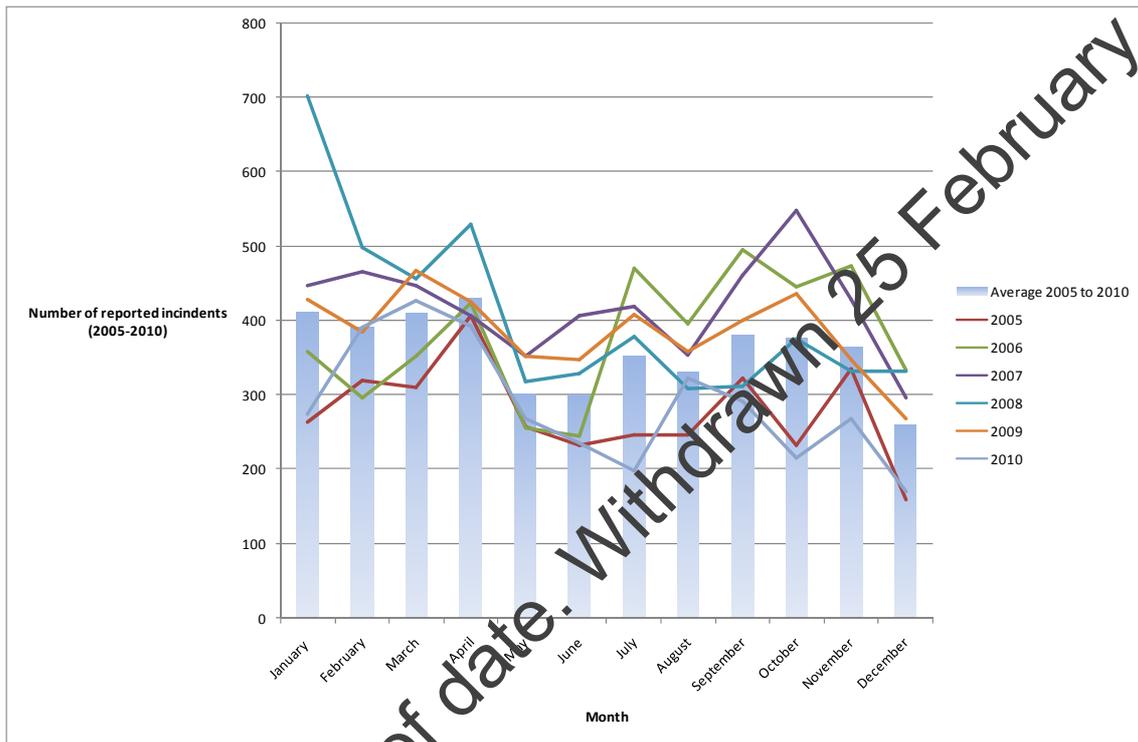
Flycapture is a database which is used by English and Welsh local authorities to report incidents in their area. The information inputted in to the database can vary and it does not always include detailed information on where the incident occurred or the size of the incident. The number of South East tyre incidents reported by 68 councils in the “Flycapture database” was obtained for the period of 2005 to 2010. This data illustrated that the number of reported incidents increased slightly in 2007 and 2008 as shown in Table 1.7, this may be due to the landfill ban but could also be due to a clamp down on tyre crime.

Table 1.7 Total number of tyre incidents reported for 2005 to 2010

Years	Total number of tyre incidents reported	% of incidents reports
2005	3,335	12.9
2006	4,549	17.6
2007	5,035	19.5
2008	4,874	18.8
2009	4,627	17.9
2010	3,456	13.4

Figure 1.11 illustrates the average number of reported incidents for all local authorities in the South East of England for 2005 to 2010. From the data provided there appears to be a reduction in the number of reported incidents in the summer months, with May and June showing the lowest number of incidents reported, the reason for this is not clear but may be influenced by the holiday period and increased daylight hours. December also shows a reduction in the number of incidents reported which may be due to the Christmas period meaning a lot of businesses close for the holiday period.

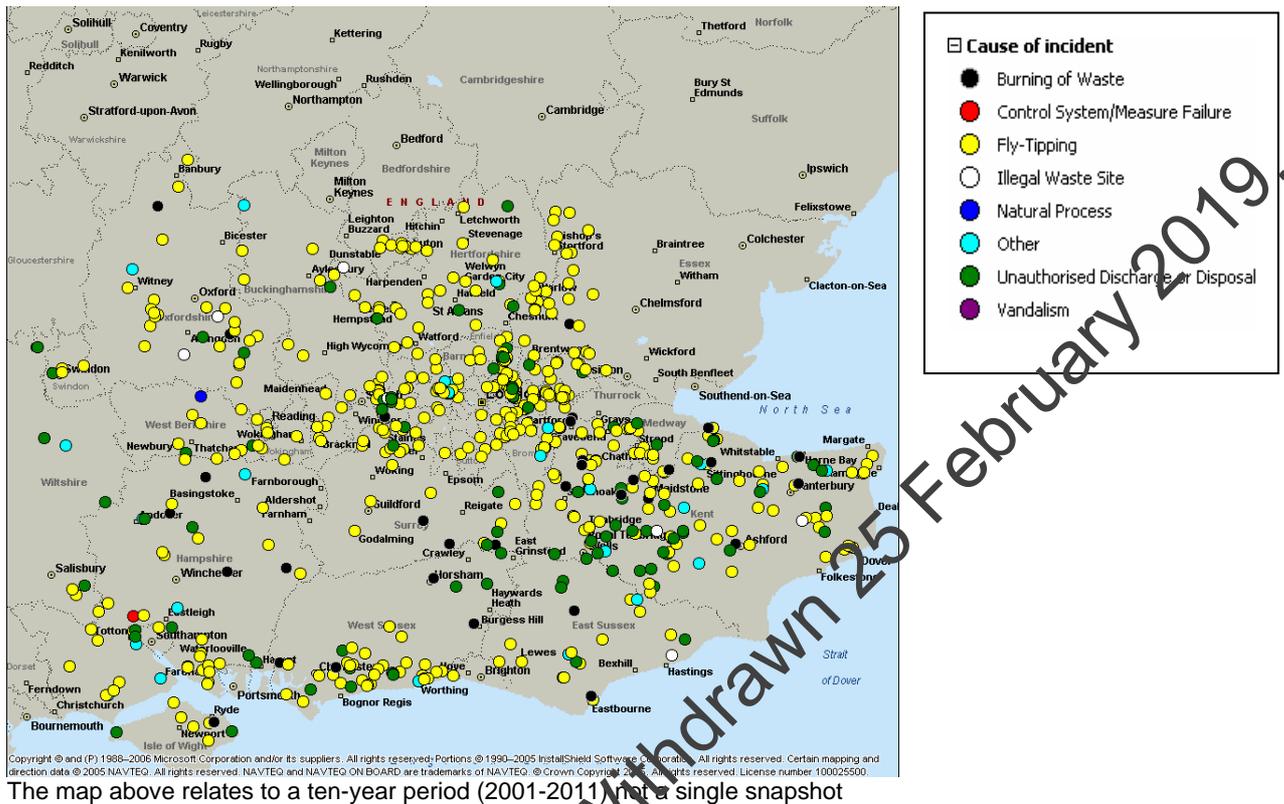
Figure 1.11 Number of reported flycapture incidents per month for 2005 to 2010



The Environment Agency also provided data from their National Incident Recording System (NIRS) for the South East of England on the number of tyre incidents reported for 2001 to 2011. Figure 1.12 illustrates the type of incidents reported in the Environment Agency database and the location of the incident.

This document is out of date. Withdrawn 25 February 2019.

Figure 1.12 Type of tyre incidents and the location



Based on the map above, fly-tipping is the most frequently reported waste tyre crime to the Environment Agency. Although fly-tipping has the highest number of reports it does not necessarily follow that it is the biggest polluter. The number of unauthorised disposals (shown in green), whilst fewer in number according to the data, may contribute greater numbers of tyres (for example large volumes stored illegally in unregistered premises). Therefore, the reporting of incidents may not be an accurate measure of the size of the problem and other factors should be considered.

The data in Table 1.8 is also based on the NIRS database (2001 – 2011). Not all the reported incidents in the database included the number of tyres that were disposed of illegally. The data in table 1.8 illustrates that although fly-tipping has the highest number of reported incidents it does not produce the highest number of tyres per incident. Based on the Clear Kent case study in section 2.2 of this report it could cost up to £40,000 for a local authority to clean up a fly-tipping incident of 4,000 tyres. Therefore the cost to deal with an illegal waste site with up to 18,000 tyres or an unauthorised discharge or disposal or waste management activity with 60,000 tyres would be expected to be significantly higher.

Table 1.8 Number of tyres relating to the reported incident

Illegal Activity	Total number of reported Incidents	Number of incidents reported including data on the number of tyres	Range of the number of tyres reported to have been identified per incident
Fly-Tipping	457	172	4 to 4000
Vandalism	1	-	Unknown
Unauthorised Discharge or Disposal or Waste Management Activity	124	9	300 to 60,000
Burning of Waste	44	8	30 to 270
Other	29	3	100 to 400
Control System/Measure Failure	2	-	Unknown
Natural Process	1	1	60
Illegal Waste Site	7	1	18,000

South East Prosecutions

Information was also provided on the number of prosecutions that have been issued in the South East region of the UK relating to waste tyre crime, as shown in Table 1.9. The data provided was from 2000 to 2007 in the former Environment Agency Thames region. There were 17 prosecutions with 12 relating to fly tipping and the other 5 incidents related to DoC issues and keeping of tyres with no Waste Management Licence.

Prosecution data for waste tyre prosecutions was also provided for the former Environment Agency Southern region. This data included prosecution data from 2003 to 2011; there were 12 individual prosecutions made although only 6 individuals were prosecuted, as 3 of the offenders were prosecuted more than once for tyre crime activities. The fly tipping prosecutions resulted in a range of fines as shown in Table 1.9.

