BioRegional
solutions for sustainability

Pushing reuse

Towards a low-carbon construction industry

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About the authors

BioRegional is an entrepreneurial charity, which initiates practical sustainability solutions, and then delivers them by setting up new enterprises and partnerships around the world. We assist and encourage others to achieve sustainability through consultancy, education and informing policy.

Salvo aims to encourage and promote stockholding dealers in architectural salvage, garden antiques, reclaimed building materials, demolition salvage, and lastly recycled materials. Salvo also aims to increase appreciation and awareness of historical crafts skills and manufacture, and to help reduce the amount of salvageable materials from old buildings and gardens going to landfill.

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1 Executive summary

BioRegional has worked to push reuse of construction materials since initiating BedZED, the UK's largest low carbon community. With low carbon industry high on the agenda, we have commissioned Salvo Llp, the reclamation and reuse consultancy which carried out the BigREc[1] surveys, to write **Pushing reuse**. We hope that the Government will seize this opportunity to drive investment and enterprise in this neglected green market.

Key findings

Reuse is better than recycling

Reuse is the second highest priority in the UK Government's waste hierarchy, after reduction. Reuse strategies typically lead to a greater reduction in waste to landfill, greater savings in carbon emissions, and more jobs in the construction and waste industries than recycling alone.

Reuse in construction has declined in the past 10 years

Construction materials have been reused and remanufactured in the UK since at least Roman times. But in the past decade there has been a shift away from reuse towards recycling, and latterly towards energy from waste. This was confirmed by two recent BigREc surveys, which show that 25% less material was being reclaimed in 2007 than in 1998, and that reclamation was becoming more difficult.

Policy is not driving reuse

The regulatory backdrop in the EU and UK is failing to prioritise reuse above recycling and energy from waste, despite being higher in the waste hierarchy adopted by both. By classifying reusable construction materials as waste, by conflating reuse with recycling, and by focussing on landfill diversion rather than the waste hierarchy, policy may have contributed to the decline of reuse in the past decade.

Simple policy interventions are available

A champion for reuse appointed by the Government could better drive forward its waste hierarchy; investing in reuse enterprises to kick-start mainstream capacity would create new low-carbon jobs; putting reuse and the embodied energy of materials at the heart of local governance and planning policy could transform practice on the local level; wider thinking about the Emissions Trading Scheme and Landfill Tax could provide sources of funding for reuse enterprise.

[1]BigREc Surveys were carried out in 1998 and 2007. They aimed to provide data on the amount and type of building materials being reclaimed and to compare levels of reclamation in 2006, compared to the previous survey of 1998, to draw conclusions as to the current status of the industry and to identify possible interventions that might increase the levels of reclamation in the UK. Both were carried out by salvage experts, Salvo.

2 Reuse in the waste hierarchy

2.1 Why is reuse more environmentally-friendly than recycling?

The terms reuse and recycle are often confused.

Reuse in construction takes place when building material is carefully dismantled, removed and reclaimed, usually with simple tools and hand labour which expend low process energy. The reclaimed material is then reused, largely in its originally manufactured state, and often for its original purpose.

Recycling takes place when buildings materials are collected during demolition to be re-processed into lower quality materials.

2.1.1 An example of reuse

A brick wall built with lime mortar is carefully taken apart by hand and the old bricks are cleaned by hand and stacked on pallets ready for reuse as reclaimed bricks to create a new reclaimed brick wall. In this instance the advantages of reuse would be:

- the embodied energy of the brick would be saved,
- the environmental impacts of disposing of the brick would be reduced to almost nil
- the environmental impacts of creating a new brick would not be incurred.

2.1.2 An example of recycling

An old brick wall is knocked down to ground level using a machine, with the broken brick then being crushed and screened in a mechanical crusher to create an aggregate substitute. In this instance the disadvantages of recycling would be:

- the high embodied energy of the bricks would be lost, although some low embodied energy recycled aggregate would be created (i.e. "downcycling" would take place)
- the environmental impacts of recycling the bricks would be the carbon emitted and water used in crushing and screening the bricks
- the environmental impacts of creating new bricks (mainly extraction, water use, fossil fuel and some pollution) would need to be accounted for since the potential reclaimed brick was lost due to recycling.

2.1.3 Reuse before recycling

The EU Waste Framework Directive 2008 and Defra's Waste Strategy 2007, reinforce the points outlined above by adopting the waste hierarchy: prevention, reuse, recycling, energy from waste, disposal. Deviation from the priority order of the hierarchy is only possible where this can be justified by life cycle thinking on the overall impacts of the generation and management of such waste. The Waste Framework Directive also redefines recycling: recycling means any recovery operation by which materials are reprocessed into products . . . but does not include reprocessing into materials that are to be used as fuels or for backfilling operations.

Around 70 per cent of the environmental impacts of the average new construction product arise from the energy needed to make it[2]. Reusing a product saves that energy which is why reuse is placed above recycling in the waste hierarchy. Reuse reduces waste and landfill, increases resource recovery, reduces environmental impacts of disposal, and saves energy which results in a reduction of emissions, in particular carbon emissions.

Reuse can also save historic and rare, irreplaceable, and much sought-after material.

Recycling also usually reduces waste to landfill but at a higher environmental cost, creating more carbon emissions than reuse. Proponents of recycling usually argue that recycling is cheaper than reuse. They seldom argue that recycling is more environmentally friendly. There are some situations where recycling is a better environmental option than reuse. For example, this could be true if the embodied energy saved through reuse is less than the transport and process energy expended to save the material. Although this would not be true if the energy expended is less than that of a comparable new product. Likewise, it would be much better to reuse the thousands of tonnes of reclaimable tropical hardwood which are downcycled in the UK each year. These are not just better to reuse in terms of carbon emissions savings but these timbers are often irreplaceable - as some products such as those made from rosewood mahogany are now banned from trade by CITES regulations.

In the reclaimed iron and steel sector alone a shift towards reuse could save the carbon equivalent to taking 29,000 cars off the road[3] (see appendix 2 for full calculations)!

2.2 Carbon emissions, recycling and reuse

This paper will contend, in sections 3 and 4, that reuse is declining as a result of government policy which favours recycling over reuse. But perhaps the greatest benefit of reuse, in the current policy climate, is the carbon emissions savings it can provide.

The total arisings from the construction sector are calculated to be around 120m tonnes per year[4]. Salvo's estimate of the amount that could be saved and reused is around 10m tonnes. Such a figure would make a significant impact on the UK's emissions.

In the construction materials sector, the additional energy cost of recycling instead of reusing is increasing emissions. Taking salvaged iron and steel, in 2007 the emissions cost of recycling over reuse cost the UK the energy equivalent of the output of two power stations.

The following three case studies, based upon the figures from the BigREc surveys (1998 & 2007) quoted in section 3, clearly show the wasted opportunities to reduce carbon emissions. See appendix 2 for the detailed workings behind these claims.

Case study 1: reclaimed iron and steel from 1998-2007

In 1998, the embodied energy saved through reclamation was 33,000tCO_{2e}. In 2007, despite an increase in demolition, the embodied energy saved through reclamation dropped down to 13,000 tCO_{2e}. If steel had been reclaimed in 2007 at the same rate as in 1998, we would have

[2] Conversation with BRE concerning EcoPoints methodology, which sets out the overall environmental impact.
[3] **Pushing reuse** targets aim for an increase from 6% to 50% of reclaimable materials being reclaimed and reused, which would represent an increase in total iron and steel market share from 1.5% to 16% for reused materials.
[4] WRAP web site, http://www.wrap.org.uk/construction/halving_waste_to_landfill

saved 46,686 tCO_{2e}. This assumes we are displacing 100% recycled steel with reclaimed steel, rather than displacing the current average steel which is only 59% recycled.

If we had set a target to reuse 50% of the reclaimable iron and steel in 2007, we would have saved an extra 92,665 tCO_{2e}, equivalent to taking 29,000 cars off the UK roads for a year.

Case study 2: reclaimed bricks 2007

Of the 3bn bricks arising from buildings demolition in 2007 (which equals the number of new bricks produced in the UK), 10% or 300m were reclaimed for reuse. The energy embodied in 17 bricks is equivalent to one gallon of petrol. Brick reuse in 2007 saved 188,571 tCO_{2e} without any government funding or policy assistance.

Case study 3: reclaimed timber 1998 – 2007

In 1998, 613,000t of timber were reclaimed for reuse, but by 2007 only 355,000t were reclaimed. Emissions savings declined from 275,850tCO_{2e} in 1998 to 159,750tCO_{2e} in 2007.

An unusual example of failure to reuse was the 7,000 tonnes of new softwood timber washed on to beaches of southern England in 2008 which was perfectly reusable but was prevented from being reused by Receiver of Wrecks and ended being burned. A similar event with a large amount of new timber occurred in 2009 on the Kent coast.

2.3 In recent years recycling has taken over from reuse

The reuse of reclaimed materials has been a cornerstone of building materials supply in the UK since Roman times. Anglo-Saxons used reclaimed Roman bricks to rebuild the abbey of St Albans, followed by the Normans who reused old Roman masonry in many of their buildings. Sixteenth century yeoman's houses reused stone and other material from the dissolution of the monasteries. Georgian mansions such as Uppark reused oak from medieval buildings in its floor and roof structures. In 1928, when McAlpines built the new Dorchester Hotel in Park Lane, London, they ordered that bricks from the demolition of the former Georgian mansion on the site, Dorchester House, should be reclaimed and reused in the building of council housing in outlying estates in north London. Reuse was a natural first choice for any materials arising from demolition. Apart from metals, recycling did not exist.

The era of construction waste with little reuse started in the 1950s and continued into the 1960s when traditional Victorian terraces in many towns and cities were replaced by concrete high rise flats. The two building techniques - Victorian terrace and high rise concrete - were dissimilar, so there was no scope for reuse. Material coming from this era of demolition tended to be sent direct to landfill, apart from non-ferrous metals for which a buoyant market existed then as it does now.

