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Report

Friends of the Earth Europe

Gone to waste

The valuable resources that European countries bury and burn

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Executive Summary

Despite progress in recent years countries across the European Union (EU), including the United Kingdom (UK), are continuing to dispose of significant amounts of valuable recyclable materials to landfill or incineration.

This analysis examines this disposal in more depth, in an attempt to provide a reasonable estimate of the amount of different recyclable materials that is lost through landfilling or incineration. The study then estimates the value of these lost materials, and the climate change benefits that could have been gained by recycling these materials.

We used a study by Prognos[i], which was published in 2008 (using the best available 2004 data), to provide the figures on materials disposed of in the twenty seven EU countries (EU27). This report, *Gone to waste,* argues that around half of all the key recyclables available in the municipal, commercial and industrial (C&I) waste streams were being sent for disposal.

On a European level, if this material had been recycled then:

- We would have saved **CO_{2eq} emissions of 148 million tonnes**, equivalent to taking approximately **47 million cars off the road per year**.
- The material would have had a minimum potential monetary value of **€5.25 billion**.

For the UK, taking the same data and making an adjustment for the increase in recycling since 2004:

- Approximately **24 million tonnes of key recyclables are still being sent for disposal every year.**
- If this had instead been recycled we would have saved an estimated **19 million tonnes CO_{2eq},** the same as taking **6 million cars off the road per year**. This is in addition to the existing 18 million tonnes of CO_{2eq} saved by recycling.
- The material would have had a minimum potential monetary value of **£650 million**.

These findings are derived from the best available published data within the EU, using conservative estimates of the market prices of recyclables (excluding the costs of recycling) and some simplifying assumptions about the available data. They provide an initial estimate and an order of magnitude assessment of the waste of valuable resources that is happening within the EU. This analysis does not include rarer metals that are found in materials such as waste electronic and electrical equipment.

Some European countries and regions already ban the landfilling, and sometimes incineration, of recyclables. In Flanders such a ban has led to diversion of material from landfill to recycling, without increasing incineration[ii]. This study demonstrates the massive benefits, both environmental and financial, that could be gained by diverting recyclables from landfill and incineration.

In its 2008 'Raw Materials Initiative'[iii], the European Commission stressed that Europe needs raw materials in order to have a competitive economy. Given this context, it is surprising that the Commission – and many Member State governments – have done so little to make sure that valuable secondary raw materials aren't dumped in the ground or burned.

Introduction and scope of this report

Across Europe, there is growing recognition of the climate change benefits to be realised from increased recycling, reuse and reduction of waste. Increased action in these areas can play a noticeable role in supporting EU objectives for the reduction of carbon emissions and minimising the impact of climate change.

Recognition of the valuable role that sustainable resource management plays in reducing the impact of climate change is a recent development, and comes in the wake of the primary driver of EU waste policy, the EU Landfill Directive, although the subsequent revision of the Waste Framework Directive (WFD - 2008/98/EC) more explicitly recognises the role, and has set minimum recycling targets for the whole of the EU.

This paper synthesises recent work on climate change and the contribution of sustainable resource management to the reduction of carbon emissions.

It considers the developing analysis of the potential for banning key recyclables from landfill, and makes an initial assessment of the untapped potential to reduce carbon emissions by diverting key recyclables from landfill across the EU – valuable materials which at present constitute wasted resources.

The paper makes the best use we could of easily available data, with the intention of providing a starting point for future, more comprehensive research and definitive analysis. It is a headline assessment and an indicator of an order of magnitude in terms of the carbon and monetary value of recyclable resources we presently allow to be landfilled or incinerated in the UK and across the EU.

Summary of recent work on environmental benefits of recycling

In the last three or four years, there has been an increased interest in quantifying the carbon reduction and other environmental benefits of recycling, in order to more fully inform the debate about waste and resource management options and climate change.

In 2006, the UK Government's Waste and Resources Action Programme (WRAP), in conjunction with the Technical University of Denmark, produced a major international review of life cycle comparisons for key recyclable materials[iv]. This indicated that in the vast majority of robust studies reviewed, recycling offered more environmental benefits and lower environmental impacts than other waste management options. The WRAP report then made an assessment of the contribution of existing levels of UK recycling to the reduction of carbon emissions, and noted the contribution that existing UK recycling makes:

"The UK's current recycling of those materials [paper, card, glass, plastics, aluminium and steel] saves between 10-15 million tonnes of CO_2 equivalents per year compared to applying the current mix of landfill and incineration with energy recovery to the same materials. This is equivalent to about 10% of the annual CO2 emissions from the transport sector, and equates to taking 3.5 million cars off UK roads."

During the negotiation of the revised EU WFD, this foundation piece of work by WRAP was developed further by Ökopol (2008)[v], who used the WRAP/Technical University of Denmark methodology and created scenarios to assess the potential carbon dioxide equivalent (CO_{2eq}) reductions from the achievement of higher recycling targets across the EU. They concluded that the existing EU27 municipal solid waste (MSW) recycling performance of 37% (on 2005 data) resulted in savings of 158 million tonnes of CO_{2eq}.

They modelled what the result might be should higher recycling targets be achieved, including a 50% recycling rate (subsequently adopted by the EU WFD). It was calculated that a 50% recycling rate will result in the EU27 saving an annual 247 million tonnes of CO_{2eq} – estimated as the same as taking 31 million cars off EU roads.

In parallel with this study, a consortium of industry bodies in the EU[vi] commissioned a study from Prognos in partnership with IFEU Heidelberg and INFU University of Dortmund. The study examined a number of scenarios in which higher levels of recycling and energy recovery lead to resource savings and reduction of CO_{2eq} emissions. Utilising the best data available for the EU27[vii], Prognos also modelled a number of scenarios for recycling and energy recovery performance in the EU, and the potential to reduce carbon emissions.