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Table 1.9 Examples of prosecutions in the South East Region

Illegal Activity	Prosecution
Breach of conditions of waste permit	Costs Awarded Against Defendant of £3585 and conditional discharge 12 months
Failure to comply with Notices	£500 fine
Failure to comply with Notices to remove waste and provide transfer note	Costs Awarded Against Defendant £1000 and fine £500
Notice requiring the furnishing of written description and or transfer	Notice issued
Notice to remove waste tyres	Notice issued
Notice to require the removal of waste tyres	Notice issued
Unauthorised waste operation	Costs Awarded Against Defendant of £2320 fine of £2000
Unauthorised keeping of waste tyres on land	Resulted conditional discharge 12 months
Repeated offender of fly-tipping	10 Year ASBO from transporting controlled waste, including tyres, anywhere in England and Wales until 2020 150 hours unpaid work and ordered to pay costs of £2080
Breach of 10 year ASBO	Four months custodial sentence
Fly-tipping	Prosecutions ranged from fines from £100 to £2,000, 1 month imprisonment, 40 hours to 180 hours C.P.O. Costs charged ranged from £0 to £1000
Storing waste with no waste management License	Prosecutions ranged from fines from £4,900 to £10,000. Costs charged ranged from £1,900 to £2,000
Breach of Duty of Care	Prosecutions ranged from a Caution to CD 12 months. Costs charged included £273

The table above illustrates a number of different offences illegal tyre operators have been prosecuted against and also the type of prosecutions that can be issued. As highlighted above a number of the offences in the table apply to the same individual therefore suggesting the prosecutions are not always effective in deterring the illegal disposal of the tyres. For example one of the individuals prosecuted was issued a notice for the removal of waste tyres; this was followed by a failure to comply with Notices followed by 2 prosecutions for breaching a license condition.

Incentives to Reduce Tyre Crime

The data and information available shows that the majority of the illegal waste tyre crime activity begins when the collectors pick up the used tyres from the producers and get paid. Other intelligence would be expected to show other significant forms of criminality such as illegal exports. By targeting interventions at waste producers (such as education campaigns), it makes it more difficult for illegal activity to occur. The result could reasonably be anticipated to be a reduction of the number of tyres disposed of illegally. It is by no means the only method of reducing waste tyre crime but it is widely applied; examples include:

- Use of information and awareness campaigns involving on-site visits to producers, greater publication of known criminal activities and perpetrators and gathering intelligence through public information portals/helplines (see Crimestoppers/SEPA and Crimestoppers/Environment Agency partnerships recently announced);
- By substantially raising awareness amongst the waste consignors, ensuring the producers ask the right questions of the waste collectors, will help to deter waste

producers from using criminal enterprises through the statutory DoC placed on them;

- Greater levels of scrutiny and compliance checks on producers DoC: waste transfer notes; and
- Analysis of waste tyre movements using existing and new data sources from intelligence-led campaigns.

The case studies examined in this report illustrate measures taken to approach crime reduction by targeting this area.

High financial and custodial penalties work as a disincentive to waste crime and although a number of high profile cases have been brought to court in the UK during 2010/11, broadly the sentences for tyre crime and fly-tipping incidents are unlikely to deter organised gangs based on revenue potential and risk of capture. The Proceeds of Crime Act 2002 (as amended) enables recovery of the proceeds from criminal activities including by confiscation order (upon conviction by the courts) or civil recovery. It is a key deterrent in the fight against organised and serious crime in particular.

Fiscal incentives have been shown to help encourage intelligence sharing on illegal activity. This is often used to help gather more information on criminal activities and could help encourage the industry to share more information regarding suspected illegal activity.

The development of **thriving markets of secondary materials from recycled and recovered waste** is one of the most powerful tools in the arsenal against crime. Initiatives such as WRAP's tyre campaign, the waste Quality Protocols and development of European end of waste criteria help to create stable markets for waste materials, encouraging value-adding reuse applications (e.g. rubber crumb for safety matting) rather than lower-value energy recovery. Creation of stable end markets stimulates market demand for feedstock, which could, in an optimistic scenario, have the effect of reversing a collection charge to a collection payment. Whilst the used tyre market in the UK has yet to fully realise its potential, there is merit in regulators incentivising development of technologies that can produce higher value materials from waste (see PyReco⁴⁴) and encourage reuse (see WRAP's new Waste Prevention Loan Fund⁴⁵).

Incentivising the collector to manage and dispose of tyres using legal means could be supported by the introduction of a scheme to require collectors of the waste do not get paid until they provide a certificate of proof of disposal to the producer (essentially working a collection system based on payment in arrears). This could be audited as part of the TIF scheme.

A system that tracks the tyres from cradle to grave could also help reduce the number of waste tyres disposed of illegally. Unique identification codes on new tyres would help to provide a 'TAG' by which each tyre could be tracked over its lifecycle. There are logistic difficulties and no specific framework for doing this at present. It would be expensive to implement and add a layer of data reporting complexity however it could provide the ultimate in traceability. As highlighted by Wealden District Council (WDC) in the case studies below, the council tried tracing new imported tyres, however once the tyres are distributed to smaller companies via the wholesaler it becomes increasingly difficult to track movements.

⁴⁴ <http://www.pyreco.com/>

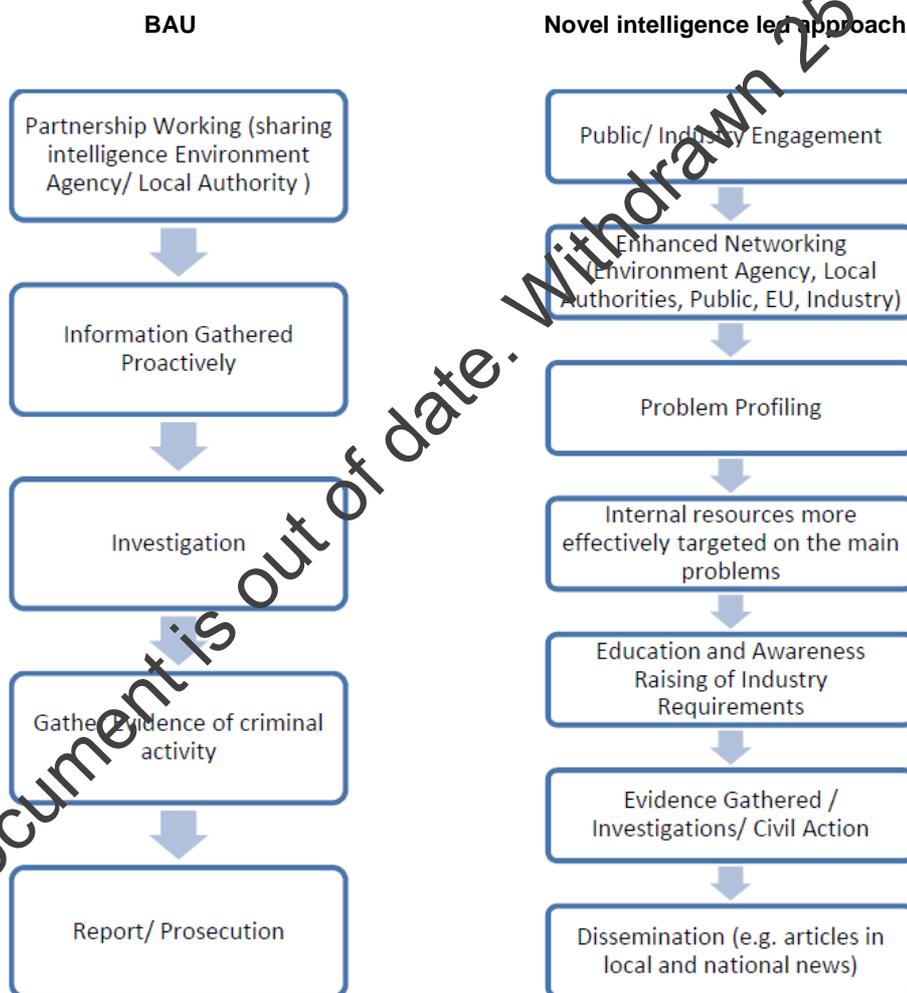
⁴⁵ Whilst Phase 1 of the WPLF does not specifically include tyres, the reference is used for illustrative purposes (http://www.wrap.org.uk/retail_supply_chain/home_electrical/wplf.html)

2.0 Public Sector Novel Approaches to Tyre Crime

The standard business as usual approach adopted by regulators like the Environment Agency to dealing with waste crime has moved away from reactive regulation to an intelligence led approach. Based on the knowledge gathered from the case studies there are three main areas where the approach that could be considered to be 'novel' varies from the Business as usual (BAU) as shown in Figure 2.1:

- Profiling the problem to allow resources to be targeted effectively;
- Enhanced level of networking and partnerships extended further; and
- Dissemination of main outputs leading to more effective enforcement.

Figure 2.1 Waste Tyre Crime BAU approach compared to novel intelligence led approach



The section below provides summary case studies evaluating different intervention approaches that have been adopted by government agencies in order to tackle waste tyre crime. In many cases, these have gone beyond the BAU approach, using delivery partnerships, awareness raising and press promotion to get their messages across.

2.1 Environment Agency Novel approaches to tyre crime

This section provides details of two Environment Agency led waste tyre trials; the first was undertaken in the Environment Agency's South East region in the Thames North East area (case study 1) which includes:

- The London Borough of Hounslow, Harrow, Tower Hamlets, Newham, Waltham Forest, Redbridge, Barnet, Camden, Epping Forest, Islington, Haringey;
- Runnymede, Slough and Harlow District Councils; and
- Buckinghamshire County council

The Environment Agency identified that the cases of waste tyre crime in the Thames North East area had a number of similarities and therefore they decided to run a pilot intelligence-led trial. The trial was novel to the Environment Agency's old approach mainly because it collected internal intelligence and industry knowledge to target the source of the illegal activity, the producers; rather than the more reactive approach of targeting the suspect offender. It also provided the Environment Agency and its partners with the opportunity for the officers to educate the producers regarding their DoC requirements, identify if they are using illegal carriers and send a message that the Environment Agency and its partners are actively working to reduce waste tyre crime (profile raising). One of the main additional outcomes from the trial is that the information enabled the Environment Agency to enhance their intelligence on the companies collecting tyres and the suspected offenders.

The second trial was undertaken in Solent and South Downs area of the UK, which includes all of Hampshire, Sussex and the Isle of Wight. The campaign is still ongoing. However, the initial stage has been undertaken and therefore the data presented in case study 2 is based on the initial stage of the campaign. The campaign involved the producers of the waste being targeted, initially via a questionnaire, with the aim of gathering information on the quantity of tyres produced, the cost and the normal disposal route. This data is being used to enhance current intelligence and to enable pro-active prioritisation of resources in the areas where it is shown the most beneficial effects are possible (i.e. reduction of crime).

The trial, which is currently underway, will also involve a questionnaire to the tyre collectors identified and visits to the producers, collectors and reprocessors. The information obtained will help build a picture of the waste flows and enable a cross-checking of the number of tyres reported as being collected to the amount recorded to be treated. The visits will also help ensure the compliance of the companies DoC requirements and check that the information provided on the questionnaire is accurate.

Separately, the Environment Agency is working with the Centre for Environment, Fisheries and Aquaculture Science (CEFAS) and the charity Crimestoppers to increase the intelligence coming in to the Environment Agency. It is a one year national pilot project being led by the Kent and South London (KSL) Environmental Crime Team's Intelligence Unit. The pilot project is particularly interested in aspects of waste crime. Some examples of what they are looking out for as part of the pilot project includes illegal export of waste tyres, waste electrical equipment, and municipal waste. The information is collected and recorded in a national database, then analysed to identify hot spots, trends in environmental crime, highlight priority issues and through the Area Crime Groups improve targeting of resources.