In the 1970s architectural salvage yards began to be established throughout the UK which created and developed markets for reclaimed building materials. These were world leaders and to an extent they are still. In the 1980s, while demolitions continued to feed increasing volumes of materials through to

the salvage sector and the customer-base for these materials continued to grow, the reclaimed building materials sector continued to expand.

In the 1990s, the demolition sector moved fairly rapidly from being made up of small under-capitalised contractors using a lot of casual hand labour, to large highly capitalised concerns using human-operated machines to replace hand labour. Pressures on dwindling landfill sites, EU directives, landfill taxes, health and safety issues, an upsurge in demolition and the perceived need for faster demolition by mainstream construction all resulted in new technologies created to process construction waste including concrete crushers and timber chippers. These technologies were generally considered by government to be positive as they recycled material that might otherwise be landfilled. The fact that reclaimable timber, brick and stone were also being destroyed by these new recycling technologies was not considered important, certainly in the 1990s.

By the mid 1990s, the waste hierarchy, with the agenda set by industry lobbyists in Brussels, was flattened so that the three activities – reuse, recycling and waste to energy – were considered to be of equal environmental value. Reuse had never been widely accepted by mainstream construction, but the small acceptance it had was quickly dropped out of its environmental thinking. Most customers of reclaimed material were private individuals. Within mainstream construction, reuse of reclaimed materials seldom occurred unless the client stipulated that reuse would occur often in the face of intransigence by their design and construction team.

Salvo was set up in 1992 to make it easier for customers to find suppliers of reclaimed materials and to encourage mainstream construction to save and reuse more reclaimed material. The salvage sector does not have a trade body to represent its views to government or in Brussels, although we understand a body is in the process of being established. Consequently the newer recycling technologies, which were enthusiastically promoted by mainstream construction and funded by government through WRAP and others, have made considerable headway and levels of reuse have reduced. Encouraging reuse has had much less support from government. So reuse has not in the past ten years had a level playing field.

In market terms, recycling has been more widely adopted by mainstream construction for a number of reasons mainly connected with convenience and keeping materials out of landfill. We now turn to these reasons and the opportunities to make reuse a priority.

3 Opportunities to make reuse a priority

The following tables show how reuse can be enabled or resisted in two construction phases. The mainstream construction sector discourages its clients from the practice of reuse but in the past year or two some of the biggest clients and major contractors have begun to reuse a small quantity of reclaimed materials in their projects. This practice has yet to filter down to medium-sized clients and contractors. The smallest clients - private consumers as opposed to mainstream construction companies - use small contractors who are familiar with reuse, and it is this sector that reuses around ninety percent of all UK reclaimed material.

3.1 Soft strip and demolition phase

Construction sector objections to RECLAIMING during the demolition phase	Construction sector reasons for approving RECYCLING during the demolition phase	Reclaiming for REUSE IS THE BEST ENVIRONMENTAL OPTION during the demolition phase
1. HEALTH & SAFETY		
reclaiming involves hand labour which is considered **dangerous** on demolition sites	recycling is mechanised so it is **safer** no money has been invested in tools that substitute for hand labour which would make **reclaiming safer**	demolition contractors **soft strip prior to demolition using hand labour,** prior to machine demolition, so reclaiming materials merely means an extension of the soft strip phase
2. TIME CONSTRAINTS		
reclaiming takes longer because it needs more hand labour and because costly safe access is needed to carefully dismantle elements of buildings	**recycling is quicker** because it is mechanised and is often undertaken from ground level	many buildings to be demolished have been empty for years so **plenty of time could be made available** for careful deconstruction
3. SPACE, STORAGE & TRANSPORT		
reclaiming requires **storage** for reuse on the same site or a **ready market** to sell into	recycled waste is **easier to store** and has a **less complex market** to sell into	**reclaimed building materials are best reused on the same site from which they are demolished** so if storage on that site is not available **nearby vacant plots** will need to be rented temporarily the improvements nationally in reducing lorry movements would be a great environmental benefit as **many lorries would be taken off the roads**

Construction sector objections to RECLAIMING during the demolition phase	Construction sector reasons for approving RECYCLING during the demolition phase	Reclaiming for REUSE IS THE BEST ENVIRONMENTAL OPTION during the demolition phase
4. COST SAVINGS		
usually the client **pays more**	usually the client **pays less**	if reuse sometimes costs more then more thought should be given before demolishing reusable buildings in the first place the alternative to the client paying more to reuse, is that the client pays less but the rest of society pays more the cost of not reusing is more emissions and more destruction cost cannot be cited as a reason not to implement the EU waste hierarchy
5. ENVIRONMENTAL IMPACTS		
lower environmental impacts from reclaiming are less of a consideration until the relative cost of reclaiming is reduced through costs or legislation such as landfill tax and Site Waste Management Plans (SWMPs – see section 5.2.1.8)	**higher** environmental impacts of recycling are considered an acceptable collateral environmental consequence of more speed and control	higher volumes reclaimed means more reuse which saves embodied energy, embodied water, and reduces other environmental impacts so **the environmental impacts and carbon emissions are lower**

3.2 Rebuilding phase

Construction sector objections to RECLAIMING during the building phase	Construction sector reasons for approving RECYCLING during the building phase	Reclaiming for REUSE IS THE BEST ENVIRONMENTAL OPTION during the building phase
6. MARKET CONSIDERATIONS		
reuse diminishes market share for similar new products	**recycling does not threaten market share** of new as it destroys old reusable products	reducing market share for new products is good as this **replaces unsustainable growth with sustainable growth** manufacturers will need to embrace reuse if they are to survive Modern methods of construction should reuse old materials as a **fundamental principle**
7. SOURCING		
reclaimed materials **sourcing is more complex** logistically	sourcing materials with recycled content **is easier** and more controllable	professionals need to **design buildings specifying reclaimed materials which are readily available, preferably from demolition on the same site,** rather then designing as they do with new materials on the assumption that reclaimed materials of the right type and quantity will somehow be available on a just-in-time basis **architects and specifiers need a change in attitude** away from clean sheet specification towards becoming a part of a reuse supply chain

8. SPECIFICATION		
it is **harder to specify** reclaimed materials	products with recycled content **can be specified as easily as new** products	specification is a complex issue which needs construction and insurance working together to tackle the conundrum which is: insurers want builders to use CEN (European Standard) approved new materials and not CEN non-approved reclaimed materials, but insurers also want to mitigate climate change by reducing emissions **so insurers must support the reuse of reclaimed materials** and not merely promote the use of approved new materials
9. STANDARDS OF SUPPLY		
reclaimed material cannot be verified to have been manufactured to a known standard	products with recycled content can be constructed to known production standards	**building regulations have a fitness for purpose clause which allows reuse of fit reclaimed materials** informally the UK government has derogated from the EU Construction Products Directive with respect to the reuse of reclaimed materials, government support for the green guide rating for the code for sustainable homes confirm this

10. INSTALLATION TIME		
it **takes more time to install** reclaimed materials using more hand labour and traditional construction methods	it **takes no longer to install** recycled content materials than new equivalents using modern construction methods	**educate the construction sector on reuse** and provide new tools to increase installation speed increased installation time is acceptable if the alternative is higher embodied energy and complex, toxic but more easily fitted new materials Modern methods of construction should reuse reclaimed then there would be no time disincentive on site
11. PRODUCT LIABILITY		
reclaimed material comes with **no guarantee or warranty**	some material with recycled content come with **a guarantee or warranty**	(see comment about insurance above) **toxins below a certain level are acceptable in reclaimed materials,** as long as they are not harmful to human health on occasion toxic materials are accepted for UK use, e.g. National Trust and English Heritage use banned lead-based paint existing UK buildings contain toxins (the most dangerous of which were created in the 1990s) so if reclaimed materials cannot be reused due to toxic safety then, logically, all existing UK buildings should be demolished and disposed of as hazardous waste
12. THE DECISION TO RECLAIM AND REUSE		
it is best if the client makes the decision to reuse the client might **pay more but society pays less**	the client may refuse to reuse because it takes longer, costs more and is not covered by guarantees then the client **pays less but society pays more**	the **client can make savings** by reusing (see note above about this)

4 The decline of reuse, 1998 – 2007

In a draft report to BigREc in November 2008 (see Appendices 1 &2), we began to examine trends in reuse. **Overall the reclamation trade in 2007 shows a large increase in value of sales but a general decrease (25% less in 2007 than 1998) in the volumes of materials salvaged.** There appears to have been a shift in the trade since 1997 from selling entirely reclaimed building materials and architectural salvage, to 2007 where sales also include a significant proportion of new and reproduction alternatives to salvaged materials, perhaps as high as 50% of sales.

This means that the demand for reclaimed products has increased over the past 10 years. The shift towards reproduction items suggests one or more of the following:

- Supply of genuine items is lower than demand; either because they are not entering the marketplace (i.e. being recycled or landfilled) or because demolition of appropriate buildings is taking place at a lower rate.
- Genuine reclaimed products and materials are more expensive than their reproduction equivalent
- Customers have concerns over the provenance or 'fitness for purpose' of genuine reclaimed products and materials

The trend is very concerning as the positive environmental effect of reclaiming building materials cannot be attributed to reproduction items, whilst customers may be under the false impression that they are reusing materials and products. Hopefully, the requirement to have documentation relating to the source of reused materials in the Code for Sustainable Homes will help raise awareness of genuine reclamation versus reproduction. Another factor worth highlighting is that the number of people employed within the sector dropped by 34% between the two years.