In a major piece of work, they also analysed the potential performance of the EU27 in terms of two groups: the 8 EU 'recycling/incineration states' with high levels of recycling and energy recovery, and the 19 EU 'landfilling states' with a higher present dependency on landfill - and therefore a greater potential to realise better performance on recycling and consequently on carbon emissions reduction. In the highest performance scenario they modelled a potential EU MSW recycling rate of 58% bringing a potential CO_{2eq} reduction by 2020 of 235 million tonnes a year.

In all the research studies described above, it will be noted that there are limitations on the availability of data from across the EU27, and some variations in the way that different countries calculate recycling rates.

Each study has modelled scenarios for high recycling performance across the EU, recognising the different baselines member states are starting from.

Despite the limitations inherent in modelling and making assumptions, it is nevertheless clear and consistent in all these major studies that there are real and quantifiable environmental benefits from intensive recycling performance and minimising the landfill of key recyclables.

Other recent European research[viii] has found that, despite a trend in which our use of materials has begun to decouple from economic growth in relative terms, in absolute terms our consumption of resources has remained constant for a decade.

In absolute terms, this level of resource use remains unsustainably high. Many of the burdens associated with the use of resources have been transferred to countries overseas as the balance of trade has altered. Wherever they are used, the consumption of these resources has a negative impact on the environment, be it via air emissions, emissions to water, solid waste, the extraction of raw materials and through the use of energy.

Methodology and availability of data

Baseline data – the Prognos study

The Prognos study provides specific data on levels of recycling of different materials in each Member State, separated from disposal (which includes energy recovery). This allows a calculation of the quantity and value of key recyclables presently being landfilled or incinerated across the EU.

The Prognos study is the best available work that attempts to capture data from all 27 EU Member States. It acknowledges the constraints and variations in waste data collection across the EU. It is the most comprehensive European data on materials that we could identify, published in 2008 based on 2004 data.

There is also work in progress from the European Topic Centre to update EU27 data on MSW, construction and demolition waste. They have very recently published an interim working paper[ix]. However, for the purposes of this short report we have utilised the Prognos study.

Calculation of CO_{2eq} saved by recycling

We have then utilised the calculations for the value of CO_{2eq} saved, by material, for those key materials which can be recycled as used by WRAP/Technical University of Denmark in their major 2006 study.

The values for different waste management options reflect the whole life emissions associated with the materials. For instance, in the example of aluminium, sending the material to landfill causes the use of additional virgin material, and is therefore responsible for more emissions than recycled aluminium, which avoids the production of primary material[x].

Table 1: CO_2 emission factors per recyclable fraction
Source: Ökopol 2008[v] (page 11, references page 19), updated by WRAP (2009)[xi]

Material	CO_{2eq} per tonne of landfilled fraction	CO_{2eq} per tonne of incinerated fraction sent for energy recovery	CO_{2eq} per tonne of recycled fraction	Source
Paper and card	2.20	1.40	1.30	CEPI (2007)[xii] FEFCO (2006)[xiii] Ecoinvent (2003)[xiv] Procarton (2008)[xv] Environment Agency (2005)[xvi]
Plastic packaging	3.10	5.00	1.50	WRAP (2006)[1] Defra (2009)[xvii]
Textiles	18.00	9.00	2.00[2]	Allwood *et al* (2006)[xviii] ERM (2006)[xix] Morley *et al* (2006)[xx] Wooldridge *et al* (2006)[xxi]
Glass packaging	0.84	0.84	0.53	WRAP (2006)
Steel packaging	3.00	1.30	0.70	WRAP (2006)
White goods	3.00	3.00	0.70	WRAP (2006)
Aluminium packaging	11.05	11.05	2.00	WRAP (2006) EAA (2008)[xxii]
Garden waste	0.2	-0.14	-0.12	Grant (2003)[xxiii] WRAP calculation (2007)[xxiv]
Kitchen waste	4.50	4.20	4.08	WRAP calculation (2007)[xxiv] Lundie and Peters (2005)[xxv]

[1] All references to WRAP (2006) relate to the key document *Environmental benefits of recycling – an international review of life cycle comparisons for key materials in the UK recycling sector,* Banbury: WRAP
[2] This figure includes an element of textile reuse as well as recycling. Morley et al (2006) suggest that 70% of textiles collected separately are reused.

Where these calculation factors have been updated by WRAP, we have used the updated level provided in WRAP's own model for carbon calculation. This allows a simple quantification of potential CO_{2eq} savings for key recyclable materials not presently being recycled. This is the basis on which the Ökopol study made assessments of the climate potential contribution of EU recycling targets, summarised in Table 1.

The major limiting factor in the Prognos data is that it dates to 2004. We recognise that recycling levels have increased since then across most of Europe, but a comprehensive set of data for the EU27 since 2004 is not yet available. Even the data being presented in the European Topic Centre report is no more recent than 2006 in most cases, and even then not consistently across all Member States. Therefore, for simplicity, we have used the baseline 2004 data from the Prognos report, accepting that this will result in a modest overstatement of the potential additional recycling that could be achievable, as there has been an increase in recycling performance across the EU in the intervening period.

However, specifically for the UK data, using published UK MSW recycling rates[xxvi], we have taken account of the increase in MSW recycling since 2004 and made an adjustment that eliminates the overstatement of the quantity of key recyclables being landfilled, based on the actual reduction in MSW waste sent to landfill of 4.3 million tonnes between 2004/5 and 2007/8. For simplicity, we have focused on the reduction of MSW waste to landfill, and converted this to a simple percentage reduction in recyclables going to disposal (of 14%) and applied this to the 2004 data. This was not possible for the EU-wide data, due to the limitations of recycling performance data from a number of Member States.