Case Study 1: Thames North East London Tyre Trial

When the Environment Agency identifies someone who is suspected of disposing of tyres illegally they will collate all of the evidence they have gathered and this will be used to build a case file against the suspect. This information is then presented to the Environment Agency lawyers. The Environment Agency identified that the cases of waste tyre crime being presented bore similarities across the Thames region; this included fly-tipping, false paper work, breached exemptions and illegal export. Therefore the Environment Agency decided to run a pilot intelligence-led trial targeting the source of the crime, the tyre producers, instead of the normal reactive regulation that targets the individuals that are carrying out the offences following reported complaints.



The trial used intelligence gathered from industry and the Environment Agency's own information to identify the tyre producers that would be targeted, and to help identify suspected offenders. This trial adds value to the EPOW programme by:

- Education and awareness raising: providing the waste producers with a greater understanding of their Duty of Care (DoC) requirements;
- Identifying to some producers that they were potentially using illegal carriers; and
- Illustrating that the Environment Agency has a zero tolerance to illegal tyre crime activities and sending a message they are actively working to reduce waste tyre crime.

The trial was a multi-stakeholder operation, all of the authorities in the Thames North East region were asked to be involved by the Environment Agency and 12 agreed they would take part. One London fire brigade officer also accompanied one of the Environment Crime Officers on their visits. The aim of the trial was to visit tyre producers in the local area on a single day (allowing for the element of surprise) to gather information on the waste tyre flows and also help inform the waste producers of their DoC requirements. The Environment Agency also gathered intelligence on suspected offenders in the area. The Local Authorities also undertook their visits in the same week. If the tyre producers visited were unable to provide evidence of their waste movements a letter was issued to them, highlighting that they must provide paperwork to the Environment Agency showing every waste removal from the site for the last 2 years and that it has been done in line with the DoC requirements. The intelligence gathered during this operation has been used in forthcoming prosecutions and casefiles.

Findings

Out of the 12 Local Authorities that agreed to undertake visits, only 9 have currently provided any information of the results of their visits. The detail of the number of audits undertaken by both the Local Authority and Environment Agency officers is detailed in the table below.

Number of sites audited, fixed penalty note and letters issued and producers using a suspected offender

	Audited	using suspected offender	Letters Issued	Follow up/ further investigation required	Fixed Penalty notice
Local Authority Visits	56	3	14	4	0
Environment Agency Visits	32	7	9	0	3*

* These were withdrawn as the tyre producers provided their DoC: waste transfer notes

The level of information gathered by the Environment Officers on the day of the visits varied, which resulted in gaps in the data collected, making it hard to understand patterns in the flows of the tyres coming in and out of the shops. Based on the Environment Agency DoC: waste transfer notes gathered from the trial an evaluation of the correlation between the price waste tyre producers are paying to have their car tyres collected and the presentation of valid DoC: waste transfer notes on the day of the visit has been undertaken, as illustrated in the table below. Only car tyres could be considered as the companies that were issued with DoC: waste transfer notes did not provide any cost per tyre for any other type of tyre. Also the information provided by the Local Authorities was limiting with very few councils providing tyre flow or cost data.

The difference between the costs of the companies that provided their DoC: waste transfer notes on the day of the visit to those that provided them after the visits was 4p less per tyre. This suggests that the companies that issued their DoC: waste transfer notes later are paying less than those that could present the DoC: waste transfer notes on the day of the visit.

Lessons learnt and areas for further investigation

The Environment Agency identified the following as learning outcomes following the trial:

- In preparation, carry out a full audit of the list of tyre producers to check that they are still operating and make sure each producer is only visited once;
- Tailor the data collection forms to allow more space to write observations and notes.

- Follow-up with participating partners (e.g. Local Authorities) to ensure maximum return of usable data and secure suitable resources after the audits to evaluate the information collected; and

If the Environment Agency could identify from the information they have gathered the waste tyre companies that were using the suspected illegal waste tyre collectors and also if they could identify all of the companies that have been issued with letters, including the local authorities then this would allow the Environment Agency to better understand whether:

1. There is a correlation between the price waste tyre producers are paying to have their tyres collected and the presentation of valid DoC: waste transfer notes on the day of the visit; and
2. There is a relationship between the collection costs paid by producers using possible illegal tyre management companies and those costs for using legitimate companies.

If the Environment Agency do not have this information further trials collecting similar data could be used to secure data that would allow the Environment Agency to better understand the above two points.

This document is out of date. Withdrawn 25 February 2019.

Case Study 2: Solent and South Downs Waste Tyres Campaign

The Environment Agency is currently undertaking an intelligence gathering campaign focused in the Solent and South Downs area of the UK. The aim of the campaign is to **build intelligence** on the waste tyre activity in the area to help redefine the problem profile and inform/shape future actions and interventions that could be taken. It was introduced following the successes of a similar campaign run by the Environment Agency in the North East of England.

Method and execution

There are a number of stages to this campaign. **Phase 1** has already been undertaken and this involved the Environment Agency **identifying producers of waste** in the selected area. A questionnaire was sent to the 572 companies identified, it aimed at gathering information about the amount of tyres produced, the cost of disposing of tyres, who collects the tyres; and where the tyres are taken once collected.

Phase 2 of the campaign involves sending out a similar questionnaire to the waste carriers identified in the producers' responses to the questionnaire. Again capturing the quantity of tyres collected per month and the details of the company the tyres are taken to as well as requesting samples of DoC: waste transfer notes. The data from this phase will be cross-checked with phase 1 to identify data anomalies or mismatches, which can then be further evaluated. This phase will also identify whether the carriers mentioned are registered.

Phase 3 involves **undertaking a number of visits** to the producers and waste carriers identified from the questions. The aim of the visits will be to check the companies are complying with their DoC requirements (for example checking their DoC: waste transfer notes) and also to raise the profile of waste tyre crime and reinforce DoC requirements. One of the main aims of visiting the carriers is to identify end routes for waste tyres collected as initial responses from producers indicates there is some uncertainty.

The final stage of the campaign (**Phase 4**) will involve the Environment Agency visiting some of the reprocessors of tyres identified by the producers and waste carriers. This will provide a greater insight and understanding of the waste tyre flows in the area and support in identifying where possible illegal activities occurring in the life cycle of the tyres. Similarly to Phase 3, this exercise will raise the profile of waste tyre crime and reinforce DoC requirements.

Outcomes

There was a 52% response rate from the companies contacted to date with 39% identifying that they are tyre producers. Out of the responses received, 216 companies provided the average number of tyres they produce a month however only 191 companies provided cost data.

The data provided by the tyre producers varied, for both the numbers of tyres they produced per month and the cost per tyre. Some of the producers provided an upper and lower range and others provided an average value. Some of the producers provided details on the type of tyres collected for example the number of car and commercial tyres and the cost for the different types of tyres, however not all of the responses included this information. Therefore, it is not clear if the data is wholly comparable because in some cases the data is based on a range and in other cases the data is based on an average.

The survey questions for cost data asked for cost for commercial and private vehicle tyres, however the data provided by a number of the companies did not identify what tyres the data related to and just provided one figure. The cost to dispose of a 4x4 tyre, for example, can be more than a car tyre and therefore without this split the results are subject to degrees of uncertainty when being reported.

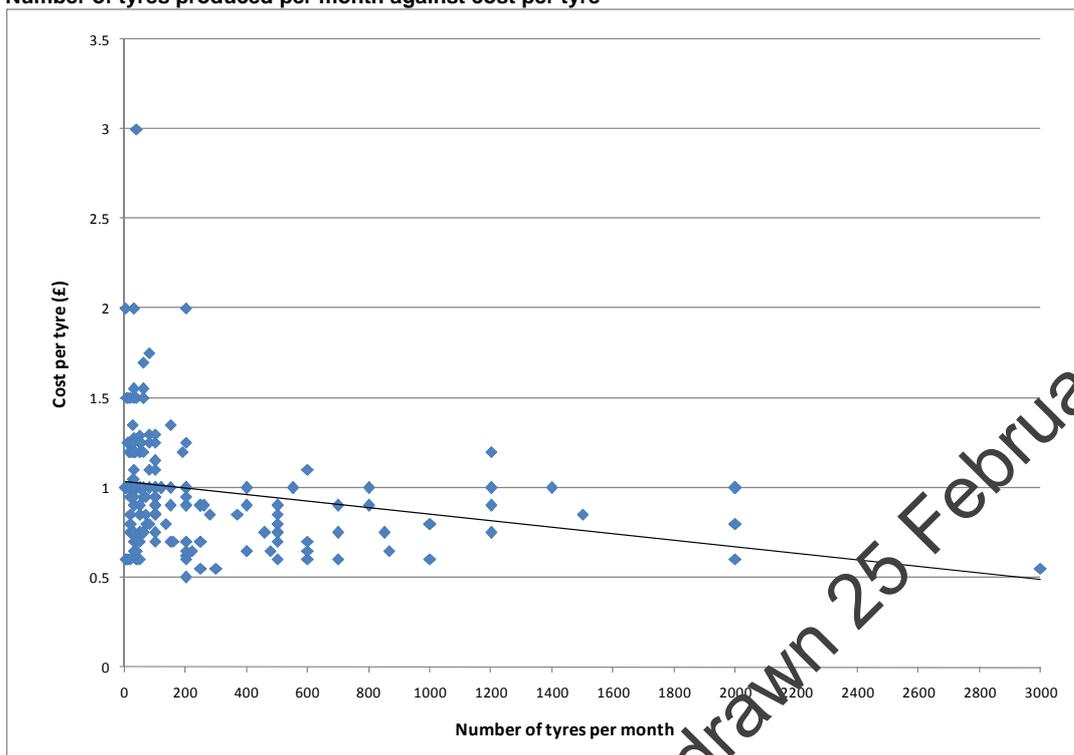
Summary of data collected from the producer survey

	Number of tyres produced per month		Cost	
	Number of tyres produced per month (lower range)	Number of tyres produced per month (upper range)	Cost per tyre (£) (lower range)	Cost per tyre (£) (upper range)
Maximum	1300	3000	3.00	10.00
Minimum	0	2	0.50	1.00
Average	165.62	280.79	0.98	2.98

The data used in the evaluation has been based on the upper number of tyres produced and the lower cost data, if a range of data was provided. Over 60% of the companies surveyed reported to produce 500 or less tyres a month with the remaining companies producing between 550 and 2000. One company reported up to 3000 tyres a month.