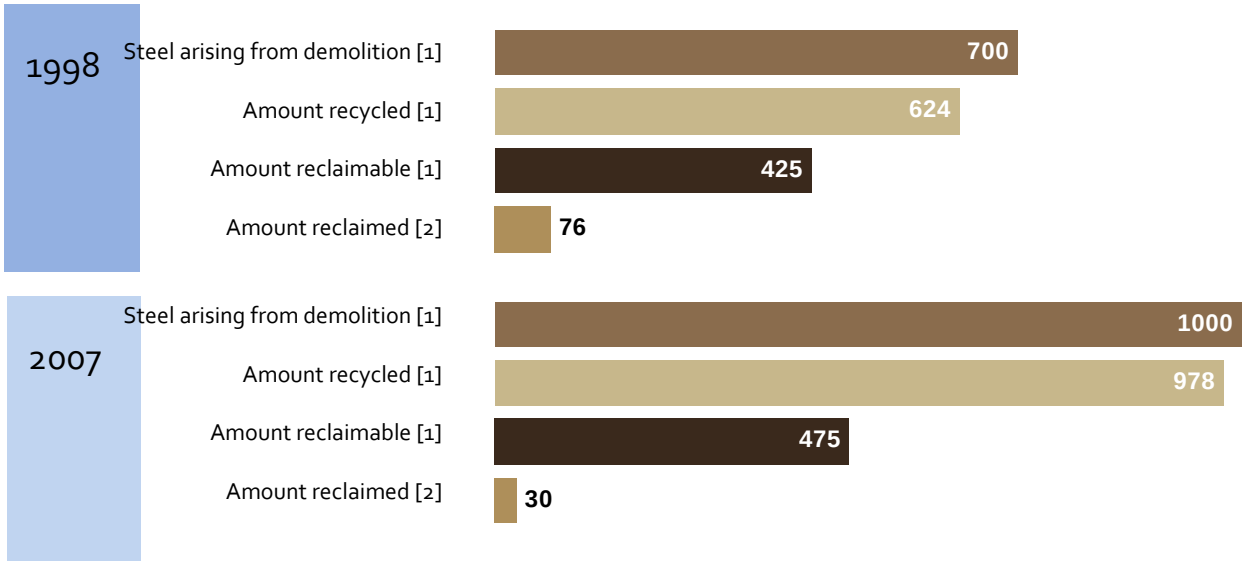
4.1 Detailed appraisal of the steel sector

Sales of salvaged steel fell from 70,000 tonnes in 1998 to 22,000 tonnes in 2007 although prices rose from £147 per tonne to £270 per tonne; overall sales fell from £11.2m to £5.9m.

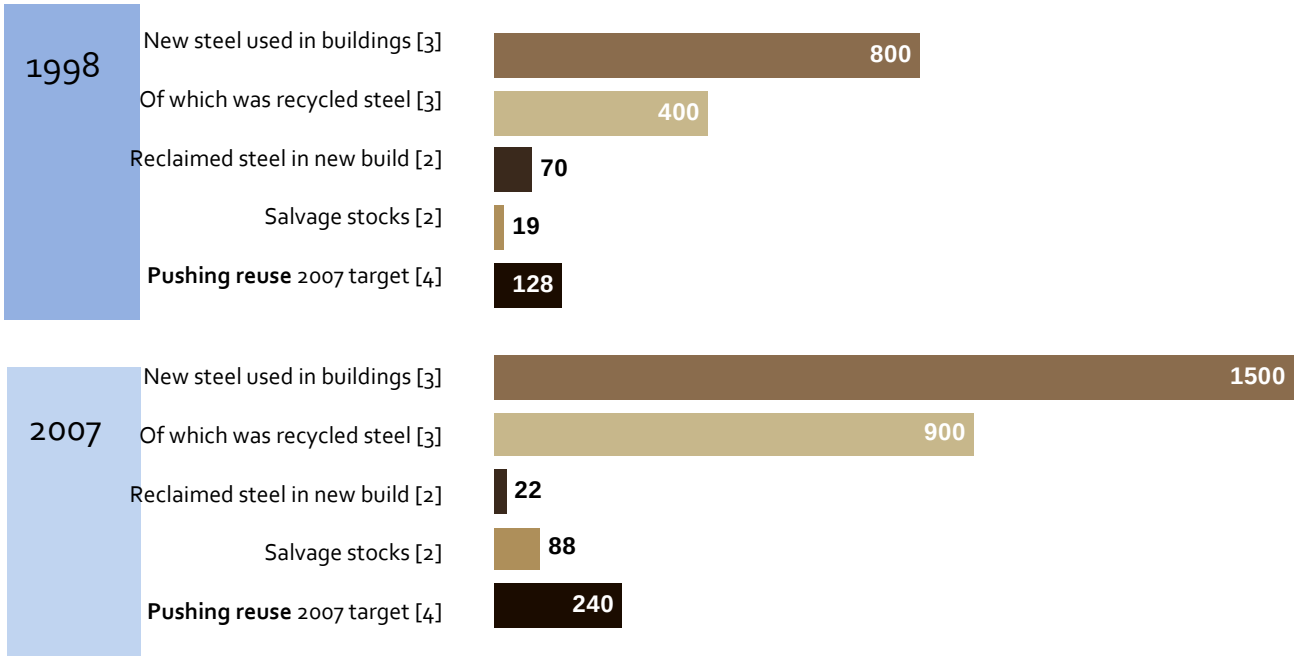
In 1998, salvaged steel was estimated to have supplied 9 per cent of UK constructional steel. By 2007 this figure had fallen to 1.5 per cent (see chart overleaf: UK Construction Steel: New Build Impacts).

The UK salvaged iron and steel sector is one of the world's most efficient, comprising more than a thousand small businesses. Prior to the advent of the specialised salvage yard, all scrap metals were handled solely by scrap metal merchants, some of whom specialised in reusable steel but many were general dealers who would keep reusable steel to one side and sell it directly to customers, such as small builders and farmers.

4.1.1 *UK construction steel – demolition impacts (thousand tonnes)*



4.1.2 *UK construction steel – new build impacts (thousand tonnes)*



NOTES
[1] Salvo : **Pushing reuse** estimate
[2] Salvo : BigREc surveys 1998 and 2007
[3] British Constructional Steel Assn : Stockholders - the strategic resource; and EEF UK Steel Key Statistics 1990-2006
[4] Salvo : **Pushing reuse** targets placed for comparison purposes : 1998 actual reuse 70kt (9 per cent of total constructional steel), target reuse would be 128kt; 2007 actual reuse 22kt ,target would be 240kt (16 per cent of total constructional steel)

Typically, until the 1990s scrap metal dealers would offer structural steel sections to small builders while reclaimed building material dealers would sell elements of structure, such as fire escapes, spiral staircases, profile cladding and roof sheets.

Reusable steel stockholders, many of which dealt in new steel, sold their reclaimed stocks to metal fabricators, agricultural and light engineering customers, as well as the construction sector. A dozen or so small complete steel buildings were dismantled and stored for resale, and anecdotal evidence suggests that a few entire buildings were dismantled by foreign dealers for reuse in developing countries.

By 2007, the world of scrap and salvaged steel had undergone a decade where a number of factors brought about rapid changes.

- The scrap metal price for steel went from an all time low to an all time high. [5]
- The UK Government moved from a position of zero subsidies and grants for recycling to several hundred million pounds a year, although none were given to encourage reuse. [6] [7]
- Business regulations were introduced which impacted on the waste and scrap sector. [8]
- The property boom of the 1990s and 2000s gave a shift from low to high labour costs, and from careful reclaiming for reuse to speedy recycling (crushing, scrapping or chipping) of old reusable items. [9]
- The UK Government scrapped clauses to save and reuse in Planning Policy Guidance (PPG) 15 used by local authority planners to put riders on planning applications involving demolition. [10]
- Listed building and building control officers refused to allow reuse for spurious reasons. [11]
- Architects and designers have been slow to embrace reuse; using new appears easier. [12]

In the late 1990s, low prices for scrap steel, new regulations requiring higher processing standards, higher capital plant and building costs and the high price of land, resulted in small scrap yards closing which left the bigger, more capital-intensive high-volume recycling orientated scrap dealers. Tougher insurance requirements meant that scrap businesses could no longer easily retail or make trade sales to small builders. The slow pace of the reuse sector meant that larger businesses began to develop working practices to break materials down into material product groups as rapidly as possible, which precluded careful dismantling, in order to sell at high prices into the recycled metals markets.

The speeding up process spilled over into demolition, traditionally a labour-intensive reclamation-friendly activity, which for similar reasons encouraged a move towards capital-intensive demolition, not least to keep its workforce away from close contact with materials as a means of improving site

[5] e-Digest Statistics Defra 2003 - 2008
[6] UK National Accounts Blue Book 2006
[7] UK Environmental Taxes By Sector. UK government agencies, such as WRAP, have grant-funded activities such as brick crushing and timber recycling by more than £20m but no grants have been given to encourage reuse
[8] Landfill Directive, Controlled Waste Regulations, Hazardous Waste Regulations, WEEE Regulations, CDM Regulations, SWMPs
[9] SalvoNEWS 1993 - 2007
[10] The Salvo Reclamation Protocol : SalvoNEWS 109 Monday 10 April 1995
[11] ibid
[12] ibid

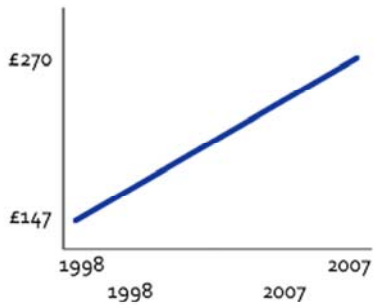
safety. This also meant that demolition contractors developed more destructive dismantling methods which involved shearing and distortion of steelwork which rendered it less able to be reused. Structural steel elements also fell victim to the need for rapid demolition. Items such as fire escapes made of lighter sections had even less scrap value and usually little salvage value, although a few were rescued and reused, most were not. Even comparatively new steel buildings are being scrapped because time is not allowed to market them in advance of demolition, and even when customers are available the additional time taken and costs of careful dismantling are unwelcome to the client and their construction team.