The intention is to provide policymakers with an initial estimate, an order of magnitude of the potential available in the resources we currently still waste in Europe.

Calculation of the monetary value of recyclables

To place a monetary value on the key recyclable resources that are still landfilled and incinerated, we have used recent published market data from trade media sources[xxvii], and used conservative market values for products in all instances.

Note that this analysis does not include rarer metals that are found in materials such as waste electronic and electrical equipment (WEEE). Although the WEEE Directive sets recycling targets for these materials, it doesn't actually restrict the disposal of WEEE through landfill or incineration.

As a result of the global financial meltdown and the consequent recession there have recently been extreme movements in commodity prices. Therefore we have chosen to use market pricing at the lower end of the commodity cycle to indicate a likely minimum level of monetary value attributable to those presently landfilled materials that could be recycled. This calculation only looks at the market value of the material concerned - using a low estimate. It does not consider the costs of recycling the material.

We also recognise that in many Member States, further work is needed on development of markets and end uses for recyclable materials (particularly biowastes). Therefore a simple monetary value calculation is again only an indicator of potential, as it does not fully take into account the potential effect on commodity pricing of the availability of materials in the marketplace. Further work is needed in this policy area, and this is also acknowledged in the European

Environment Agency's recent assessment report on the effectiveness of waste management policies in the EU[xxviii].

Most materials have a positive market value. However, in a couple of cases – recycling of wood and biowaste – we are assuming a negative market value. There are strong environmental benefits for the recycling, composting or digesting of these materials, but the market value of the output is usually low (though this will vary in individual circumstances). Another benefit of recycling these materials is that research[xxix] has shown that the wider the range of materials that are collected for recycling, the higher are the levels of participation by the public which increases the overall environmental benefits gained.

In Tables 3 to 5 below, the figure for "total materials with market value" excludes the wood and biowaste figures, whilst the cost of wood and biowaste outputs are included in the "net total market value of all materials" figures.

Based on June 2009 published market pricing, and tested across the three published data sources, the following assumptions are made, described in Table 2. They are used for the UK and also the EU headline assessments, using a current €/£ conversion[xxx].

Table 2: Market pricing of recyclables
Sources: Materials Recycling Week and letsrecycle.com, June 2009

Material type	Price used (£ per tonne)	Note on rationale
Glass	13	Based on lowest mixed glass price, although much is still collected separately
Paper	22	Based on lowest mixed paper price, although much newspaper and other grades are collected separately
Plastics	90	Based on lowest mixed plastic bottles price, also lowest per tonne price in basket of plastic types
Iron and Steel	30	Based on lowest steel can price, there are higher values for many iron grades
Aluminium	450	Based on lowest loose collected can price (used beverage cans)
Wood	-14	Negative value based on packaging recovery note (PRN) income (£6/t) minus collection cost (£20/t)
Textiles	175	Based on textile bank collection price, lowest in basket of grades
Biowaste	-14	Negative value based on compost selling price (£4/t) minus collection cost (green waste £18/t)

Key findings - for the United Kingdom

In the UK, of approximately **51 million tonnes of key recyclables available** in the MSW and C&I waste streams in 2004, approximately **28 million tonnes (around 55%) was being sent for disposal.**

With an adjustment to account for increased UK recycling between 2004 and 2008, approximately **24 million tonnes of key recyclables are still being sent for disposal**.

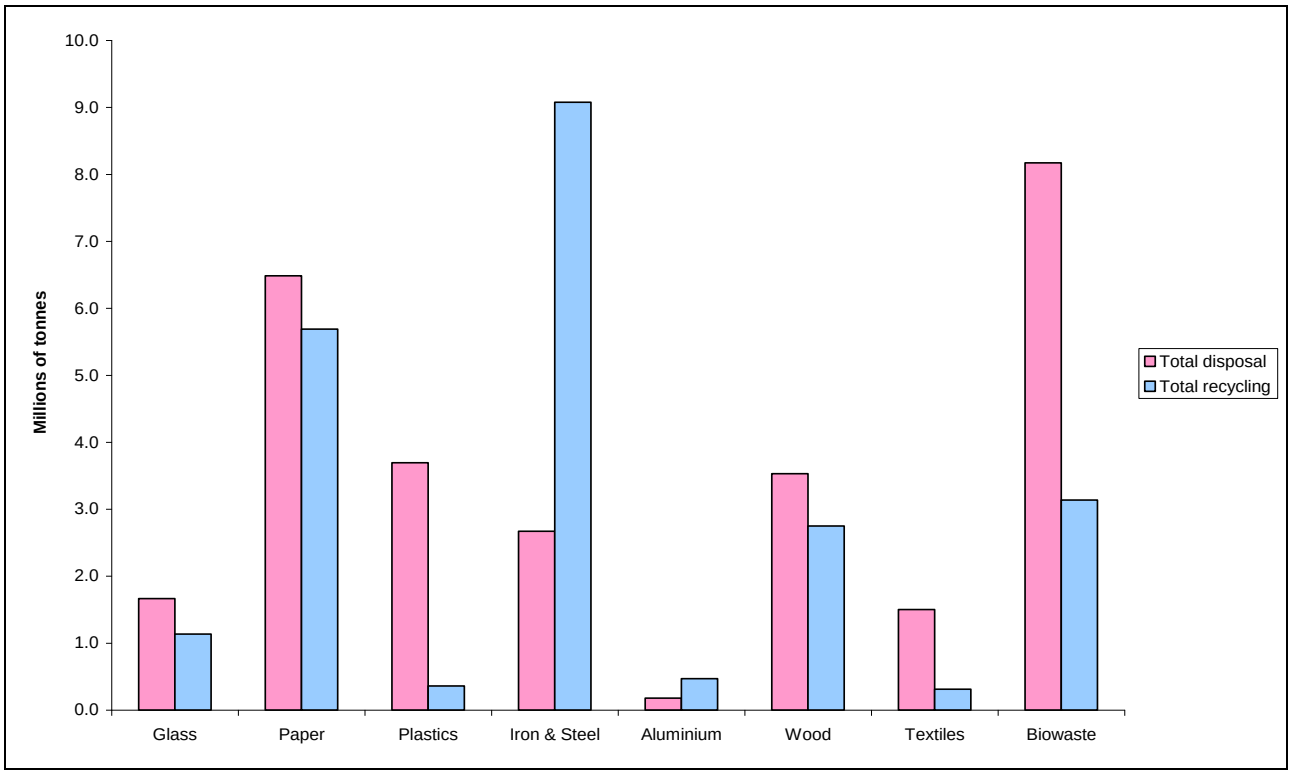
If this material which is presently being landfilled or incinerated was recycled it would have an estimated **CO_{2eq} saving potential of 19 million tonnes (equivalent to taking 6 million cars off the road per year)**, and a minimum potential monetary value of **£651 million**.