The graph below plots the number of tyres consigned (upper range⁴⁶) against the cost per tyre (lower range⁴⁷). The findings illustrate that companies producing more tyres do, on average, pay slightly less per tyre than companies producing less tyres. However, the majority of producers did not identify the type of tyre being collected and therefore the results are subject to some uncertainty.

Number of tyres produced per month against cost per tyre



The most common price range charged per tyre is £0.91 to £0.95, hence, with over 40 companies reporting to pay in this price range. The next most common price range is £0.81 to £0.90 and only 18 companies out of the 191 responses paid more than £1.30 per tyre. The companies paying above £1.30 were producing 2 to 200 tyres per month, with an average of 58 tyres per month. The information provided indicates that companies reported to be producing tyres in West Sussex are paying the most on average per tyre.

Points of learning

One of the main lessons learnt from the first phase of the campaign was to ensure that the companies surveyed include number of tyres and cost per tyre based on the type of tyre and also that the question specifies either an average value or range of values. Having this level of data delineation allows for a more accurate comparison of the data provided and therefore providing more accurate intelligence with reduced levels of uncertainty.

Summary

This trial forms a novel approach insofar as the way in which the Environment Agency gathers its intelligence; using a range of direct communication and data gathering techniques to extract higher quality and more accurate data from waste producers, waste carriers and reprocessors.

The way in which the data is used once it is fed into the national intelligence database is also a key step in being able to target those areas that would benefit most from intervention in the future and how the Environment Agency prioritises its resources at these areas. Building a picture of the waste tyre flows within these three counties will help to understand the impact of factors such as regional collection price differentials, variance in collection charges and geographical proximity to suitable reprocessing facilities. Gaining an understanding of the market and main factors will allow the Environment Agency to cascade information to other authorities so as to help them prioritise resources within the areas where problems are likely to occur (e.g. where notably higher collection prices are putting pressures on the waste tyre producers) and to monitor those where analysis indicates illegal activity may be occurring. The campaign will raise awareness of key DoC requirements and hopefully facilitate greater degrees of compliance.

This document is out of date. Withdrawn 25 February 2019.

2.2 Local Authority Novel approaches to tyre crime

This section describes 3 Local Authority campaigns operating in the South East England. Local Authorities are responsible for clearing fly-tipped tyres in public areas and therefore all of the campaigns were focused on reducing the level of fly-tipping in their area. Although fly-tipping, in terms of the number of tyres illegally disposed of, is not the most significant it does cause an issue for local authorities and when a fly-tipping incident occurs they are responsible to pay for the collection and legal disposal of the tyres.

Similar to the Environment Agency's trial in the Thames North East area, Wealden District Council (WDC) have introduced a campaign focusing on targeting the source of the tyre waste, the tyre producers. WDC's reactive approach to dealing with fly-tipping had limited impact on actually reducing the fly-tipping rate and therefore they decided to undertake targeted visits using intelligence gathered, which they had not done before. This is an ongoing campaign and since its introduction WDC have seen a decrease in the number of fly-tipped tyres in their area, as discussed in case study 3.

Tower Hamlets and the surrounding areas like WDC had seen an increase in the level of fly-tipped tyres and their normal approach of working individually to deal with the problem was not effective (case study 4). The Councils therefore decided to rejoin an Environment Agency group which focused on more strategic analysis of the shared intelligence gathered by the Councils on waste crime activity in their area. The key difference in the approach of this campaign was the method used to tackle the source of the problem, by sharing resources, intelligence and sending a constant message on how the Councils were dealing with the fly-tipped tyres. The campaign resulted in a number of prosecutions of the repeat offenders, including a custodial sentence. The outcome has been a reduction in the number of fly-tipped tyres.

Case study 5 also involves partnership working. The 'Clean Kent' campaign was introduced in 2004 to help combat littering, fly-tipping and graffiti in Kent. The campaign is a partnership initiative between the 12 district, borough and city councils in Kent, Kent County Council, Kent Police, Kent Fire and Rescue Service, Crown Prosecution Service, the Highways Agency, Kent Probation and the Environment Agency. Historically, the authorities and services in Kent had worked individually to deal with fly-tipping; as part of the campaign, a crime enforcement unit was set up to address a range of issues. In 2010 Clean Kent successfully helped track and prosecute a recurring waste tyre fly-tipper and since the introduction of the campaign, Kent has seen a reduction of 67% in fly-tipping.

Case Study 3: Wealden Waste Tyre Campaign

Wealden District Council (WDC) noticed an increase in the number of tyres being fly-tipped in their district in 2007. The Council identified that it was likely the tyres being fly-tipped originated from commercial tyre garages due to a number of characteristics including:

- The tyres still had tyre soap on them from their removal;
- They were all typical of the sizes commonly found on passenger cars and vans; and
- Chalk markings were present on some of the tyres (used by some garages to identify the tyre size while they are on the racks).



The Council's normal approach to fly-tipping investigations would involve using the original producer of the waste to identify the illegal waste collector. Following this, the offender would either be reminded of their Duty of Care (DoC) requirements or prosecuted. WDC identified their normal approach was not possible for the fly-tipped tyres, mainly because they found it hard to trace the origin of the tyres. Therefore the Council decided to target the producers with a compliance and awareness-raising campaign that started in the beginning in 2008.

Approach

The Council researched the origins of the tyres that were being fly-tipped and also used their local knowledge and public directories to identify businesses in the area that produce waste tyres, which were subsequently visited by the Council. The main aim of the visits was to check that the companies were disposing of their tyres correctly and also to advise them on their DoC requirements. The campaign is still on going and the Council has no current intention of finishing the campaign. The same garages are visited on a regular basis to keep the pressure on them so that they use legal companies to collect and treat their tyres.

The local police were also informed of the campaign and were asked to report any cases they came across where vehicles were found to be carrying large numbers of tyres. They were very willing to assist. Through their regular waste crime practitioners' meetings involving the neighbouring authorities, WDC have shared the findings from their campaign; however the surrounding authorities have identified that they do not have the same problem with fly-tipped tyres as WDC.

Achievements

Since the introduction of the campaign, WDC has seen a decrease in the number of tyres being fly-tipped and the average number of tyres reported to have been fly-tipped per incident, with a considerable drop in 2010, as shown in the table below. The number of tyres disposed of in 2010 dropped by 28% compared to the figures reported in 2008 and the number of reported incidents dropped by 58%.

Number of reported incidents of the fly-tipping of tyres in Wealden

Year	Number of reported incidents	Average number of tyres reported per fly-tipping incident	Minimum number of tyres reported per fly-tipping incident	Maximum number of tyres reported per fly-tipping incident
2008	26	38	8	80
2009	40	25	2	100
2010	15	19	4	50
2011	20	10	1	30

*2011 data is number of tyres fly-tipped up until the end of July 2011

The Council has identified that the reduction in the fly-tipping of tyres is likely to be related to the introduction of the campaign and that the significant drop in 2010 could be linked to an individual that, probably as a result of the campaign, is no longer operating in the area. The evidence therefore suggests that a lot of the tyres fly-tipped during 2008 and 2009 could have been linked to a single group or person. WDC highlighted that "The residents of Wealden District were increasingly concerned at the number of fly tips involving tyres and the potential dangers of them being dumped on the highway. As a result of the Wealden district Council Street Scene Team's continuing DoC initiative, complaints have decreased drastically and Wealden is a far safer place".

Case Study 4: Tower Hamlets Waste Tyre Campaign

Background

Tower Hamlets and the surrounding authorities had, for a number of years, been experiencing problems with the continued fly-tipping of used tyres. It was suspected that this was a result of a gang operating in the London, Essex and Kent area. From intelligence jointly gathered by the respective councils it was believed that those perpetrating the illegal disposals had been collecting and fly-tipping tyres illegally for a number of years.

Using intelligence gathered, the illegal operation was understood to be a sophisticated one, in which a large numbers of tyres were being illegally dumped in Tower Hamlets, Newham and the surrounding areas on a regular basis. At one stage of the illegal operation, it was believed the gang were operating up to four 7.5 tonne vehicles and illegally dumping up to 1000 tyres a night. Based on tyre collection cost data gathered by the Environment Agency and Local Authorities in the Thames North East region (which varied between 35p and £1 per tyre), the gang could have been making up to £1000 a night. It was estimated that the dumping of these tyres cost the councils more than £1 million to clean up and they also caused damage to the local environment through activities such as the burning of the tyres.

Approach

The local councils rejoined an Environment Agency group, which focused on a more strategic analysis of the shared intelligence gathered by the local councils on the waste crime activity in their area. The initial analysis of the data indicated that certain councils were not suffering the same magnitude of fly-tipping and as a result, a number of councils decided not to be involved further with the campaign. The campaign therefore involved a multi-agency partnership between Tower Hamlets, Newham and Islington councils and the Environment Agency. Near the end of the campaign Epping and Harlow councils also got involved due to the increase of waste tyres becoming a problem in their area. Other authorities, such as the police, were involved early in the campaign to build a profile of tyre crime and criminal activity based on gathered intelligence, to support in communicating the key messages and share any relevant information.

The key difference in the approach of this campaign, the novel element were the methods used to tackle the source of the problem – the campaign was founded on sharing resources, sharing intelligence and sending consistent messages on how the councils were dealing with the fly-tipping of tyres. This is contrary to the councils' more usual approach, which is typically authority-centric, sticking to administrative boundaries. By using the intelligence suggesting illegal collectors and fly-tippers worked across a number of authority boundaries, it was believed that this approach would be more effective and the outcomes more meaningful in the longer-term. Authorities working individually to tackle incidents in their authority area are typically less effective at dealing with mobile and persistent offenders. The councils kept a log of any reported incidents sharing this information with all of the parties involved and carried out surveillance using CCTV to help trace the tyres back to the offender.

Outcomes

Following a couple of smaller prosecutions resulting in small fines, a ten-year anti-social behaviour order (ASBO) was issued banning the individual who was thought to have led the gang from transporting controlled waste, including tyres, anywhere in England and Wales until 2020. The ASBO was the result of collaborative work by the boroughs impacted by the gang. Newham Council highlighted that issuing the ASBO was a better way of enforcing the crime instead of receiving the smaller fines as historically, these had been shown to act as a less effective deterrent, and if the offender breached the ASBO, there was a legal mechanism there to bring them to court quickly with the chance that they may face a custodial sentence.

Following the issuing of the ASBO, the fly-tipper continued to operate and dispose of tyres. This breach of the ASBO was identified as a direct result of intelligence gathered during the original operation. Subsequent prosecution resulted in the offender being jailed for four months and two of the accomplices receiving suspended prison sentences after they each admitted two counts of depositing controlled waste. One of the accomplices was also ordered to carry out 120 hours unpaid work and pay £250 costs and the other was ordered to keep to a four-month curfew between 8pm and 6am. The vehicles used by the convicted individuals were crushed as part of the punishment. These outcomes sent a clear message that perpetrators of illegal waste crime would face the full force of the legal system and the councils had an ongoing mechanism to bring these cases to court.