4.1.3 Salvaged Iron & Steel - How the market changed between 1998 and 2007

See overleaf for the charts that illustrate these trends:

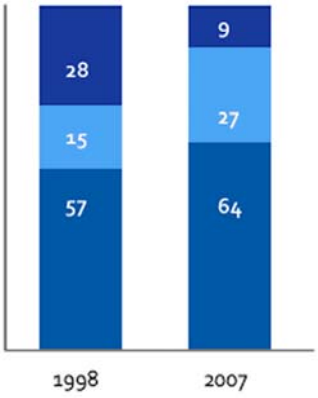
- Stockholdings increased (chart 7)
- Value per tonne of stock increased (chart 1)
- Sales per tonne of stock decreased (chart 1)
- Sales decreased (chart 1)
- Customers decreased (chart 4)
- Customers travelled further (chart 3)
- Customers from DIY and private sector increased(chart 2)
- Demolition contractors supplied less (chart 8)
- Employment decreased (chart 5)
- Standards of supply increased (chart 6)

These findings are broadly similar across the entire sector of architectural salvage, reclaimed building materials and demolition salvage (see Appendix 2 : The BigREc2 Survey 2007)



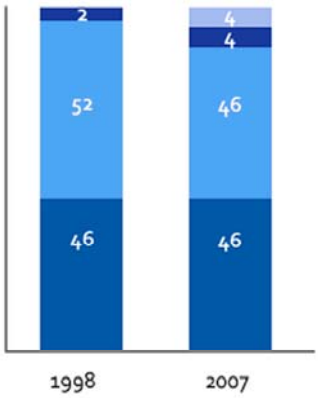
1. **SALES PER TONNE OF STOCK**

Note: 2007 £s is actual, 1998 £s has been inflation adjusted using RPI



2. **CUSTOMER TYPE (percent)**

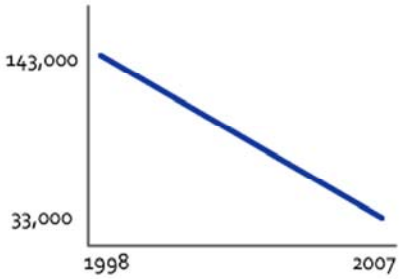
Private
Developers
Builders



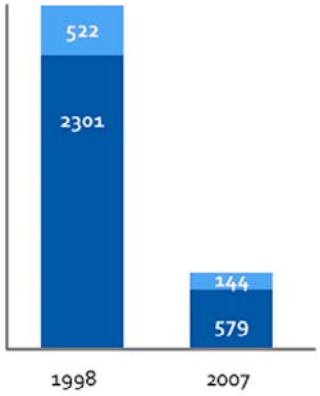
3. **CUSTOMER DISTANCE (percent)**

Private
Developers
Builders
Exports

Distances: Local - within 10 miles, Regional - within 100 miles, National - within UK

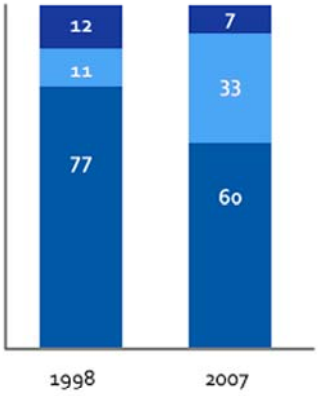


4. **SALVAGE CUSTOMERS**



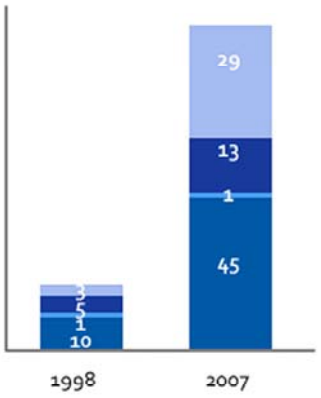
5. **EMPLOYMENT (total jobs)**

Dismantling
Processing



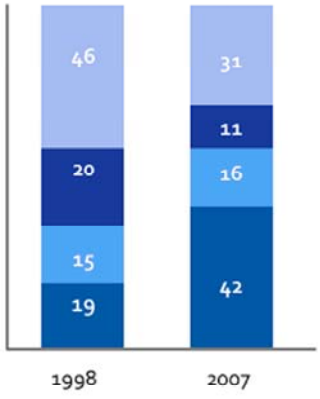
6. **STANDARDS (percent)**

As found
Processed
Cleaned



7. **UK TOTAL STOCKS (kt)**

Structural
Sheet
Steel frames
Elements



8. **STOCK SOURCES (percent)**

Private
Own demo
Builders
Demolition

5 EU and UK policy background

Section one of this report showed that reuse should be a priority over recycling; section two explained the practical drivers that help or hinder reuse; section three shows that, in part due to those drivers, reuse has actually decreased in the past 10 years compared to recycling and section 4 gives steel as a case study of this decline. In this section we turn our attention to the policy drivers and issues arising from this unsatisfactory situation.

The key issues are, in summary:

1 Confusion exists about the classification of reusable materials as waste in EU policy, which inhibits reuse, but there is an unambiguous requirement to set reuse targets and promote repair and reuse networks;

2 UK policy is focussed on landfill diversion and favours recycling, but carbon emissions targets should favour a new focus on reuse to reverse its decline.

5.1 Waste classification and reuse in EU policy

The European Parliament creates the legislation defining waste, and governs how waste is handled. Its directives control UK domestic definitions and laws on waste. The UK can derogate from (delay implementation of or decline to enact) EU laws under what is known as the subsidiarity rule. [13]

In June 2007, Defra circulated without comment judgements in the European Court qualifying the EU's legal definition of waste in Europe (listed below).

In 1990 the European Court ruled[14] that national legislation which defines waste as excluding substances and objects which are capable of economic re-utilisation is not compatible with Council Directives 75/442 and 78/319. In other words the UK government cannot pass laws which state that reclaimed building materials are not waste simply on the basis of their reuse value.

In 2000, the European Court ruled [15] that the fact that a substance is the result of a recovery operation within the meaning of Annex IIB to that Directive is only one of the factors which must be taken into consideration for the purpose of determining whether that substance is still waste, and does not as such permit a definitive conclusion to be drawn in that regard. Whether it is waste must be determined in the light of all the circumstances, by comparison with the definition set out in Article 1(a) of Directive 75/442, as amended by Directive 91/156, that is to say the discarding of the substance in question or the intention or requirement to discard it, regard being had to the aim of the Directive that its effectiveness is not undermined. In other words, reclaimed building materials are not waste if the disposing owner believes those materials to have a reuse value.

In 2004 the European Court adjudged [16] that the meaning of 'waste' for the purposes of the first subparagraph of Article 1(a) of Directive 75/442, as amended by Directive 91/156 and by Decision 96/350, is not to be interpreted as excluding all production or consumption residues which can be or

[13] The principle of subsidiarity applies where the EU does not have exclusive competence, which in practice is used in an informal manner and has both legal and political consequences. An example of derogation under the subsidiarity rule took place when the UK decided in 2007 to derogate indefinitely the enaction of the metric units directive because it would affect trade with the USA.

[14] Zanetti Vessoso

[15] Arco Nederland

[16] Niselli

are reused in a cycle of production or consumption, either without prior treatment and without harm to the environment, or after undergoing prior treatment without, however, requiring a recovery operation within the meaning of Annex IIB to that Directive. In other words reclaimed building materials may or may not be considered waste.

In February 2007, the EU clarified its definition of waste with a communication which stated:

> The definition of waste has been a key part of protecting the European environment from the impacts of waste generation and management over the past thirty years. Objects or substances that are defined as 'waste' are controlled by Community waste legislation in order to protect human health and the environment.
>
> [2007 COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT on the Interpretative Communication on waste and by-products]

If placing reclaimed building material into the waste category would have the effect of damaging human health and the environment then the de facto legal position must be that reclaimed building material cannot be so classified. Since a big threat to human health and the environment is climate change caused by emissions, and reusing reclaimed building materials reduces emissions, then reclaimed building material cannot be waste under EU law.

If reclaimed building material is considered waste by the EU it then falls under a raft of regulations which prohibit people from freely reusing reclaimed building material. If reclaimed building material is not EU waste then these regulations should not form part of a waste strategy.

Reducing the market share of the reuse sector serves a number of purposes for mainstream construction products manufacturers, the most important being that it increases the market share of new materials.

Reducing reuse has:

- encouraged the recycling sector to create an industry built around the destruction of reclaimable materials in the name of resource efficiency, which in turn means more new materials need to be manufactured.
- spawned a new dynamic self-serving growth industry in recycling (which means destroying) reusable materials which is usually subsidised by government.
- led to an increase in material being burned for waste to energy, especially reusable wood, much of which is timber from irreplaceable first growth forests.
- resulted in reusable steels being recycled at a high energy cost for no environmental benefit, for example reclaimed structural steel sections are recycled back into new structural steel sections.
- resulted in billions of bricks being destroyed which could have replaced the need to manufacture trillions of new ones.
- benefitted industry but has been damaging to consumers because high quality materials are being downcycled. In human and global terms it has also been damaging.

The way in which reclaimed building material can be defined as part of the waste stream is effectively encouraging its destruction. A reclaimed brick which has been categorised as waste can be recycled

(crushed) with the use of fossil fuel which turns it into hardcore. If the brick is reusable then it will substitute for a new one.