Table 3 and Figure 1 provide a breakdown of this data by key recyclable type.

Table 3: Total tonnages of key recyclables in the UK (MSW and C&I unadjusted from Prognos 2008[i])

Material	Total Potential (Mt)	Total Recycled (Mt)	Total Disposal (Mt)	Percentage of material going to disposal	Estimated total - materials with market value (£m)	Estimated net total market value of all materials (£m)
Glass	2.801	1.135	1.666	59%	18.63	
Paper	12.175	5.690	6.485	53%	122.70	
Plastics	4.055	0.360	3.695	91%	286	
Iron & Steel	11.784	9.078	2.670	23%	68.89	
Aluminium	0.648	0.469	0.179	28%	69.27	
Wood	6.278	2.748	3.530	56%		-42.5
Textiles	1.814	0.312	1.502	83%	226.05	
Biowaste	11.307	3.137	8.170	72%		-98.37
Totals	**50.862**	**22.929**	**27.897**	**55%**	**791.54**	**650.67**

Figure 1: Total tonnages of key recyclables in the UK (MSW and C&I), illustrated by material type – disposal and recycling



Source: derived from Prognos (2008) [i]

Key findings - for the European Union

In the EU as a whole (including the UK), of approximately 405 million tonnes of key recyclables available in the MSW and C&I waste streams in 2004, approximately 212 million tonnes (around 52%) was being sent for disposal.

If this material which is presently being landfilled or incinerated was recycled it would have an estimated **CO_{2eq} saving potential of 148 million tonnes (equivalent to taking approximately 47 million cars off the road per year),** and a potential monetary value of **€5,251million**.

Table 4 provides a detailed breakdown of the available data, by recyclable material type and by country.

Table 5 takes this breakdown a stage further and provides a country-by-country analysis of the estimated value of each material disposed.

Figure 2 provides a summary of this breakdown in graphic form for each key recyclable on an EU basis.

Figures 3 to 10 provide this same data in a series of illustrations that show the relative levels of recycling and disposal by key recyclable for each member state within the EU, indicating the position of the UK for each key recyclable.