Analysis of data and information collected through the campaign identified that the illegal gang were producing fraudulent paperwork to dupe the waste tyre producers into believing they were a legitimate outfit. The result of this was that producers were unaware that their tyre consignments were being illegally dumped. Intelligence was gathered on the companies that were thought to be using the illegal companies and these were then visited. The visits were used to highlight to the producers that they were using an illegal waste carriers to collect their waste and to help raise awareness to the producers of their Duty of Care (DoC) requirements. The councils also issued DoC: waste transfer notices if appropriate to some of the waste producers. Educating the producers as part of the campaign meant that the councils were also working to reduce the source of the crime as well as targeting the



offender.

The campaign resulted in a reduction in the number of fly-tipped tyres in the area following the prosecution of the individual and the issuing of the prison sentence. Although the issuing of the ASBO did not deter the individual from undertaking the illegal activity of fly-tipping tyres, Tower Hamlet Council believes that the ASBO helped build a case against the individual, which meant when the offender re-offended it made it easier to prosecute. The councils continue to work together to try and reduce the number of fly-tipped tyres. All of the parties involved communicated the campaign via the news pages on their Websites; the issuing of the ASBO was also reported in a national newspaper. Reporting the outcome of the campaign should help to deter other individuals from discarding of tyres illegally.

This document is out of date. Withdrawn 25 February 2019.

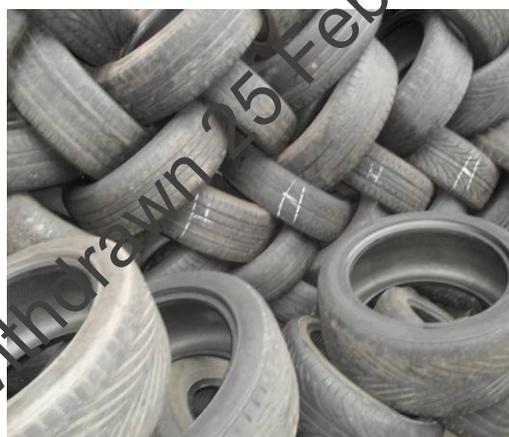
Case Study 5: Clean Kent Waste Tyre Campaign

The Clean Kent campaign has been operational since May 2004; it was introduced to help combat littering, fly tipping and graffiti in the Kent area. It aims to protect and preserve Kent's environment by reducing the instances of fly-tipping, littering and abandoned vehicles. The campaign is a partnership initiative between the 12 district, borough and city councils in Kent, Kent County Council, Kent Police, Kent Fire and Rescue Service, Crown Prosecution Service, the Highways Agency and the Environment Agency. The partnership has experienced incidences of illegal dumping of tyres. Prior to the introduction of the campaign all of the partners listed above worked as individual entities in regards to waste tyre crime. Therefore there was no formal network set up for the authorities to share their intelligence in regards to tyre crime.

As part of the on-going role to improve the quality of the local environment, Kent County Council set up a dedicated county-wide enforcement unit designed to tackle the issues identified above and to help develop new ways of working with other partners. This had not been done before within Kent and was a new way of working for the authorities in the region. The general public have been encouraged to get involved and to share any intelligence or incidents they had witnessed through the Clean Kent Watch (an off shoot of Kent Neighbourhood Watch).

Approach and Outcomes

Where appropriate, the council will use mechanisms available to help trace the waste back to the offender. In 2009 Clean Kent introduced the use of SmartWater, with Kent being the first county council in the country to use SmartWater to help deter fly-tipping of waste such as tyres. SmartWater incorporates state of the art forensic technology and each batch is forensically unique. It provides an invisible and permanent trace to the waste, meaning that if it is sprayed on individual batches of waste they can be traced back if disposed of illegally. Another advantage of SmartWater is that it can withstand extensive periods of burning and so even if the tyres are burnt there is still the chance the material can be traced back. SmartWater was going to be used to help trace an offender who was dumping tyres illegally however prior to the use of SmartWater it was identified that the tyres had been numbered with chalk so the producer could track how many tyres were being disposed of. Therefore the chalk was used to successfully help track and prosecute a recurring waste tyre fly-tipper, which involved:



- Intelligence gathering from members of the public on an individual illegally collecting and dumping tyres in the Shepway area;
- Intelligence gathering (from Kent Police) on 500 car tyres being fly-tipped at 5 locations at Romney Marsh in Kent;
- Joint investigation by Shepway District Council and Kent County Council officers;
- Chalk being used on waste tyres to trace illegal fly-tipped tyres to the individual prosecuted.

The offender pleaded guilty to 7 charges of fly-tipping, collecting tyres from a business in Shepway and dumping them at varying locations throughout Kent and East Sussex. The tyres were being dumped in a 15 miles radius and the areas where the tyres were being dumped were rural (mainly farmland), there were 500 tyres dumped in total over the period of 1 week. The offender was sentenced to 150 hours unpaid work and ordered to pay costs of £2080. It is estimated that it would cost approximately £5000 for the authority to clean up the 500 tyres that had been disposed of illegally, this equates to £10 per tyre.

Based on tyre collection cost data gathered by the Environmental Agency and Local Authorities in the Thames North East region (which varied between 35p and £1 per tyre), the prosecution costs ordered were far greater than the monetary gain to be made from dumping 500 tyres. Although it is likely that the individual collected more than 500 tyres without a licence, the financial penalties imposed based on this case are more than 4 times the likely revenue earned through illegal tyre dumping. The financial penalty imposed plus the 150 hours of community work does provide a deterrent effect to would be illegal operators of waste tyres.

Achievements

Based on the Flycapture data reported by each of the local authorities since the campaign was introduced in 2004 Kent has seen a reduction in loose (uncontained) fires since 2003/04 and a 67% reduction in fly-tipping since 2003/04.

The reduction in fly-tipping and loose rubbish fires illustrates how the introduction of the Clean Kent campaign has helped reduce the number of waste crimes in the area. Also, the successes such as the use of SmartWater to help identify the individual that was prosecuted for the fly-tipping of tyres should actively deter other fly-tippers in the area.

2.3 National Case Study

SEPA is undertaking specific intelligence-led work targeting illegal waste operations that cause pollution and harm to the environment, working closely with law enforcement partners, local authorities, business and industry to identify high risk sites and take effective joint agency action.

As part of this work, SEPA has undertaken a number of campaigns, one of which focused on targeting the producers of the used tyres rather than the BAU approach of reacting to an offender. Following the campaign, there was a decrease in the number of complaints relating to illegal tyre disposal and number of tyres being disposed of illegally and an increase in the awareness to the producers of their DoC requirements. The campaign is believed to have had a significant impact in reducing the number of illegal carriers operating therefore increasing the use of legitimate tyre companies.

Case Study 6: SEPA Tyre Campaign

SEPA undertook a tyre campaign in the Glasgow and Lanarkshire area following problems with illegal fly-tipped incidents. The campaign focused on SEPA targeting the source of the illegal waste, the producers, rather than their normal approach of targeting the suspect fly-tipper. SEPA sent a questionnaire to approximately 480 producers aimed at gathering information on the number of tyres produced, who collects the tyres and the end destination. A poster was also sent to the producers outlining what was expected of them (e.g. only using legitimate registered waste carriers) and what the consequences would be of not complying with Duty of Care (DoC). For example, reports to Procurator Fiscal and possible prosecution/fines of up to £10,000. Following the mail-shot, SEPA visited 103 producers over the period of two days during October 2009. This included the producers who did not respond to the questionnaire to check they were complying with their DoC requirements.

Achievements

The methods used to determine whether the project was a success were a combination of feedback received from the waste tyre producers/tyre operators directly and feedback received from other agencies such as local authorities and waste tyre processing plants. The outcomes following the campaign are as follows:

- An immediate decrease in the amount of waste tyres that were being illegally dumped and a significant reduction in complaints to SEPA relating to illegal tyre disposal;
- Increase in the number of producers confirming with SEPA they are using legitimate operators/carriers;
- Following subsequent visits and discussions with waste tyre producers it was evident that many had not been using legitimate carriers but started following the campaign;
- Evidence was provided by large scale tyre processing companies that they had received a significant increase in business as more tyre producers were now using legitimate carriers;
- Evidence from Local Authorities that they had noticed a reduction in the amount of waste tyres being dumped in their areas this was supported by flycapture figures showing a reduction in the number of incidents reported from the previous year.



To date, illegal tyre disposal is still at a very low level compared to recent years, meaning less money is being spent by the local authorities and SEPA on cleaning up incidents of illegal tyre disposal⁴⁸. One consequence of the campaign was an increase in the volumes of tyres sent to legal tyre processing as a result of the reduction in illegal dumping. This has, in some cases, resulted in certain tyre processors being close to or exceeding their permitted treatment capacity and SEPA continue to work with industry to achieve a resolution. SEPA identified that any future campaign would take this issue into consideration as it was a difficulty that could not have been predicted prior to the campaign. This could help to ensure measures and action plans are in place to secure an outlet for all tyres to be treated legitimately, thus avoiding the problem being moved on.

The increase in the use of the legal tyre processing as a result of the reduction in illegal dumping has, in some cases, resulted in certain tyre processors being close to or exceeding their permitted treatment capacity. SEPA identified that any future campaign would take this issue into consideration as it was a difficulty that could not have been predicted prior to the campaign.

SEPA has recently announced a partnership campaign with the charity Crimestoppers to target illegal waste operations in what they term an intelligence and 'harm-led approach' aiming to target the areas of crime on the basis of harm or likely harm to the environment, wildlife or human health. The initiative was formally launched on the 12th July 2011 and is the result of several years of intelligence-led environmental enforcement working closely with other agencies, businesses, local authorities and the police to target and reduce waste crime.

2.4 European Case Studies

Italy's Green Association Legambiente and ELT Company Ecopneus carried out research that identified that illegal tyre crime could be costing Italy up to €400 million per annum. The Italian government have recently published a ministerial decree which sets in place a new system based upon an extended producer responsibility scheme. The aim of the scheme is to reduce tyre crime by offering the producers a free-at-point-of-use, wholly legitimate and environmentally responsible means of consigning their waste tyres.

This document is out of date. Withdrawn 25 February 2019.

Case Study 7: Extended Producer Responsibility and Door-to-Door Free ELT Collection Scheme

Research conducted by the Italian Green Association Legambiente, together with Ecopneus (the largest Italian organization involved in the End of Life Tyre management) indicates that illegal tyre crime in Italy may be costing €400 million per annum, with state losses of €140M, industry lost revenues of €150M and remediation costs in the order of €80M per annum. Of the estimated 380,000 tonnes of end of life tyres arising in Italy each year, the research suggests 95,000 tonnes may be exported, dumped or stored illegally. Between 2005 and 2010, the Italian authorities undertook major investigations of 19 incidents of illegal waste trafficking, brought public legal action against 413 people involving 16 regions in the country and sought to manage intelligence on flows of tyres from over 30,000 places.