5.1.1 EU waste policy – other environmental considerations

The EU Thematic Waste Strategy states: [17]

> Waste policy will help reduce the environmental impacts of using resources. The relationship between waste, resources and IPP (integrated product policy) should be more than just theoretical. Waste policy should illustrate how environmental impact and life-cycle thinking should work in practice**. Waste prevention and recycling policies can reduce three different environmental impacts**:
>
> - **the impacts of extraction of primary raw materials**. For example, recycling metals avoids the hazardous by-products of ore-processing, and since less mining waste needs to be moved reduces CO_2 emissions by saving energy;
> - **air pollution or energy use from** the transformation of primary raw materials in **production processes**;
> - **emissions from waste disposal installations**, e.g. methane emissions from landfills.
>
> [Section 6.1] Thematic Waste Strategy which was part of the EU 6th Environmental Action Plan

Each of the above points relates strongly to reuse of building materials, which reduce the need for primary material extraction, reduce the need for production processes and reduce the quantity of waste going to landfill. The strategy continues:

> The preliminary communication noted that the amount of waste generated depends on a wide and complex range of factors. These include levels of economic activity, demographic changes, technological innovations, life-style and, more generally, patterns of production and consumption. This means that waste prevention targets do not work when they are used in isolation from product and resource policy, as they have been on occasions. Secondly, it remains questionable whether weight or volume are always the most appropriate indicators of the environmental burden of waste. **In practice the relationship between the generation of waste and its environmental impacts is more complex, since changes in waste generation patterns generally affect not only the quantity of waste generated, but also the type of waste generated**. Such changes may also affect impacts at other stages of the product life-cycle, e.g. through changes in product design... At the same time, no obvious alternatives to weight-based targets have emerged over the consultation period since the preliminary communication ... it is clear that full advantage is not being taken in the EU of the benefits of waste prevention, and this will not happen without some form of catalyst to encourage more effective action and better analysis in support of waste prevention. Action at EU level could help to address the patchy nature of waste prevention work.
>
> [Section 6.4] Thematic Waste Strategy which was part of the EU 6th Environmental Action Plan

This section considers the quality of waste items. If reclaimed building materials are considered waste rather than a valuable resource, then quality becomes more of an issue. Is it worse to crush or landfill

[17] EU waste policy issues were set out in a Thematic Waste Strategy which was part of the EU 6th Environmental Action Plan, they were designed to be in effect from 2002 to 2012.

300 year old reusable bricks rather than 30 year old bricks? Is it worse to chip or compost reusable timber from first growth forests of 1,000 year old trees from British Columbia logged 100 years ago rather than 30 year old plantation-grown wood? The former are irreplaceable resources, the latter is easily replaced. But the wood grown more recently has a higher environmental impact because more energy and chemicals were used to grow it. Does this make it more worth saving? Reclaimed building materials cannot fit into the waste stream and be dealt with under the Waste Framework Directive. So derogation and subsidiarity must apply.

The 6th Environmental Action Plan considered the Sustainable Use of Natural Resources within which a definition was given for renewable and non-renewable resources and this has an impact on the reuse of reclaimed building materials. Here is the paragraph:

> a) raw materials such as minerals (including fossil energy carriers and metal ores) and biomass. Fossil energy carriers, metal ores and other minerals (e.g. gypsum, china clay) are non-renewable in the sense that they can not be replenished within a human timeframe. Their stocks are finite and are diminishing because of the use by human activities. In contrast, biomass is in principle renewable within the human timeframe. It includes quickly renewable resources, such as for example agricultural crops and slowly renewable resources, such as timber [7]. However, these biological resources used as raw materials can be exhausted if they are overexploited. [8] This is an acute threat to certain commercially fished marine species, for example.
>
> [7] The meaning of "renewable resources" is different from "renewable energy resources" as defined in Directive (2001) 77 final of 27th October 2001.
>
> [8]COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT - Towards a Thematic Strategy on the Sustainable Use of Natural Resources]

Box 17 overleaf illustrates that the controlled waste regulations exclude reusable building materials; these materials would normally take the following route in the diagram:

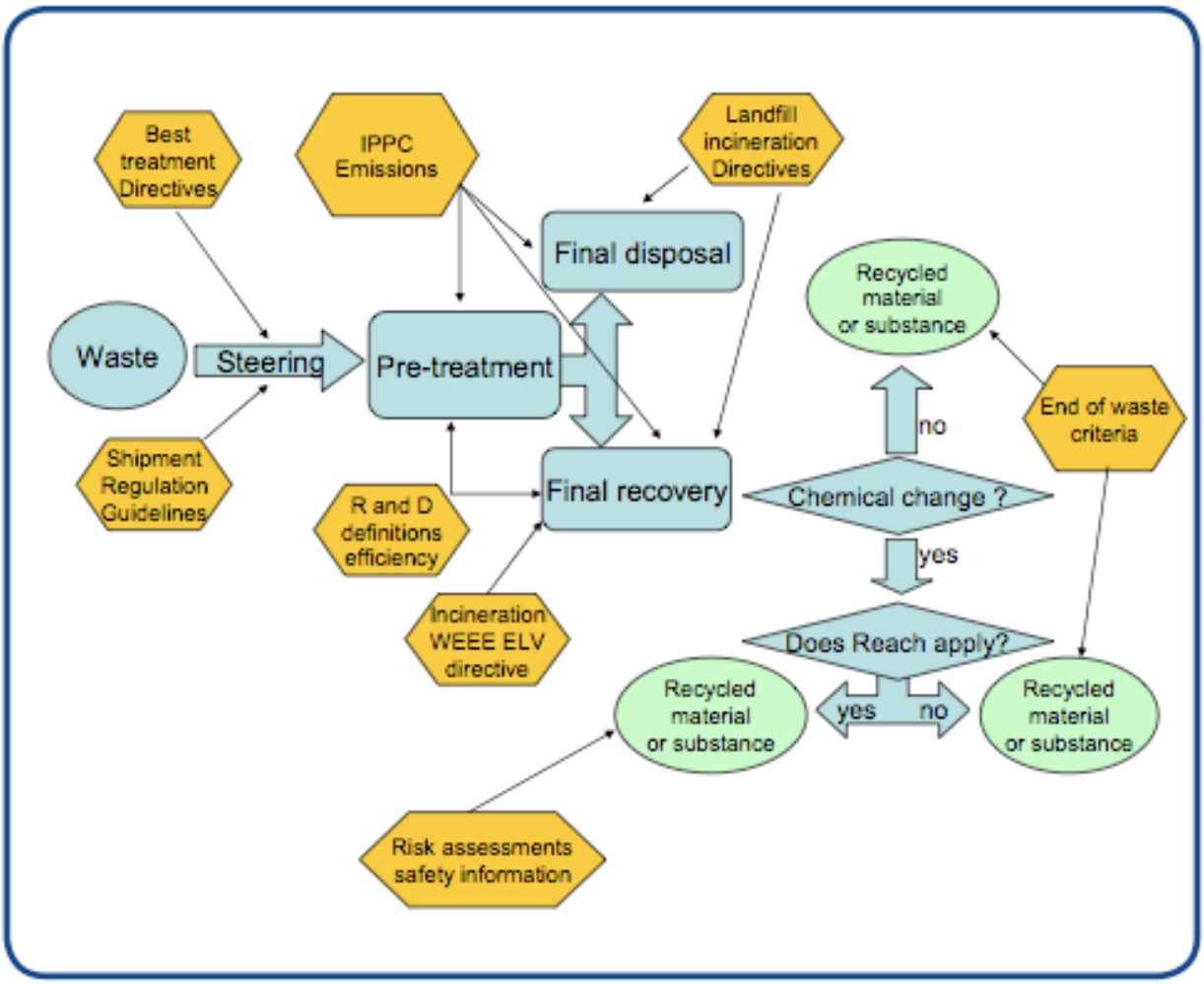
> Deemed waste >>> Pretreatment >>> Final recovery >>> Chemical Change? No >>> Recycled material or substance: End of waste criteria

Embodied and acquired toxicity are excluded with respect to reuse, for example with floorboards:

- Embodied toxicity: A few species of tropical hardwoods can occasionally cause rhinitis from breathing in the sawdust. Reclaimed tropical hardwood can be reused.
- Acquired toxicity: Reclaimed wood subjected to timber treatment more than once in a domestic house might contain a cocktail of timber preservative. Reclaimed treated softwood can also be reused.

In each case reuse creates no particular additional hazard to human health. Logically if reuse is prohibited then the original use should also be prohibited, thus condemning most of a country's existing housing stock. Reuse may be a better environmental option than disposal which could create an additional environmental harm depending on the disposal route, and the substitution of new floorboards could result in increased use of pesticide, herbicide and soil acidification.

Figure 9: EU standards applied along the waste management chain



5.1.2 Progress in EU recycling policy

The EU is committed to the creation of a recycling society. After several years of discussion, in December 2008, the EU embedded Reduce, Reuse, Recycle into EU law in the 2008 EU Waste Framework Directive.

Recycling was redefined within the Waste Framework Directive so that some types of downcycling, which destroy high quality reusable material for no environmental benefit, will now be downgraded to disposal. Crushing bricks and chipping wood will not be considered recycling.

> 17) "recycling" means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations;
>
> EU Waste Framework Directive December 2008

Member states must incorporate the Waste Framework Directive into domestic law or regulation by December 2013.

5.1.3 EU reuse policy 2008

The EU Waste Framework Directive sets out a priority order for its new version of Reduce, Reuse, Recycle:

> Article 4
>
> Waste hierarchy
>
> 1. The following waste hierarchy shall apply as a priority order in waste prevention and management legislation and policy:
>
> (a) prevention;
>
> (b) preparing for re-use;
>
> (c) recycling;
>
> (d) other recovery, e.g. energy recovery; and
>
> (e) disposal.
>
> 2. When applying the waste hierarchy referred to in paragraph 1, Member States shall take measures to encourage the options that deliver the best overall environmental outcome. This may require specific waste streams departing from the hierarchy where this is justified by life-cycle thinking on the overall impacts of the generation and management of such waste.
>
> Member States shall ensure that the development of waste legislation and policy is a fully transparent process, observing existing national rules about the consultation and involvement of citizens and stakeholders.
>
> Member States shall take into account the general environmental protection principles of precaution and sustainability, technical feasibility and economic viability, protection of resources as well as the overall environmental, human health, economic and social impacts, in accordance with Articles 1 and 13.
>
> EU Waste Framework Directive December 2008

How does "reduce, reuse, recycle" fit into this new waste hierarchy?