Figure 2: Overview picture for all countries in EU27

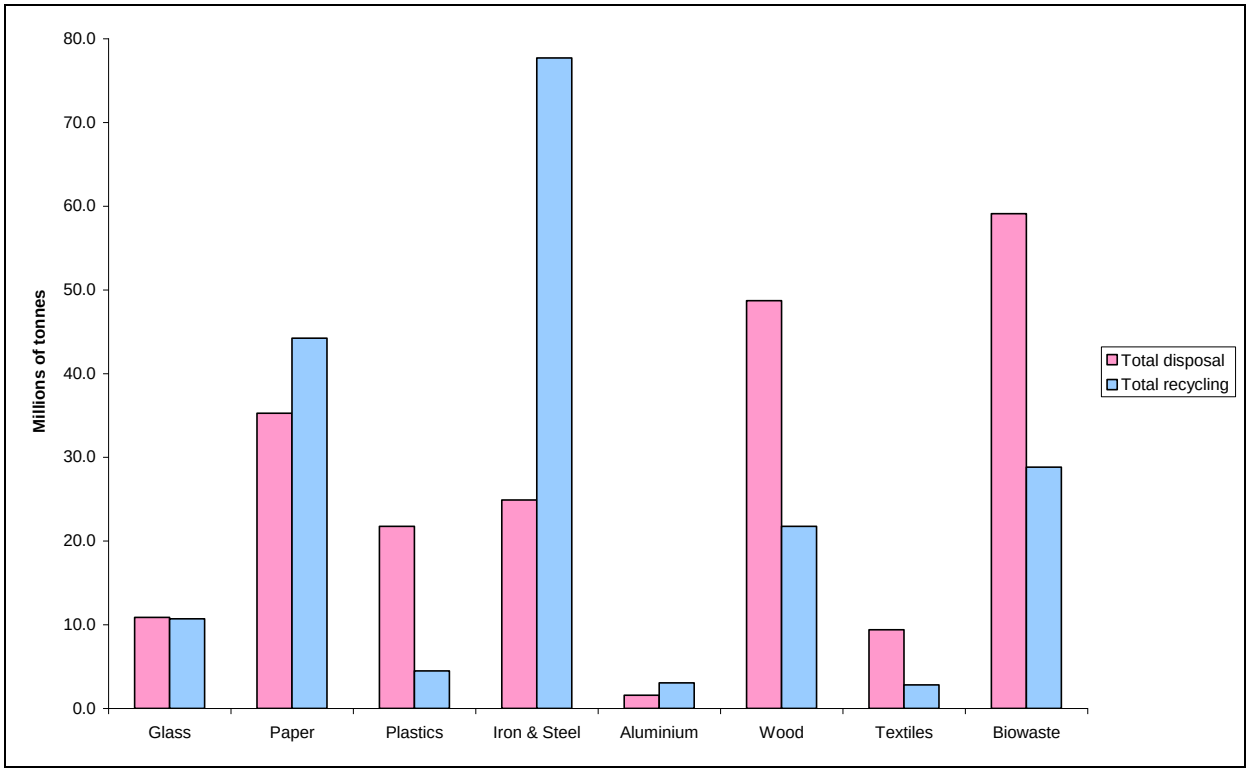


Table 4: Summary of recycling and disposal of key recyclables in the EU27 – figures in million tonnes (mt)

Country	Glass recycled	Glass disposed	Paper recycled	Paper disposed	Plastics recycled	Plastics disposed	Iron & Steel recycled	Iron & Steel disposed	Alumin-ium recycled	Alumin-ium disposed	Wood recycled	Wood disposed	Textiles recycled	Textiles disposed	Biowaste recycled	Biowaste disposed
Austria	0.214	0.091	1.195	0.606	0.102	0.478	1.302	0.403	0.085	0.038	0.604	1.542	0.120	0.299	0.918	1.386
Belgium	0.400	0.220	1.909	0.906	0.205	0.785	1.831	0.600	0.070	0.035	0.324	1.372	0.150	0.230	1.059	2.544
Bulgaria	0.014	0.166	0.272	0.300	0.011	0.241	1.121	0.933	0.029	0.024	0.113	0.598	0.010	0.172	0.000	1.452
Cyprus	0.001	0.011	0.067	0.083	0.007	0.043	0.028	0.026	0.001	0.001	0.001	0.075	0.000	0.021	0.029	0.097
Czech Rep.	0.096	0.196	0.560	0.600	0.092	0.341	1.022	0.722	0.046	0.025	0.231	0.746	0.030	0.297	0.476	1.227
Denmark	0.147	0.039	0.733	0.383	0.037	0.326	0.697	0.143	0.034	0.016	0.593	0.320	0.046	0.080	0.148	0.806
Estonia	0.020	0.059	0.139	0.199	0.005	0.068	0.254	0.194	0.010	0.006	0.624	0.852	0.001	0.049	0.103	0.232
Finland	0.127	0.103	0.613	0.330	0.019	0.246	1.154	0.411	0.029	0.010	2.461	2.712	0.006	0.079	0.335	0.550
France	1.838	1.330	5.225	4.141	0.413	3.006	11.805	3.314	0.456	0.277	4.291	4.391	0.419	0.879	3.629	6.355
Germany	2.967	1.442	12.959	5.910	1.716	2.777	17.784	3.803	0.724	0.308	2.515	6.844	0.882	1.341	10.782	7.589
Great Britain	1.135	1.666	5.690	6.485	0.360	3.695	9.078	2.670	0.469	0.179	2.748	3.530	0.312	1.502	3.137	8.170
Greece	0.038	0.128	0.420	0.574	0.014	0.406	0.901	0.474	0.052	0.039	0.039	0.843	0.009	0.147	0.032	1.639
Hungary	0.023	0.152	0.306	0.358	0.038	0.299	1.359	0.872	0.061	0.026	0.180	0.629	0.009	0.133	0.209	1.293
Ireland	0.087	0.074	0.394	0.466	0.026	0.269	0.494	0.192	0.012	0.011	0.147	0.228	0.013	0.170	0.096	1.042
Italy	1.285	1.321	4.357	5.507	0.465	2.851	8.691	3.212	0.370	0.203	2.648	3.207	0.274	1.252	2.055	8.301
Latvia	0.001	0.007	0.037	0.044	0.001	0.007	0.013	0.004	0.002	0.001	0.041	0.141	0.000	0.005	0.049	0.108
Lithuania	0.022	0.091	0.076	0.145	0.019	0.090	0.504	0.176	0.010	0.006	0.029	0.231	0.006	0.035	0.214	0.262
Luxembourg	0.034	0.023	0.075	0.040	0.010	0.029	0.120	0.057	0.006	0.001	0.016	0.059	0.003	0.010	0.066	0.040
Malta	0.003	0.006	0.020	0.032	0.004	0.015	0.036	0.038	0.002	0.002	0.002	0.032	0.001	0.007	0.000	0.065
Netherlands	0.421	0.226	2.099	1.167	0.096	1.059	2.204	0.378	0.107	0.046	0.407	2.162	0.087	0.337	2.305	2.512
Poland	0.510	1.210	0.965	1.348	0.163	1.395	3.330	1.119	0.103	0.104	0.494	3.666	0.117	0.699	0.542	2.406
Portugal	0.091	0.146	0.595	0.609	0.077	0.465	0.003	0.001	0.021	0.018	0.126	0.732	0.044	0.161	0.118	0.773
Romania	0.289	0.515	0.626	1.179	0.022	0.476	3.895	1.956	0.042	0.037	0.121	1.801	0.075	0.345	0.048	1.330
Slovakia	0.033	0.188	0.201	0.203	0.019	0.137	0.639	0.370	0.012	0.011	0.123	0.406	0.010	0.077	0.477	0.766
Slovenia	0.015	0.038	0.073	0.069	0.016	0.035	0.242	0.153	0.004	0.004	0.083	0.291	0.003	0.022	0.157	0.165
Spain	0.733	1.160	3.282	2.973	0.494	1.881	6.428	2.005	0.221	0.111	0.386	4.007	0.134	0.891	1.276	7.133
Sweden	0.168	0.270	1.329	0.605	0.059	0.335	2.776	0.681	0.084	0.038	2.394	7.297	0.040	0.147	0.574	0.865
Totals (mt)	**10.712**	**10.878**	**44.217**	**35.262**	**4.490**	**21.755**	**77.711**	**24.907**	**3.062**	**1.577**	**21.741**	**48.714**	**2.801**	**9.387**	**28.833**	**59.109**
Estimated value of disposed materials (€m)		**166.32**		**912.23**		**2,302.55**		**878.72**		**834.55**		**-801.83**		**1931.84**		**-972.93**