Tyre crime in Italy has been of significant concern and on the 8th June 2011, the Italian Government published Ministerial Decree 04/11/2011 No. 82. From the 7th September 2011 a new system was set in place based upon an extended producer responsibility scheme. It sets requirements on eco-design for tyres, new and defined accountabilities on used tyre flows and sets destination priorities to increase the overall recycling rate of used tyres for higher-value secondary materials in Italy which at 20-25%, Ecopneus data suggests is currently half the EU average. The new Decree establishes:

- No cost door-to-door collection of end of life tyres from producers who register for the scheme;
- An objective to collect and recover 100% of used and end of life tyres; and
- Levies an 'environmental contribution' charge on tyres, defined and implemented by the Italian Ministry of the Environment and its respective agencies.

The new scheme is mandatory for all producers and importers, who can choose different alternatives for respecting their obligation; one possibility, free and voluntary, is to join Ecopneus who is at the heart of the initiative to manage the flow, by offering producers a wholly legitimate and environmentally responsible means of consigning their waste tyres. It is hoped the scheme will generate additional commercial revenues from increased material recovery, reduce illegal storage and landfilling of waste tyres and raise awareness amongst civil society of the action the government is taking on one area of the environment – waste and crime. The data collected by all producers, importers and organisations as Ecopneus will be sent to the Ministry for the Environment, who in turn will administer any changes to the environmental contribution levy and report on the overall progress of the scheme. The scheme also involves widespread stakeholder campaigns, public information and communication and transparent reporting on public access information sites.



As a main partner of the new scheme, Ecopneus will support the recovery and recycling of end of life tyres. Examples of recovered and recycled products include the development of lightweight construction materials, rubber composites, granulated rubbers and development of high technology rubber-asphalts for highways maintenance.

Whilst many EU Member states have adopted the Producer Responsibility approach, this partnership between government, agencies and industry represents a huge step forward for Italy in tackling the area of waste tyre crime head on.



2.5 Further considerations

During the evaluation of the case studies, it became apparent to the research team that the general feeling amongst those closely linked with the interventions was that the campaigns had moved forward the waste tyre crime agenda; raising the profile of the topic and the agency/authorities involved, delivered knowledge sharing and education and in some cases leading to prosecutions that strengthened the deterrent effect.

An approach adopted by all of the campaigns (apart from two) was focusing on the source of the crime, the producers of the waste, rather than the individual carrying out the offence. In some cases this approach resulted in a reduction in the number of tyres being fly-tipped and incidents reported. Focusing on the producers of the waste also provided the authorities with the opportunity to gather intelligence on the waste tyre activity in their area, for example who is actively committing waste crime within the area. In some cases the campaigns also followed up with the companies collecting waste tyres and the waste treatment companies, to provide a more comprehensive picture of the tyre flows in the area and provide evidence to establish where illegal activity is occurring. Whilst it was recognised that tyre crime can occur at numerous points within the activity chain, by focusing on the waste producers this enabled active communication on DoC requirements and to provide advice and intelligence to producers where illegal waste carriers were known to be operating within the area.

As part of the EPOW programme the feasibility of a number of novel approaches to reducing waste crime have been assessed. One approach piloted as part of the EPOW feasibility study, focused on a waste stream approach. The Environment Agency commented on this approach as follows:

"We are changing the way we audit permitted waste facilities and have developed a 'waste stream approach', which involves improving the existing auditing process to find out more information on:

- the quality and quantity of input and outputs at collection, recycling and treatment sites;*
- where different waste streams go;*
- what happens to waste streams when they get to their destination, for example treatment and processing."*

Adopting the waste stream approach has helped target campaigns to maximum effect. This approach, as with other waste streams, when applied to tyres provides better data and evidence on flows of tyre waste through permitted facilities. Whilst the majority of campaigns examined in this report focus on the producer, consideration of other parts of the waste tyre flow could help expose other aspects of criminality such as illegal waste exports.

Implicit within the 'waste stream approach' is an understanding of the full life cycle of the chosen waste to map the flows of material for all stages of the waste's life cycle. The map is then used to establish likely points for illegal activity, which provides a point of entry for a targeted intervention to be made. The SEPA campaign adopted a similar approach, targeting specific stages of the waste tyre life cycle. This campaign resulted in a number of positive outcomes including decrease in illegal fly-tipping of tyres and increased compliance. The on-going Solent and South Down campaign has also been designed to examine data and collect intelligence on specific life cycle aspects of the waste tyre activity in the area.

The 'Waste Stream Approach' is relevant to, and therefore should be considered in, all campaigns.

All of the campaigns worked in partnership with other agencies and in some cases industry, this allowed them to share intelligence and their resources to help reduce tyre fly-tipping. This approach in some cases also helped build a case against repeat offenders and resulted in prosecutions and allowed the authorities to communicate a consistent message to the industry.

There were limited campaigns identified outside of the UK focusing on waste tyre crime. It was suggested by a European trade organisation, that they were unaware of any other countries in Europe operating a dedicated programme to tyre crime like the UK. This suggests that the UK could be leading the way in tackling tyre crime.

This document is out of date. Withdrawn 25 February 2019.

3.0 Measuring Success of Novel Interventions

It is often the case that the degree to which any intervention is perceived by an individual or entity to have been successful is itself subjective and therefore a 'vague science'. What is important to one individual or organisation is less important to another. It is also important to separate measurement of success from measurement of the cost effectiveness. The latter is about a 'balanced argument' that seeks to provide an indication of whether the inputs (e.g. resources such as time, materials, knowledge, money etc...) are proportionate to the outcomes (e.g. a reduction in crime, successful prosecution, knowledge transfer etc...). An intervention may still be successful whilst also being judged not cost effective. In either case, how it is intended the intervention will be measured requires careful design at the outset, so as to ensure that the approach taken captures the right type, level and detail needed to be able to effectively evaluate what impact it has had. Of particular note in the campaigns evaluated was a lack of solid financial data that would, in each case, prevent an examination, and ultimately judgement, of cost effectiveness⁴⁹; whereas many of the people interviewed believed the campaigns to be broadly 'successful'.

In measuring the success, the research has indicated it is of critical importance to set out at the concept/design stage of intervention:

- The criteria against which the impacts of the intervention will be measured (e.g. economic, social, environmental); and
- How the evaluation will be conducted (statistical, subjective, objective or mixed).

Measurement of the success based on outcomes is generally a robust approach so long as those outcomes can be quantified and compared to a baseline position. The establishment of a baseline position is therefore one of the fundamental components of being able to measure the impact of an intervention as actions move the situation from point A (the baseline/current) to point B (the outcome). Outcome-based interventions have been incorporated into Environment Agency (and other regulatory bodies) thinking for a number of years and have been successfully evaluated using a range of metrics.

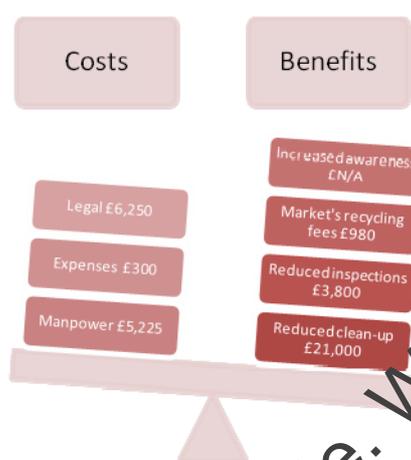
The evaluation of the novel approaches to reducing waste tyre crime has provided valuable insight into some of the fundamental principles that could be considered as pre-requisites for measuring the success of a campaign or an intervention. Some key points noted include:

- Measurement of the success needs to be 'designed into' the campaign or intervention itself. It must be clear on what basis any impact (or outcome) is to be judged, which could be a single factor (such as reduction in the number of crimes reported) through to a complex 'basket' of metrics. Establishing a 'baseline' is fundamental to being able to quantify any benefit or impact conferred as a result of the intervention or campaign.
- Where financial impact is being used as a measurement of success or cost effectiveness (i.e. reductions in costs or revenue generated), data on costs needs to be collected in a systematic way so as to enable comparisons to be made at the evaluation stage. This was a significant weakness of many of the studies evaluated within this project. It is important to ensure standardisation of units and timeframes over which data is reported that ensures like-for-like analysis can be completed and to avoid introducing significant unquantified uncertainties into any

reported results. A hypothetical model is presented in figure 3.1 to demonstrate how financials might be used as part of the evaluation of a campaign or regulatory intervention.

- Qualitative impacts need to be taken into account in measuring success; improvements in community spirit (quality of life), knowledge gains, unquantifiable environmental benefits and reputational gains (e.g. of an authority or public body) can be seen as successful outcomes. These qualitative outcomes are important because they can often mean a lot to the audience in spite of a lack of precision around the degree to which the impact can be quantified or attributed to the intervention.

Figure 3.1 Hypothetical model of financial costs and benefits



Based on the case studies evaluated within this project there are a number of areas that may be used to assess the impact of novel approaches to reducing waste crime. To measure the success, it is likely that a weighting or notional score will be required against each evaluation element based on the priorities of the campaign. This way, the impact and outcomes can be judged on a range of representative criteria, whilst ensuring ultimately the success is measured taking account of the overall aim of the intervention or campaign. It is likely that the number of criteria chosen will vary in each case.

Based on the case studies evaluated within this project, the following table represents a set of possible criteria for evaluating the level of success of campaigns focused on reducing waste tyre crime. Weightings have not been applied because, although important, these should be developed prior to the start of a campaign based upon the key outcomes sought from the campaigns.