- Reduce becomes Prevention
- Reuse becomes Preparing for reuse
- Recycle remains Recycling
- Waste to Energy becomes other recovery e.g. energy recovery
- Landfill becomes Disposal

When the Waste Framework Directive was drafted it was agreed that any item that is reused is not waste, therefore reuse has no place in the directive. Instead, preparing for reuse is the

expression used. What does this expression mean? In essence, preparing for reuse is reclaiming. When a brick is carefully removed from a wall that is being demolished, and is cleaned of mortar, placed on a pallet and stored, it is being prepared for reuse, or in plain English, it is being reclaimed.

So reuse has been prioritised above recycling in the directive.

Germany, which has low reuse rates, requested that reuse, recycling and waste to energy were given equal priority under a new term, 'recover'. However the German amendment was not accepted by MEPs.

The waste hierarchy now has a pivotal role in the Waste Framework Directive and is a rule rather than a guiding principle. Departing from the hierarchy is only possible where justified by life cycle thinking on the overall impacts of the generation and management of waste.

The directive was also due to set a 70 per cent target for reuse, recycling or waste to energy of construction and demolition waste with, it would seem, a preference for reuse. Instead it simply requires that targets be set.

> (2) Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 laying down the Sixth Community Environment Action Programme2 calls for the development or revision of the legislation on waste, including a clarification of the distinction between waste and non-waste, and for the development of measures regarding waste prevention and management, including the setting of targets.
>
> EU Waste Framework Directive December 2008

The directive requires member states to promote repair networks.

> Article 30
>
> . . . the promotion of the reuse and/or repair of appropriate discarded products, notably through the establishment or support of repair/reuse networks under Annex IV. Such objectives and measures shall be designed to break the link between economic growth and the environmental impacts associated with the generation of waste. Member States shall determine specific qualitative and quantitative targets and indicators for any measure or combination of measures adopted in order to monitor and assess the progress of individual measures.
>
> EU Waste Framework Directive December 2008

Other measures suggested in the directive include planning measures, the promotion of research and development, the development of indicators, the promotion of ecodesign, the implementation of best available techniques, training, the provision of financial support, the use of consumer panels to set reuse targets, awareness campaigns, ecolabels, agreements with industry and reuse integration into public and corporate procurement.

5.2 Reuse and recycling in UK policy

Reduce, reuse, recycle first appeared in the UK government white paper entitled **This Common Inheritance** produced under Chris Patten's ministry at the old Department of the Environment, after the outgoing prime minister Margaret Thatcher had, in 1992, signed the **Rio Accord** at the UN Earth Summit.

The **UN Agenda 21** programme was implemented through Local Agenda 21 in local structure plans, and at government level through sustainable development proposals. In 1997, the Rio Accord was reinforced by the **Kyoto Protocol** which resulted in the UK government committing to reduce UK carbon emissions to below 1990 levels of 590mtCO_2 by 2008-12.

In 1998, the **UK Sustainable Development Strategy** was adopted by government which was seeking to protect the environment by continuing to reduce our emissions of greenhouse gases now and plan for greater reductions in the longer term.

Every local authority was required to have councillors with specific responsibilities for monitoring and helping with implementation of Agenda 21 objectives. This was still a requirement in 2009.

In 2005, the government produced a sustainable development strategy framework for England, Scotland, Northern Ireland and Wales entitled **One future - different paths** which did not specifically include reuse as an objective but did include the desire to achieve our goals of living within environmental limits.

In the same year the UK government produced **Securing the Future - UK Government sustainable development strategy** which built on its 2000 waste strategy, providing for reviews in 2005 and 2015 with a 'root and branch review in 2010'. One aim was to:

> protect human health and the environment by **producing less waste and by using it as a resource wherever possible**. Through more sustainable waste management – reduction, re-use, recycling, composting and using waste as a source of energy – the Government aims to break the link between economic growth and the environmental impact of waste. The Government will therefore give much greater priority to a coherent 'product policy' approach through developing and publishing, by the end of 2006, a set of measures for taking forward integrated product policy, to reduce the environmental impacts of everyday products across their life cycle, enhance measures to close the loop in the way we use resources (e.g. through recycling, re-use or remanufacturing). **Product re-use, re-manufacturing and recycling** offer many commercial opportunities, as well as environmental benefits. The Government will favour policies that advance these kinds of market, wherever they make good business and environment sense. For example, additional resources are being made available to initiatives such as WRAP and the National Industrial Symbiosis Programme under the Business Resource Efficiency and Waste programme as part of the wider drive for greater resource efficiency.
>
> Securing the Future, 2005

Most of the money given to WRAP was used, and is still predominantly used, to promote recycling. Much less **has been used to support reuse.** Following a question to David Milliband, the

then Environment Minister, the Government confirmed that WRAP were the agency responsible for reuse.

In 2007 the Government introduced sustainability indicators which aimed to give a snapshot of whether regions were more or less sustainable using a red amber green system. Waste arisings from construction and demolition figure in the annual reports. In north east England, for example, the following was given:

> North East England Sustainability Indicator 2007
>
> Waste - arisings - RED
>
> Waste - recycling - GREEN
>
> • In 2004-5, around 11 million tonnes of waste (arising from construction and demolition, industry and commerce and the municipal sector which includes household waste) were produced in the North East; 6 percent of the England total (the lowest regional contribution to England's total waste).
>
> • 44 percent was produced by construction and demolition (48 percent, England average) and 42 percent came from industry and commerce (36 percent, England average), whilst the remaining 14 percent was municipal waste (16 percent, England average).
>
> • 48 percent of the waste was disposed of by landfill (42 percent, England average) and 47 percent was recycled (53 percent, England average).
>
> [NE REGIONAL SUSTAINABLE DEVELOPMENT INDICATORS FACTSHEET 31 January 2008]

The government's policy has been to concentrate on complying with the EU Landfill Directive which has meant keeping materials out of landfill even if this has resulted in an increase of emissions. Implementing the EU Waste Framework Directive will have an increasing impact on this policy, and reuse will eventually have to be embraced at policy level. **The introduction of the Climate Change Act (2008) should drive a much greater consideration of the carbon impacts throughout the lifecycle of products and waste, which will in turn favour reuse before recycling.**

5.2.1 Government spending on reuse in the UK

Despite this, during the period between the two BigREc surveys from 1998-2007 the government gathered around £10bn on landfill and aggregates taxes, and spent more than £1bn encouraging recycling, **but spent very little on encouraging reuse of building materials**.

In 2006, Sir Nicholas Stern recommended spending 1 percent of GDP on mitigating climate change, or around £10bn annually of which it would be fair to spend £100m [18] on supporting the reuse of reclaimed building materials. The actual figure spent is very small. Tax raised from landfill and aggregates is now over £1bn a year. [19] Therefore on a pro-rata basis, the government should spend at least £10m a year encouraging reuse of reclaimed building materials. [20]

[18] £100m is 0.25 percent of the annual £4bn spent annually on new construction materials in the UK

[19] Tax from environmental taxation of landfill and aggregates has increased from £113m in 1996 (landfill tax starts), £333m in 1998, £754m in 2002 (aggregates levy starts), to £1.1bn in 2006 of which £804m was landfill tax and £321m

The government ring-fenced £284m of landfill tax and aggregates levy and placed it in the BREW (Business Resource Efficency & Waste) fund, which it planned to use over a three year period to support a group of recycling agencies: Envirowise, WRAP, Market Transformation Programme, Carbon Trust, National Industrial Symbiosis Programme, Environment Agency, Regional Development Agencies, Agricultural Waste. BREW funds were intended to provide free advice on increasing resource efficiency, developing markets for recycled products and materials, and longer-term research programmes to benefit business in the years ahead. **There was very little targeting of reuse by BREW,** although it seemed that, far from the negative attitude to reuse of the late 1990s, government seemed to be warming to reuse, and some BREW money has trickled into research in the reuse sector in the past two years.

BREW-funded agencies and reuse

1. **Envirowise** is run by Serco TTI and AEA Technology, and has no reuse agenda for reclaimed building materials. [21] Its objectives were to engage with construction sector stakeholders to stimulate actions and deliver improvements in resource efficiency and waste minimisation, to provide sound practical advice on resource efficiency and waste minimisation from resource demand and supply to utilisation and to underpin their advice with proven guidance, case studies, models, tools and training.

2. **WRAP** a not-for-profit company founded in 2000 and now the government's main recycling delivery body with a budget of £70m and 200 staff, for several years ran a national advertising campaign on TV, radio, billboards and with the press promoting the recycling of scrap steel, primarily aimed at domestic steel waste recycling, entitled *Recycle - the possibilities are endless*. The impression was given that recycling was the best choice for salvageable steel rather than reuse, and that this could be done endless times at zero environmental cost. The campaign did not promote reduction and reuse. WRAP voluntarily broadened its original mandate, which was solely to encourage the recycling of domestic waste in order to meet the UK obligation under the landfill directives, by adding the creation of markets for recycled construction and demolition waste to its objectives. WRAP uses its funds to assist recycling businesses with capital grants, such as brick crushing operations. These grants are specifically not available to reuse salvage and reclamation businesses. Since it was entirely government funded, WRAP's emphasis on recycling at the expense of reduction and reuse with respect to C&D waste seemed to represent government thinking and policy, and so ten years ago this was adopted by other agencies, such as CIRIA and BRE,

was aggregates levy [HMRevenue: Government revenues from environmental taxes, 1993 to 2006]

[20] Linkage does not exist between environmental tax raised in a sector funding to improve performance in that sector. If a linkage existed then the £1bn raised could be split between domestic waste and C&D waste in the ratio of volumes which is 1 to 3 giving £750m which could be spent on reducing C&D waste. Salvo estimates that the volume of reusable building materials being recycled, burned, crushed, chipped, mulched, composted or landfilled is 1.5 times the amount it was in 1998, an increase from 100m tonnes to 150m tonnes. Had sensible reuse strategies been in place in 1998 the total C&D waste could have been 50m tonnes although most of this would be low grade reusable bulk materials such as topsoil, brick, concrete and stone. In 2007 increasing the amount saved and reused from an average of 2 percent to 25 percent would reduce the tonnage sent to the waste or recycling stream from 150m tonnes to 115m tonnes. Spending £750m to achieve this would be feasible, and would give every UK salvage operator a war chest of around £1m a year to improve efficiency and marketing and to save more for reuse.