Table 5: Breakdown of materials disposed by EU country, with estimated material value (market values and net totals after accounting for wood and biowaste) (Source: derived from Prognos (2008) and letsrecycle.com and Materials Recycling Week (2009), slight variations in totals due to rounding)

Country	Glass at €15.29 (mt)	Total (€m)	Paper at €25.87 (mt)	Total (€m)	Plastics at €105.84 (mt)	Total (€m)	Iron & Steel at €35.28 (mt)	Total (€m)	Alumin-ium at €529.20 (mt)	Total (€m)	Wood at €16.46 (mt)	Total (€m)	Textiles at €205.80 (mt)	Total (€m)	Bio-waste at €16.46 (mt)	Total (€m)	Estimated total – materials with market value (€m)	Estimated net total market value (€m)
Austria	0.091	1.39	0.606	15.68	0.478	50.59	0.403	14.22	0.038	20.11	1.542	(25.38)	0.299	61.53	1.386	(22.81)	**163.52**	**115.33**
Belgium	0.220	3.36	0.906	23.44	0.785	83.08	0.600	21.17	0.035	18.52	1.372	(22.58)	0.230	47.33	2.544	(41.87)	**196.90**	**132.45**
Bulgaria	0.166	2.54	0.300	7.76	0.241	25.50	0.933	32.92	0.024	12.70	0.598	(9.84)	0.172	35.39	1.452	(23.90)	**116.81**	**83.07**
Cyprus	0.011	0.17	0.083	2.14	0.043	4.55	0.026	0.92	0.001	0.53	0.075	(1.23)	0.021	4.32	0.097	(1.60)	**12.63**	**9.80**
Czech Rep.	0.196	3.00	0.600	15.52	0.341	36.09	0.722	25.47	0.025	13.23	0.746	(12.28)	0.297	61.12	1.227	(20.20)	**154.43**	**121.95**
Denmark	0.039	0.60	0.383	9.90	0.326	34.50	0.143	5.04	0.016	8.47	0.320	(5.27)	0.080	16.46	0.806	(13.27)	**74.97**	**56.43**
Estonia	0.059	0.90	0.199	5.15	0.068	7.20	0.194	6.84	0.006	3.17	0.852	(14.02)	0.049	10.08	0.232	(3.82)	**33.34**	**15.50**
Finland	0.103	1.57	0.330	8.54	0.246	26.04	0.411	14.50	0.010	5.29	2.712	(44.64)	0.079	16.26	0.550	(9.05)	**72.20**	**18.51**
France	1.330	20.33	4.141	107.12	3.006	318.15	3.314	116.91	0.277	146.59	4.391	(72.27)	0.879	180.90	6.355	(104.60)	**890.00**	**713.13**
Germany	1.442	22.05	5.910	152.90	2.777	293.92	3.803	134.17	0.308	162.99	6.844	(112.65)	1.341	275.98	7.589	(124.91)	**1042.01**	**804.45**
Great Britain	1.666	25.47	6.485	167.77	3.695	391.08	2.670	94.20	0.179	94.73	3.530	(58.10)	1.502	309.11	8.170	(134.48)	**1082.36**	**889.78**
Greece	0.128	1.96	0.574	14.85	0.406	42.97	0.474	16.72	0.039	20.64	0.843	(13.88)	0.147	30.25	1.639	(26.98)	**127.39**	**86.53**
Hungary	0.152	2.32	0.358	9.26	0.299	31.65	0.872	30.76	0.026	13.76	0.629	(10.35)	0.133	27.37	1.293	(21.28)	**115.12**	**83.49**
Ireland	0.074	1.13	0.466	12.05	0.269	28.47	0.192	6.77	0.011	5.82	0.228	(3.75)	0.170	34.99	1.042	(17.15)	**89.23**	**68.33**
Italy	1.321	20.19	5.507	142.47	2.851	301.75	3.212	113.32	0.203	107.43	3.207	(52.79)	1.252	257.66	8.301	(136.63)	**942.82**	**753.40**
Latvia	0.007	0.10	0.044	1.14	0.007	0.74	0.004	0.14	0.001	0.53	0.141	(2.32)	0.005	1.03	0.108	(1.78)	**3.68**	**(0.42)**
Lithuania	0.091	1.39	0.145	3.75	0.090	9.52	0.176	6.21	0.006	3.17	0.231	(3.80)	0.035	7.20	0.262	(4.31)	**31.24**	**23.13**
Luxembourg	0.023	0.35	0.040	1.03	0.029	3.07	0.057	2.01	0.001	0.53	0.059	(0.97)	0.010	2.06	0.040	(0.65)	**9.05**	**7.43**
Malta	0.006	0.09	0.032	0.83	0.015	1.59	0.038	1.34	0.002	1.06	0.032	(0.53)	0.007	1.44	0.065	(1.07)	**6.35**	**4.75**
Netherlands	0.226	3.45	1.167	30.19	1.059	112.08	0.378	13.34	0.046	24.34	2.162	(35.59)	0.337	69.35	2.512	(41.35)	**252.75**	**175.81**
Poland	1.210	18.50	1.348	34.87	1.395	147.65	1.119	39.48	0.104	55.04	3.666	(60.34)	0.699	143.85	2.406	(39.60)	**439.39**	**339.45**
Portugal	0.146	2.23	0.609	15.75	0.465	49.21	0.001	0.04	0.018	9.53	0.732	(12.05)	0.161	33.14	0.773	(12.72)	**109.90**	**85.13**
Romania	0.515	7.87	1.179	30.50	0.476	50.38	1.956	69.00	0.037	19.58	1.801	(29.64)	0.345	71.00	1.330	(21.89)	**248.33**	**196.80**
Slovakia	0.188	2.87	0.203	5.25	0.137	14.50	0.370	13.05	0.011	5.82	0.406	(6.68)	0.077	15.85	0.766	(12.61)	**57.34**	**38.05**
Slovenia	0.038	0.58	0.069	1.78	0.035	3.70	0.153	5.40	0.004	2.12	0.291	(4.79)	0.022	4.53	0.165	(2.72)	**18.11**	**10.60**
Spain	1.160	17.74	2.973	76.91	1.881	199.08	2.005	70.74	0.111	58.74	4.007	(65.95)	0.891	183.37	7.133	(117.41)	**606.58**	**423.22**
Sweden	0.270	4.13	0.605	15.65	0.335	35.46	0.681	24.03	0.038	20.11	7.297	(120.11)	0.147	30.25	0.865	(14.24)	**129.63**	**(4.72)**
Totals	**10.878**	**166.28**	**35.262**	**912.20**	**21.755**	**2302.52**	**24.907**	**878.71**	**1.577**	**834.55**	**48.714**	**(801.80)**	**9.387**	**1931.82**	**59.109**	**(972.90)**	**7026.08**	**5251.38**