Quantitative Outcomes	Suggestions for evaluation metrics
<i>Has the intervention resulted in reduction in crime?</i>	<ul style="list-style-type: none"> • Number of like-for-like criminal acts perpetrated since the intervention was implemented.
<i>Has the intervention resulted in positive action against crime?</i>	<ul style="list-style-type: none"> • Successful prosecutions made since intervention implementation; • Total value of fines and penalties levied; <p>This could also be semi-qualitative in cases where no prosecutions were made and no fines imposed.</p>
<i>Has the intervention resulted in cost savings to industry, the public or government?</i>	<ul style="list-style-type: none"> • Avoided costs associated with direct clean-up or management of illegal wastes; • Avoided environmental damage costs;

Quantitative Outcomes	Suggestions for evaluation metrics
<i>Has the intervention generated additional revenues beyond those anticipated under BAU?</i>	<ul style="list-style-type: none"> • Value of revenues generated; • Quantitative benefits to industry.
<i>Evidence of an improvement in the knowledge and awareness of the target audience?</i>	<ul style="list-style-type: none"> • Number of individuals directly engaged who have received information or advice through the intervention; • Number of reported tip-offs as a result of the campaign.
Qualitative Outcomes	Suggestions for evaluation criteria
<i>Improvements in the relationships between main actors</i>	<ul style="list-style-type: none"> • Subjective evaluation based on post-campaign analysis; • List of partners participating in campaign/approach; • Approach follows the principles of multi-agency collaboration
<i>Evidence of an improvement in the knowledge and awareness of the target audience</i>	<ul style="list-style-type: none"> • Evaluation of the dissemination plan and mechanisms in place to cascade information (incl. metrics such as number of publications, audience reached, hours logged on dissemination); • Increased levels of awareness of producer Duty of Care.
<i>Societal/Community benefits</i>	<ul style="list-style-type: none"> • Calculation based on number of avoided illegal disposals; • Assessment of level of active public engagement and active contribution to the sharing of information on incidents; • Feedback sought and gathered following completion of the campaign.
<i>Has the market benefited from the intervention?</i>	<ul style="list-style-type: none"> • Assessment of the increase (actual or predicted) in the legal disposal (suggested by an increase in the submission of relevant Duty of Care notices); • Does it make using illegal companies less attractive

Note: The distinction needs to be made between applicability of the criteria to the campaigns examined and applicability to other interventions or campaigns, which may require adapted or different criteria.

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4.0 Lessons Learnt and Recommendations

4.1 Lessons Learnt

There were some observations that could be considered to be weaknesses that rendered the evaluation of the campaign less effective and which could act as lessons for those seeking to implement novel approaches themselves. Selected key observations follow:

- When a campaign is being developed, it is important to agree on an aim or set of aims and set-out clear objectives that can then be used to help determine the main success criteria and relative importance (the weighting). Doing this in a transparent manner will help in the later evaluation of the campaign against a set of assessment criteria.
- Allow sufficient time within the campaign to set the baseline which will often require a considerable amount of research to establish. Only by setting a baseline for the metrics that will be evaluated can a full evaluation be conducted – without knowing the start point it is a greater challenge to judge the impact. Similarly, allow sufficient time and set mechanisms and resources to continue to collect data once the campaign has finished. This will enable the impact to be judged over a much longer period and will be crucial for certain criteria where there will be a data ‘lead time’ following the campaign closure (e.g. number of crimes or incidents reported).
- There were significant advantages noted to joint or collaborative programmes such as access to more resources, cost sharing, higher productivity over a shorter timeframe and better networks for dissemination of the results. Yet there were also issues that resulted in less effective delivery and evaluation – this included:
 - A consistent approach to briefing the team together with adequate control throughout the operational period. The Thames North East trial clearly has specific notes and plans to follow but it appears not all of the joint Environment Agency / local authority teams stuck to the plan and data did not come in or was incomparable. This rendered any evaluation less effective, putting a heavy reliance onto more qualitative assessments resulting in a less punchy report on success.
 - Agree on the data to be collected and ensure what is actually collected is standardised and comparable as far as reasonably practicable. The Solent and South Downs trial has demonstrated the benefits of this, with a much stronger analysis and evaluation of the intelligence possible.
 - Ensure that sufficient resource is allocated to retrieving the data from dispersed teams – the lack of data and responses from some visits means a missed opportunity to evaluate and make best use of the time and effort spent getting it.
- Set aside sufficient time and resources to effectively evaluate the campaign and do not underestimate the amount of time needed to make a proper job of this critical phase. The quality of the reporting and dissemination is proportional to the time put into the analysis and evaluation. To save time, be clear about what is to be evaluated, against what criteria, and how the results should be presented.
- The programme and timetable needs to have sufficient flexibility within it to account for delays in getting the data and information back and processing it into a form where a useful evaluation and analysis can be made. It was the case in all

campaigns examined where data was provided that the team underestimated the amount of time it takes to manipulate the data to provide useful outputs.

- Crime affects society and those exposed to it and therefore building adequate consultation with members of the public and businesses before and after the campaign into the programme is necessary to inform and disseminate the results (where issues of confidentiality and protection of sensitive information allows). In a number of cases, the development of short case studies or press articles had a profound effect within the campaign team and members of the community that 'something was being done and we got a result'. The societal benefits of any intervention or campaign may count for a lot in people's perception of success, although these benefits may not necessarily themselves be cost effective.

The lessons learnt are broadly applicable to all Member States where they are considering adoption of approaches to reducing waste tyre crime that focus on collaborative campaigns targeting the producers of the waste as the focus of the campaigns evaluated in this study were on the waste producers. It is noted that waste producers are only one link in a long chain that starts with the tyre manufacturer and finishes with the end user for the waste tyre (e.g. energy from waste) or reprocessed tyre material (e.g. a safety matting company).

4.2 Future considerations

The most pertinent points for agencies wishing to replicate or adopt public sector led novel approaches as identified from the case studies in this report are:

- Working jointly and in collaboration across authorities, agencies and regulatory bodies is an effective means of spreading the resource load, sharing the cost, transferring knowledge and know-how, targeting a wider range of areas or individuals and accessing the greatest network coverage for dissemination of best practice. This also ensures that the same message is being communicated by all of the partners.
- Building in sufficient time into the campaign programme to allow for key design, planning, execution, analysis and evaluation phases. Do not underestimate how long the process will take to make the most of the efforts and interventions that are implemented.
- Working with prominent national campaigning or tyre processing organisations to achieve industry buy-in and help in promoting the messages.
- Consider working with a range of public bodies but delivery of a campaign doesn't need to have just regulatory agents; local residential groups, environmental charities and community organisations can support.

When undertaking a campaign clear objectives need to be set at the start of the campaign with measurable outcomes; this will allow the success of the campaign to be evaluated and also help ensure that the relevant data is gathered during the campaign. A set of possible criteria which may be used to help evaluate the level of success has been outlined in section 3 of this report. To help the Environment Agency understand which of the criteria set out in section 3 could be taken forward and may be feasible, it is suggested that a workshop could be undertaken to help develop the method to measure the criteria.

From the case studies evaluated as part of this campaign it appears that a full understanding of the waste stream life cycle can help the problem areas be identified. The waste stream approach is already starting to be used by the Environment Agency and could be used to help combat tyre crime, by understanding the waste management of

tyres and where the illegal activity is occurring can help suitable interventions be implemented. The waste stream approach should be adopted for all campaigns.

4.3 Recommendations

Given the sensitive nature of data and intelligence around waste crime, there has been only limited access to detailed information other than that connected to the case studies themselves. The recommendations therefore focus on outcomes and observations primarily from the case study evaluations.

4.3.1. Development of evaluation criteria

Developing evaluation criteria and a framework for evaluating waste crime interventions is a vital step in being able to successfully evaluate the cost effectiveness of any intervention or campaign. Due to a lack of coherent and comparable data, it was not possible for the research team to effectively and meaningfully evaluate the cost effectiveness of the campaigns examined.

Internal engagement, perhaps in the form of a workshop built around the outcomes of this study, to determine the parameters and structure of such a framework would help to establish some common formats around cost effectiveness.

4.3.2. Point of intervention

The research showed that financial gain was the strongest driver for waste tyre crime and illegal collection, storage and export. By targeting interventions at the point where the money changes hands, one of the key drivers can be removed. Education, awareness and ensuring compliance with statutory legislation were used in the campaigns evaluated, however it is recommended that as part of on-going discussions with the tyre industry that the feasibility of more radical solutions are examined. The Italian case study shows that by levying a charge early in the tyre's life cycle, the incentive to illegally collect is removed as there is no money changing hands at point of waste collection. The tyre industry with government and the Environment Agency should explore how legal collection and management of scrap tyres could be further incentivised to marginalise criminal activity.

4.3.3. Multiple partnerships

The evaluation of the case studies noted the benefits of collaboration and collaborative working between different authorities and agencies. It is judged that these benefits mostly outweigh any costs however it is important to set out the roles and responsibilities of individual partners at an early stage in the planning. Where multiple partnerships are likely for specific interventions on waste crime, developing and agreeing terms of references in pre-operational, operation and post-operational activities will strengthen delivery of intelligence and provide better quality data for analysis.

4.3.4. Data comparability

None of the case studies evaluated had comparable data, which made examining the benefits of adopting one approach over another difficult. Collection of data around waste crime interventions needs common formats and requires additional standardisation. The Environment Agency should seek to develop a set of common evaluation metrics (possibly within the framework mentioned above) in order to enable the cost effectiveness and success of different interventions to be accurately compared.

Appendix A: Glossary

- Anti-social behaviour order (ASBO)
- Business as usual (BAU)
- Conditional Discharge (CD)
- Centre for Environment, Fisheries and Aquaculture Science (CEFAS)
- Community Payback Order (CPO)
- Duty of Care (DoC)
- Driver & Vehicles Licensing Agency (DVLA)
- End of life vehicles (ELVs)
- European Pathway to Zero Waste (EPOW)
- European Tyre and Rubber Manufacturers Association (ETRMA)
- European Union (EU)
- Green Public Procurement (GPP)
- National Incident Recording System (NIRS)
- National Tyre Distribution Association (NTDA)
- Quality Protocols (QP)
- Regional Attached Tonnage System (RATs)
- Retreading Manufacturers Association (R.M.A)
- Society of Motor Manufacturers and Traders (SMMT)
- South East England Development Agency (SEEDA)
- Tyre Industry Federation (TIF)
- Used Tyre Working Group (UTWG)
- Waste and Resource Action Programme (WRAP)
- Wealden District Council (WDC)

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Appendix B: End of Life Tyre Manufacturing Organisations in the Europe region

Destination Country	Website
Belgium	www.recytyre.be
Estonia	www.rehviliiit.ee
Finland	www.rengaskierratys.com
France	www.aliapur.com
Greece	www.ecoelastika.gr
Hungary	www.hurec.hu
Italy	www.ecopneus.it
NL	www.recybem.nl
Norway	www.dekkretur.no
Spain	www.signus.es
Poland	www.utylizacjaopn.pl
Portugal	www.valorpneu.pt
Romania	www.ecoanvelope.ro
Sweden	www.svdab.se
Turkey	www.lasder.org.tr

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Appendix C: Predicted end uses up to 2015

The table below is based on the findings of a WRAP (2008) study which provided a forecast of the UK's used tyre market up to 2015. The study suggested the following forecast for 2009-2015:

Option	Forecast	Explanations
Re use (including other reuse and reuse as part worn)	Remains constant (13%) till 2015	<p>Reuse as part worn - Trends in re-treading of tyres will depend on a) price of new tyres (cheap tyres from Far East); b) consumer perceptions regarding the safety of reused car tyres (reduced demand) and c) the cost of raw materials (natural rubber and fossil fuels).</p> <p>There is a potential to increase if processes such as baling become more prominent through uses such as flood defence schemes. Due to changing weather patterns – it is likely that improved flood defence schemes will be required and that the demand for such products will remain. However, flood defence schemes are unlikely to offer large volume markets in themselves and in authors' view it will increase proportionately to the increase in used tyre arisings.</p> <p>Emerging technologies - surface repolymerisation could also result in an increase in the reuse and retreading market as the process enables crumb rubber from waste tyres to be incorporated into retread compounds at much higher rates than before.</p>
Re-treading	Remains constant (12%) till 2015	<p>Until 10 years ago was a preferred means of reusing passenger car tyre casings.</p> <p>Trends in re-treading of tyres will depend on a) cost of re-treading in comparison to the price of new tyres (cheap tyres from Far East); b) consumer perceptions regarding the safety of car retreads (reduced demand), c) environmental consciousness (as re-treading is one of the best practicable environmental option) and d) the cost of raw materials (natural rubber and fossil fuels).</p> <p>Overall the tonnage for re-treading will remain constant (slight increase in truck tyres/ slight decrease in car tyres).</p>
Energy recovery	Increase (22%) till 2015	<p>It is likely that tyres will continue to be used in cement kilns in the foreseeable future. Tyres and other waste fuels such as RDF provide a more environmentally beneficial fuel as they are burning a waste rather than a virgin material subject to the emissions being controlled in line with the regulations (i.e. waste incineration directive).</p> <p>Pressure on industry to reduce the GHG emissions (cement industry is covered by the EU ETS).</p> <p>The increased costs of fossil fuels could result in an increased demand for tyres in cement kilns as they are a cheaper fuel - therefore the use of tyres in cement kilns is likely to increase. The industry has the capacity to handle around 50% of the total volume of waste tyres, according to the <i>Performance report (A Corporate Responsibility Report from the UK Cement Industry 2005)</i>.</p> <p>However, the use is dependent on the regulations, i.e. the permits issued by the EA. If permits are granted, the cement kilns are allowed to replace a percentage of fuel with tyres. If regulations change and tyres are no longer accepted at these plants, alternative markets will need to be found.</p> <p>Competition from other waste materials which are seen as possible fuel sources such as RDF - the availability of other materials can impact on gate fees charged by the cement kilns and fluctuating gate fees can result in cement kilns proving to be less popular options.</p> <p>Such increases in gate fees would create huge implications to the tyre industry, with a potential 20% of used tyres having to find other means of disposal. This could potentially be picked up via the reuse and recycling routes such as baling.</p>

Option	Forecast	Explanations
Material recovery	Increase (37% in 2012 and 38% in 2015)	<p>Applications such as sports surfaces and horticultural uses are likely to grow and there is also a potential market increase for rubber in construction and for use in roads.</p> <p>The first large scale pyrolysis plant in Europe is currently in planning stages. Tyre pyrolysis will turn used tyres back into carbon black, steel, gas and oil. The introduction of these technologies could potentially result in more demand for used tyres to feed into these processes; however, these are only viable if there is a market for the output. If, for example, the demand for rubber in sports surfaces declines the demand for tyres in processes such as cryogenics will also decrease.</p> <p>The use of rubberised asphalt is becoming increasingly popular. The shock absorbing properties of rubber provide an added safety factor and the material provides a more durable road surface and decreases noise pollution. If the use of tyres in roads increases it could result in a significant number of tyres being recycled and therefore increase demand in this area.</p> <p>The development of new technologies is likely to continue in this area.</p> <p>The market survey suggested that the future trend in crumb and shred will be constant in the next decade. Truck tyres are mostly used for crumb and shred; there is little demand for crumb produced from road car tyres</p>
Landfill engineering	Decrease (11% in 2012 and 10% in 2015)	Will decrease in the longer term due the general decline of the use and favourability of landfills (i.e. landfill void space declines, sites for landfills are harder to acquire) and due to introduction of environmentally sound and efficient technologies for dealing with waste.
Export	Decrease (5% till 2015)	<p>Difficult to predict, but as regulations in other countries become tighter it is likely to decline (also as other end markets become stronger).</p> <p>However, the data suggests that the export of vehicles and used casings is increasing (went from 2 to 14% in 2000-2008). The market survey suggested that the export of vehicles and used casings will continue to grow in the next decade as long as it continues to be a cheaper alternative in comparison to other means of re-use and/or disposal. The cost to the waste producer is the main driver behind any fluctuations in volume and the share of export of cars and used casings within the total volume of the UK used tyre disposal and recovery in general, waste tyres can be exported abroad more cheaply than the cost of disposal or re-use in the UK. Also there may be slightly less rigorous standards associated with the tyre industry in other countries so if a tyre is deemed illegal for road use in the UK it may still be "road legal" in other countries.</p>
Landfill	No forecast but close to 0% in 2015	All whole and shredded tyres (except for bicycle tyres and tyres with a diameter greater than 1.4m) are banned from landfill (excluding the use in landfill engineering).

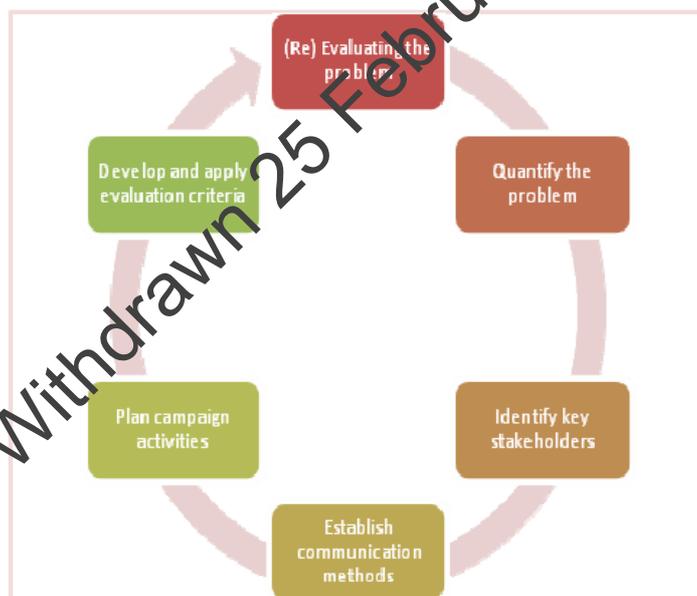
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Appendix D: Campaigns Framework Model

The Environment Agency are adopting a new 'Waste Stream Approach' (WSA), which means thinking how effort is focused on the most problematic wastes and applying the most effective interventions to mitigate adverse environmental impacts. Interventions selected should be based on robust evidence and will include a mix of compliance, enforcement, communication and influencing work with identified partners. The novel approaches to waste crime pilot study has explored some of the challenges of addressing waste crime focused on a single problematic waste stream – tyres – and has drawn some valuable lessons from the evaluations undertaken.

Figure 1 Key stages in waste crime campaign development

The campaign should form only part of the WSA; the evidence and intelligence will already have been gathered and the case for intervention or a campaign made as part of evaluating the problem (see Figure 1). In quantifying the problem (profiling), the focus is on using a range of methods to access high quality data and information. The aim is to understand and establish the size of the problem, where it has its greatest economic, social and environmental impacts and what the root causes are. Root and branch analysis can be a useful technique to examine the problem in a methodical manner. This approach helps identify what the top priorities are and what specific interventions have been shown to be successful before; this analysis should draw on existing knowledge as well as new intelligence. It may be that a campaign can tackle only one aspect of the problem, itself a useful conclusion. An intervention designed to address too many aspects of a problem can lead to less effective outcomes. Here the WSA can help to establish which points in the lifecycle would be best addressed.



Systematic examination of the key stakeholders should be made, including internal and external and covering the spectrum of **embedded, engaged, consulted** and **informed**. The pilot study found that mapping and communicating with stakeholders was one of the most fundamental components to a successful campaign. This includes those relevant to the intervention or campaign and those for whom the subject, topic or issue is important – vital for effective dissemination. Establishing with who and how the campaign will communicate is important too, case studies examined used a range of communication including printed literature (flyers), face-to-face, internet and press articles. Advertising the campaign may or may not be appropriate and decisions on the scale and type of communication should be taken on a case-by-case basis.

Leaving sufficient time to plan, organise and review effectiveness in a campaign should be one of the priorities. Where partners are used, early involvement in design helps establish trust and share the burden of campaign development. In order to judge cost-effectiveness and the impact of the intervention, selection of appropriate evaluation criteria and design of the evaluation (how it will be conducted and who will do it) is critical. This was one area the case studies fell down in – insufficient time was allowed to select evaluation criteria and conduct an 'ex-post' evaluation. The WSA advocates feeding learning back to support development of future campaigns. Evaluation is vital to establish how effective the intervention or campaign has been and this can be used in promoting the outcome and impact, increasing the benefits of dissemination. Figure 2 provides some useful insights from the pilot study to help regulators implement the WSA and deliver more effective campaigns in the area of waste crime.

Figure 2 Useful insights from the pilot study into the key stages in waste crime campaign development

Evaluating the problem	<ul style="list-style-type: none">• Focus on collection of high quality data, in particular the material and waste lifecycle and flows, including where the different wastes go and what recovery processes are used.• Set out aims and objectives and draw on previous experience and learning to influence and help develop the approach.
Quantifying the problem	<ul style="list-style-type: none">• Conduct rigorous root and branch analysis at each stage of the waste lifecycle, where is crime committed and what is driving it?• Focus on understanding where and how to intervene for greatest impact - evaluate all waste lifecycle stages (WSA) and avoid seeking an 'all-in-one' solution, focus on specific problems and draw on other campaigns to support the action.
Identifying key stakeholders	<ul style="list-style-type: none">• Ensure that stakeholders are mapped early in the process and include those that fall into: embedded, engaged, consulted and informed.• Include stakeholders that will play a role in the campaign as well as those to who the outcomes will be disseminated.
Establishing communication methods	<ul style="list-style-type: none">• Consider using a range of methods including novel social media, internet, forums, trade bodies, publications etc...• Set out with whom you intend to communicate, set out a schedule and ensure communication is routine.
Planning campaign activities	<ul style="list-style-type: none">• Leave sufficient time to plan the activities, involving partners (where appropriate) early in the process• Ensure any campaign plan includes time after the activities to analyse and evaluate cost effectiveness and impact.
Developing and applying evaluation criteria	<ul style="list-style-type: none">• Ensure that evaluation criteria are selected that match the aims and objectives as well as the likely outcomes.• Include a range of metrics as part of the evaluation but economic metrics will help to judge the cost-effectiveness of any campaign or intervention - tailor selection to the data available or likely to be collected.

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