[21] "We are generally approached with regard to materials in their raw form and not reclaimed or salvaged materials that may have a monetary value." Fiona Twisse Envirowise 28th Feb 09

who were looking to obtain government funding in the field of C&D waste. Since materials can either be recycled or reused but not both, the resources placed at the disposal of research bodies, and the subsequent emphasis on recycling with respect to policies adopted in mainstream construction and by local government, led to a reduction in reuse and an increase in recycling. This emphasis on recycling has regressed levels of reuse according to the BigREc survey. WRAP have taken steps towards promoting reuse, for example by commissioning BioRegional to produce a reclaimed building products guide. But their web site, at the time of writing, still proclaims that we should "reduce waste and recycle more" as though the option of reuse does not exist in the waste hierarchy.

3. **BREW** was funding the £2m Business Reuse Fund in 2006-2008 but this has now been superseded by support for **ReAlliance**, which is focused on third-sector organisations. Around 120 reuse social enterprises have been funded with around £120,000 each, mainly in the furniture sector. [22]

4. **The Market Transformation Programme** is a scheme started in 2002 and funded with £5m in 2007 by BREW to develop collaborative product based projects, or participation in wider projects as a common resource and policy support mechanism for Defra, DTI, OGDs, Government agencies, NGOs, BRR and CLG. Its remit included reuse for electronic products but not for construction products.

5 **The Carbon Trust** aims to accelerate the move to a low carbon economy by working with organisations to reduce carbon emissions and develop commercial low carbon technologies. Reuse does not feature on their agenda. [23]

6. **The national industrial symbiosis programme (NISP),** delivers benefits for members and positive outcomes for the environment and society by changing the way that business thinks. NISP has branches around the UK and received £7m BREW funding in 2007 (currently under review in 2008). As NISP focuses on large exchanges, it has not prioritised reuse. [24]

7. **Environment Agency (EA)** is a quasi-government department which deals with waste and the environment. On an allied site which provides environmental guidance for business, NetRegs, the EA asks readers to consider whether equipment and products can be reused in their existing form or broken down into parts or materials and reused or sold on to another organisation. NetRegs partners include NISP and Envirowise, neither of which have focussed their support on reuse of building materials. NetRegs includes a section on duty of care, however it does not include the Environmental Protection Acts which require disposers to use

[22] See http://cred.rswt.org/home/reuse.php For example, ReBuild Bury, Hufs Accrington, Airedale Appliances (now closed), ACTS Spennymoor, Renew North East, Furniture Matters Lancaster, Dorset Reclaim, Emmaus Bristol, Stevenage FRS, London FRN and Reclaim Cheltenham. The third sector has now formed an overall organisation, ReAlliance, which is supported by WRAP.

[23] "The Carbon Trust's mission is to help businesses become more energy-efficient and save carbon. Unfortunately we do not have a department that looks at the reuse of building materials. I think WRAP would be better placed to assist you as they advise businesses with recycling and reuse of materials." Pauline Sitter, Carbon Trust 18th Feb 09

[24] "Please tell me who in NISP to contact with respect to NISP's agenda for encouraging the reuse of reclaimed building materials. Please give me the email address of the director of NISP responsible for environmental policy. I am producing a briefing paper on reclaimed building materials reuse." Salvo to NISP. Feb 09. This was chased up but NISP either refused or did not bother to reply.

the best available method of disposal and which rank reuse higher than recycling and landfill. There are plenty of links about recycling but few on reuse, although the Furniture Recycling Network is listed. The author could find no links about the reuse of building materials.

8. **SWMPs:** From 6th April 2008 construction projects in England over £300,000 must create site waste management plans (SWMPs). For projects between £300,000 - £500,000 (excluding VAT) the SWMP should contain details of the types of waste removed from site, identity of the person who removed the waste and the site that the waste is taken to. For projects over £500,000 the SWMP should also contain a description of the waste and environmental permit or exemption held by the site where the material is taken. At the end of the project, the SWMP must be reviewed and a record made of the reasons for any differences between the plan and what actually happened. The EA suggests that good practice should include purchasing strategies or work methods aimed at reducing waste, on-site reuse or recycling of site-gained materials, the disposal of waste, what information you need to report to the principal contractor or client and when. Reuse does not appear to be ranked higher than other options, including landfill. There is nothing the author could find which states, for example, that 'reuse of non-hazardous waste is always the best option'. [25]

9. **The Waste Directory:** EA also partnered in the on-line Waste Directory with the strap line 'reduce, reuse, recycle or dispose of your waste' into which a post code could be typed and a list of waste handlers given, but the only businesses listed were recyclers and landfill contractors, there were none that bought and sold reclaimable building materials. In response to the author's query a member of the waste directory team wrote, 'The Waste Directory is a website that businesses and individuals can use to search for recycling and waste facilities in their area (to dispose their waste).' It could be seen as misleading to advertise the reuse credentials of a directory that has no reuse agencies listed since a user would believe that none existed when many could in fact be trading locally. The user would then naturally destroy reusable material believing that this was their only option.[26]

10. **Environmental Transformation Fund** was launched in 2007 by Gordon Brown as an £800m fund which would compliment and replace existing funding strategy, shifting the emphasis from support to individual businesses to targeted sector improvement. The main funding beneficiaries are the Carbon Trust, Envirowise and WRAP who have not directly supported the reclaimed building materials sector.

11. **Business enterprise and regulatory reform (BERR):** In the construction sector this UK government department has launched the second phase of its low carbon buildings initiative, but this does not include reuse of reclaimed materials or links to reclaimed building materials suppliers. Despite the large budgets spent, the pressing need for reuse and the very clear commitment from the government on reuse, it would seem that with respect to reuse of reclaimable building materials in construction recycling is still being strongly promoted and reuse is generally ignored.

[25] http://www.netregs-swmp.co.uk/simple-guide-20080406.pdf
[26] http://www.wasterecycling.org.uk/AboutUs.aspx

The UK government has to a large extent been led by European legislation on reuse and appears uncertain about creating its own reuse agenda. This echoes uncertainty at the EU level about whether reclaimed building materials are waste or a valuable resource, which has not been resolved within the new Waste Framework Directive. This directive will filter down into a raft of apparently grudging government agencies and quangos, but with no-one to champion reuse it is hard to see any speedy changes in policy.

The question remains: is reclaimed building material a waste that has been discarded into the waste stream or valuable resource intended for reuse. If the former, it can currently quickly be shifted from valuable reusable resource to disposal problem recyclate, and all the inherent embodied energy of the reusable product is lost. If the latter, it can still be saved and reused provided the UK government continues to derogate from the anti-reuse agenda of the EU Construction Products Directive. Even so, a large percentage will at present still end up crushed, chipped, mulched or burnt.

The government is beginning to move in the right direction as can be seen, for example, in the new Code for Sustainable Homes Green Guide Materials rating, which recommends the reuse of reclaimed bricks, roof tiles and slates, and wood flooring.

6 Recommended government actions and policy changes

6.1 Create a reuse champion

Despite being above recycling in the waste hierarchy, the UK lacks an organisation that champions reuse of building materials. This body could direct investment in new capacity; direct investment in R&D to make material reclamation quicker, safer and cheaper; provide easy-to-understand publicly available data on the embodied carbon consequences of materials choices; and work across government to promote the other policy recommendations in this section.

6.2 Invest in kick-starting reuse capacity

One of the main barriers to the reclamation of construction materials in the UK is the lack of storage and reprocessing capacity. This has been held back by a lack of available land, high land prices, and difficulties in negotiating the partnerships required to set these facilities up.

For example, BioRegional and the National Community Wood Recycling Project have been working for a decade to establish these two models in the UK:

- Reclamation megayards – large facilities to take, process if necessary and store reclaimed building materials. They would be equipped to receive materials from major demolition contractors, and sell on to major construction contractors.
- ReIY shops and wood recycling projects[27] – smaller in scale, taking over-ordered and waste materials from construction sites, as well as reclaimed materials from deconstruction/demolition sites, and selling them onto the DIY and small trades markets.

The Government should match its capital investment in recycling with a commitment to provide the land and broker the partnerships to establish these facilities. It should be noted that WRAP Scotland have recently provided capital support to a new building materials reuse centre in Scotland.

6.3 Direct local government and planning to reuse

The Department for Communities and Local Government has shown a willingness to engage with the issue of embodied energy in the Code for Sustainable Homes, but there are further opportunities to drive reuse:

- Place guidelines on and requirements for embodied energy assessments, including reuse in planning policy, for example in the PPS1 supplement on climate change and in the eco-towns PPS.
- Create a new National Indicator as part of Local Area Agreements to require that local government monitors, reports and sets targets on reuse of business and particularly construction waste in their local area.
- Require building control officers to err on the side of reuse.

[27] Note – this is filling a small part of the reduction in wood reuse through a declining overall level of wood reuse by the architectural salvage industry. Of the around 250,000 tonnes reduction over the last 10 years, not-for-profit initiatives have recovered around 1,000 tonnes, 0.4% of the short fall.

- Encourage, or require, local authorities to provide temporary holding facilities for material reclamation and storage during demolition, pending their immediate use.