Figure 3: Glass - disposal and recycling in EU27

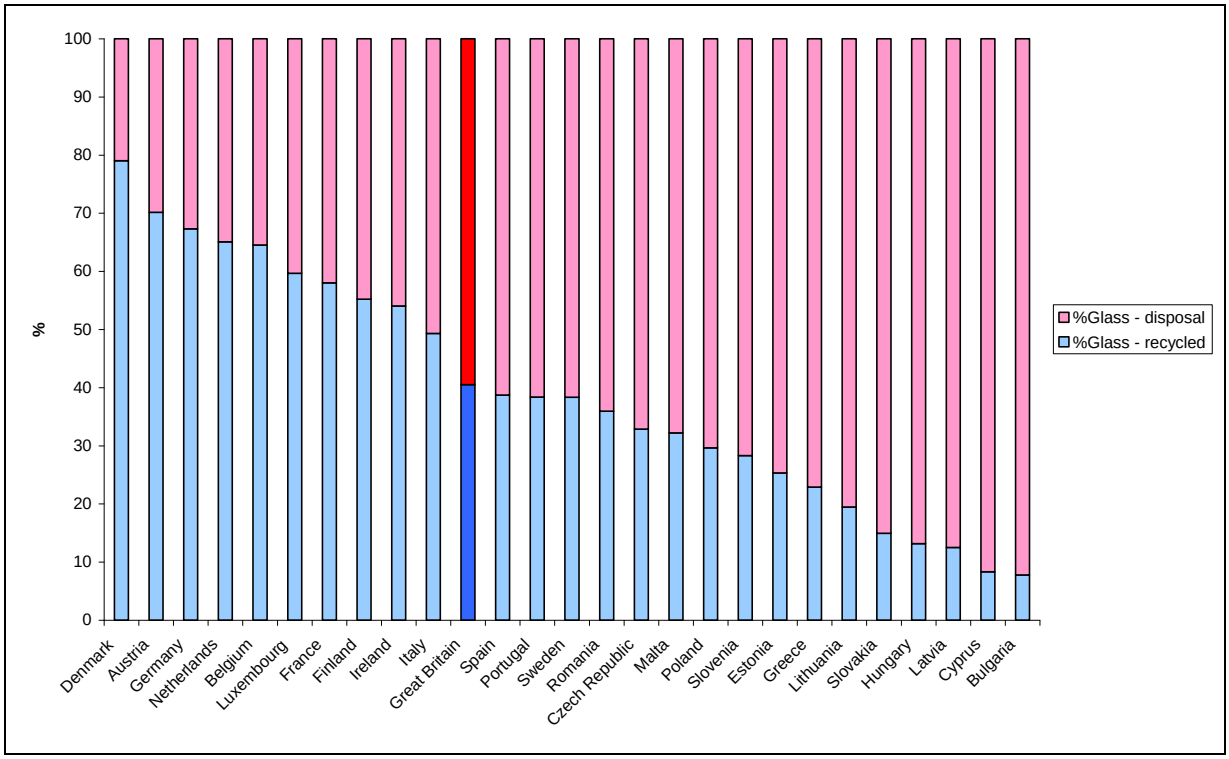


Figure 4: Paper - disposal and recycling in EU27

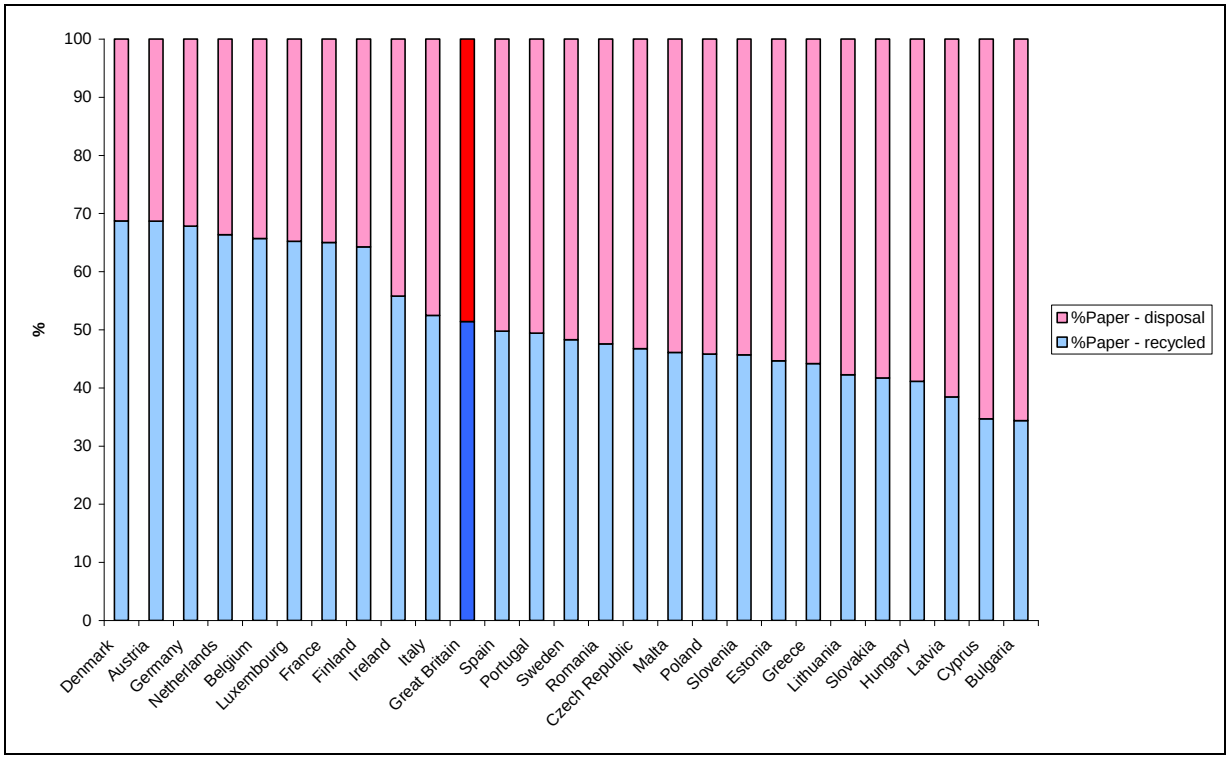