6.4 Put materials in the EU Emissions trading scheme

The Government should explore the possibility of making construction materials tradable, so that the reclamation and reuse industries could be incentivised. For example, the UK reclaimed brick sector should be recompensed at the rate of £10/tCO_2 saved[28] which would have allowed around £15m to have been reinvested in the sector between 1998 and 2007.

6.5 Direct landfill revenues to reuse before recycling

The UK government pays WRAP for each tonne of waste diverted from landfill. Had it recompensed the UK reclaimed brick sector (for example) in this way the sector would have received government support, which could have been invested in new technologies to increase reclamation.

Reuse is the new recycling. The government can and should create a new reuse agenda.

[28] This is based on the auction clearing price of the EU emissions trading scheme in March 2009 – see http://www.dmo.gov.uk/documentview.aspx?docname=ETS/20092403auctionresult.pdf&page=ETS%20Auction

Appendix 1 - Overview of the salvage trade

Table 1, overview of the salvage industry in 1998 and 2007

	£000		Tonnes		Employment	
Sector	1998	2007	1998	2007	1998	2007
01 SALVAGED IRON & STEEL	13,512	2,026	76,000	22,000	2,820	730
02 SALVAGED CONCRETE	n/a	n/a	n/a	n/a	n/a	
03 SALVAGED WOOD	44,217	4,645	377,000	49,000	7,789	7,126
04 RECLAIMED BEAMS	51,082	10,192	132,000	286,000	3,640	5,310
05 RECLAIMED BRICKS	37,239	117,029	420,000	847,800	4,010	1,810
06 RECLAIMED ROOFING	76,824	9,349	290,000	100,670	3,560	790
07 RECLAIMED STONE	35,221	21,625	1,100,000	573,700	2,450	1,201
08 RECLAIMED FLOORING	35,194	7,205	103,700	19,900	2,950	1,620
09 RECLAIMED PAVING	22,634	12,924	357,700	178,650	1,340	1,043
10 ARCHITECTURAL STONE	20,978	21,595	43,000	13,000	2,088	729
11 ARCHITECTURAL WOOD	5,428	26,126	7,000	26,150	1,102	2,212
12 ARCHITECTURAL IRON	5,508	15,497	4,700	17,400	799	424
13 ARCHITECTURAL TERRACOTTA	1,168	803	2,000	320	759	95
14 ORNAMENTAL STONE	19,588	42,954	11,000	38,400	1,173	597
15 ORNAMENTAL WOOD	43,675	19,348	20,000	32,400	1,738	429
16 ORNAMENTAL IRON	11,125	18,909	10,000	14,800	970	542
17 ORNAMENTAL TERRACOTTA	1,008	16,714	1,000	6,400	80	437
18 OLD BATHROOMS	49,236	15,401	12,000	6,500	1,900	725
19 OTHER	n/a	n/a				
total	473,637	362,342	2,967,100	2,233,090	39,168	25,820

BigREc1 1997, BigREc2 2007 compiled by TKay, Salvo Llp for Defra and BERR, published by BRE

Draft report to BigREc 2007: T Kay & G Hobbs November 2008:

The 'salvaged' sector had more activity in 2007 than in 1998 than predicted with sales from the postcard survey showing a 400% increase. The most likely explanation for this is that BigREc respondents have dropped out of scrap leaving the field to new small one-man businesses selling scrap UPVC windows, scrap plasterboard, secondhand but reusable modern plumbing and electrical fittings etc. The supply of these materials is split between private disposals and direct from demolition. The survey shows an increase in customers who are developers, which could possibly be a result of buy-to-lets mopping up cheaper secondhand materials for refurbishment. There was stronger demand in 2007 for reusable steels but the supply does not seem to be feeding through into salvaged stocks from demolition.

The supply of modern timber and timber fittings from demolition has all but stopped. Although no wood is burned either on demolition sites or by demolition contractors off site, the amount of reclaimable salvage wood, as opposed to scrap unusable wood, has dropped. Most of this wood seems to be chipped for compost or turned into MDF panel board.

In the 'reclaimed' sector anecdotal evidence from salvage dealers is that old but reclaimable timber beams are being chipped for MDF or compost and reclaimable secondhand bricks are being crushed by demolition contractors under time pressure. The picture emerging from the BigREc survey seems to reinforce the trade's views about bricks but undermines their views on reclaimed beams. Results show an increase in reclaimed beam stocks held and an increase in the percentage coming from demolition. However, reclaimed brick stocks are down from 37m to 33m and the amount supplied

from demolition sites has dropped. There are more customers for reclaimed bricks from the private sector in 2007 compared to 1997 despite an increase in standards of supply which should have, in theory, attracted more mainstream construction customers.

Reclaimed roofing stocks have dropped by two-thirds, probably a result of difficulties getting access to sites to remove tiles and slates ahead of demolition. Sales have also dropped by two thirds, although the percentage sold to mainstream construction has risen from 8% to 18%. Standards of supply were higher in reclaimed roofing than other sectors in 1997, and have remained so.

Reclaimed stone stocks are down by a half although the amount paid per tonne has risen from £35 in 1997 to £150 in 2007. Most now comes from private sources. Demolition supplied eight times more stone in 1997 than in 2007 despite the quadrupling in prices paid.

Reclaimed flooring stocks are down and fewer dealers are trading in flooring, possibly a result of cheaper competition from the new laminate wood flooring sector which barely existed in 1997. Customers are down and sales have dropped from £29m to £12m. In order to try to compete with new kiln-dried wood the number of dealers able to supply kiln-dried reclaimed flooring has risen from 25% to 80%. The real or perceived additional labour costs of fitting reclaimed wood flooring and the fact that many people cannot see the difference in quality between antiqued new wood and original reclaimed may be to blame. Reclaimed paving stocks are down from 573,000 m^2 to 141,000 m^2, although prices paid for reclaimed flooring stocks have risen from an average of £16 in 1997 to £48 per m^2 in 2007.

The 'architectural' sector saw an increase in sales from £26m to £43m. There seems to have been a shift in appreciation of antique worked stone and wood from earlier times, with more people wanting to fit details back into period property and new properties. The fact that considerably less stocks are carried now than ten years ago means that customers are prepared to act faster when the right item comes up. This can assist in a more rapid demolition-to-end-user transaction.

More people are using antique ornamental stone and terracotta, often in gardens or landscape settings, and such material has been getting scarcer and more expensive for years. The salvage trade is unlike others in that old stocks in all sectors of the conventional economy depreciate and must be sold on cheaply to make way for new models. The opposite tends to be true in salvage where stocks appreciate the longer they remain unsold. A southwest business that was trading primarily in ornamental stone for thirty years has seen the value of its old unrestored stock increase by a factor of ten in the past ten years. This material cannot be replaced at the cheaper prices at which it was originally bought so the business is in no hurry to sell and can hold out for high prices for finished pieces.

In 1997 most salvage operators were local resources, taking in local materials and reselling them locally. Now they operate regionally, and supplement their reclaimed stocks with 50% new materials. At the same time, far fewer materials are coming to the trade from demolition waste streams than 10 years ago. The overall amount saved for reuse by the architectural salvage sector has dropped from 3.3m tonnes to 2.6m tonnes in the past ten years. Consequently, the amount of embodied energy being avoided has reduced significantly over the past ten years. The overall impact is further compounded when the supply of materials dry up, since the trade suppliers move over to new and reproduction materials, often sourced from far away countries.

Draft report to BigREc 2007: T Kay & G Hobbs November 2008

Appendix 2 – carbon savings workings

The following workings explain the carbon savings claims made in section 2.

Case study 1: reclaimed iron and steel from 1998-2007

We assumed that the market matures to the point where reclaimed steel is replacing 100% recycled steel, with no virgin steel produced. According to Bath University's Inventory of Carbon and Energy (ICE), 100% recycled steel has 0.43 $kgCO_{2e}$ / kg, so we have assumed that is the saving when reusing.

Increasing reclamation from 6% to 50% will see an increase of 215.5 tonnes of iron and steel being reclaimed and reused. The carbon savings for this shift will be 215,500 kg x 0.43 = 92,665t.

Defra figures[29] put the average car at roughly 3.18287 tonnes per year. The carbon savings from the shift to reuse will therefore be roughly equivalent to 29,114 cars.

If we assume that reclaimed steel displaces the average steel on the UK market, which currently has 59% recycled content at 1.37 $kgCO_{2e}$ / kg (ICE) the savings increase to 295,235 $kgCO_{2e}$ or almost 93,000 cars! We haven't used this assumption because the purpose of the report is to show why reuse should displace recycling – as per the waste hierarchy – in a world where we achieve 100% recycled content iron and steel.

Case study 2: reclaimed bricks from 1998 – 2007

Based on Defra's 2009 conversion factors[30] there are 10.472 kg CO_{2e} in one gallon of petrol. From ICE there are 0.62 $kgCO_{2e}$ per kg of bricks. Therefore one gallon of petrol is equivalent to 16.89, or roughly 17, bricks.

Taking figures from ICE, replacing new bricks with reused bricks saves 0.22 $kgCO_{2e}$ / kg. At 350 bricks per tonne, the 300 million reused bricks saved 188,571 tCO_{2e}.

Case study 3: reclaimed timber 1998 – 2007

In 1998, 613,000t of timber were reclaimed for reuse, but by 2007 only 355,000t were reclaimed. Emissions savings declined from 275,850tCO_{2e} in 1998 to 159,750tCO_{2e} in 2007.

An unusual example of failure to reuse was the 7,000 tonnes of new softwood timber washed on to beaches of southern England in 2008 which was perfectly reusable but was prevented from being reused by Receiver of Wrecks and ended being burned. A similar event with a large amount of new timber occurred in 2009 on the Kent coast.

[29] Based on the following press release: http://www.defra.gov.uk/news/2009/090327c.htm

[30] Defra (2009), Guidelines to Defra/DECC's Greenhouse Gas Conversion Factors for Company Reporting, http://www.defra.gov.uk/environment/business/reporting/conversion-factors.htm