Figure 5: Plastics - disposal and recycling in EU27

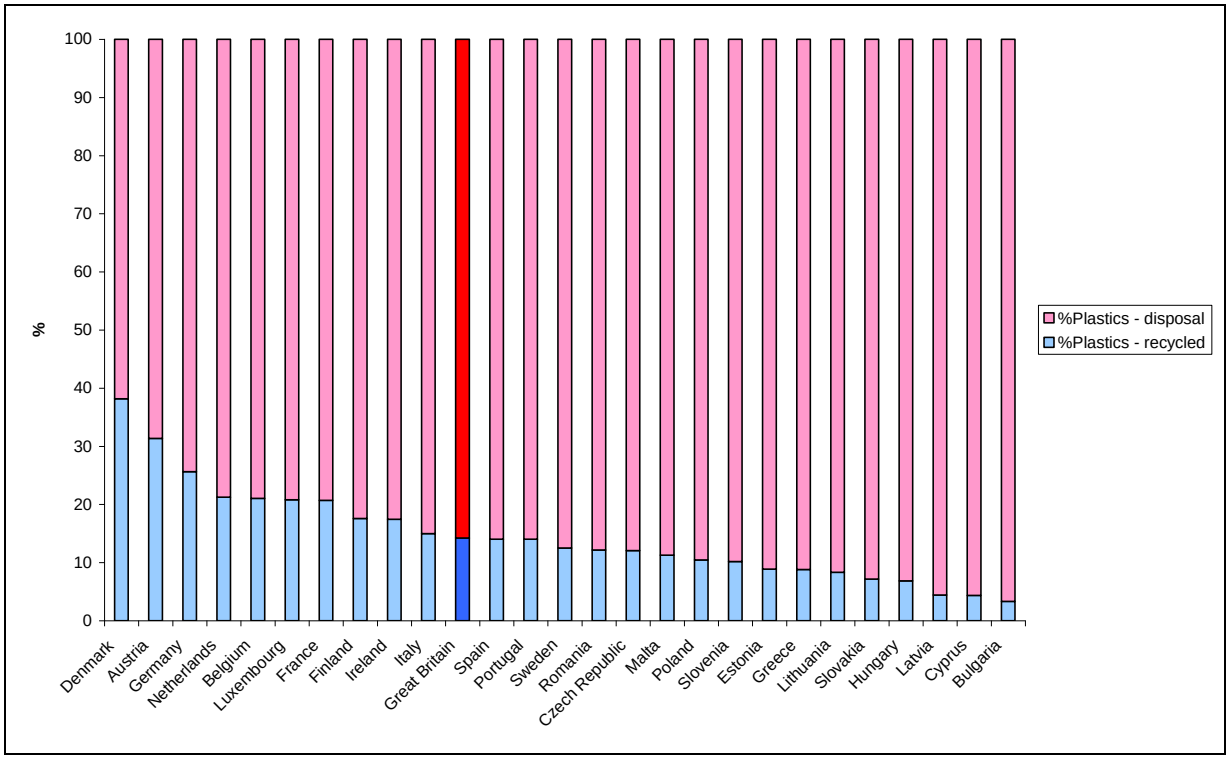


Figure 6: Iron and Steel - disposal and recycling in EU27

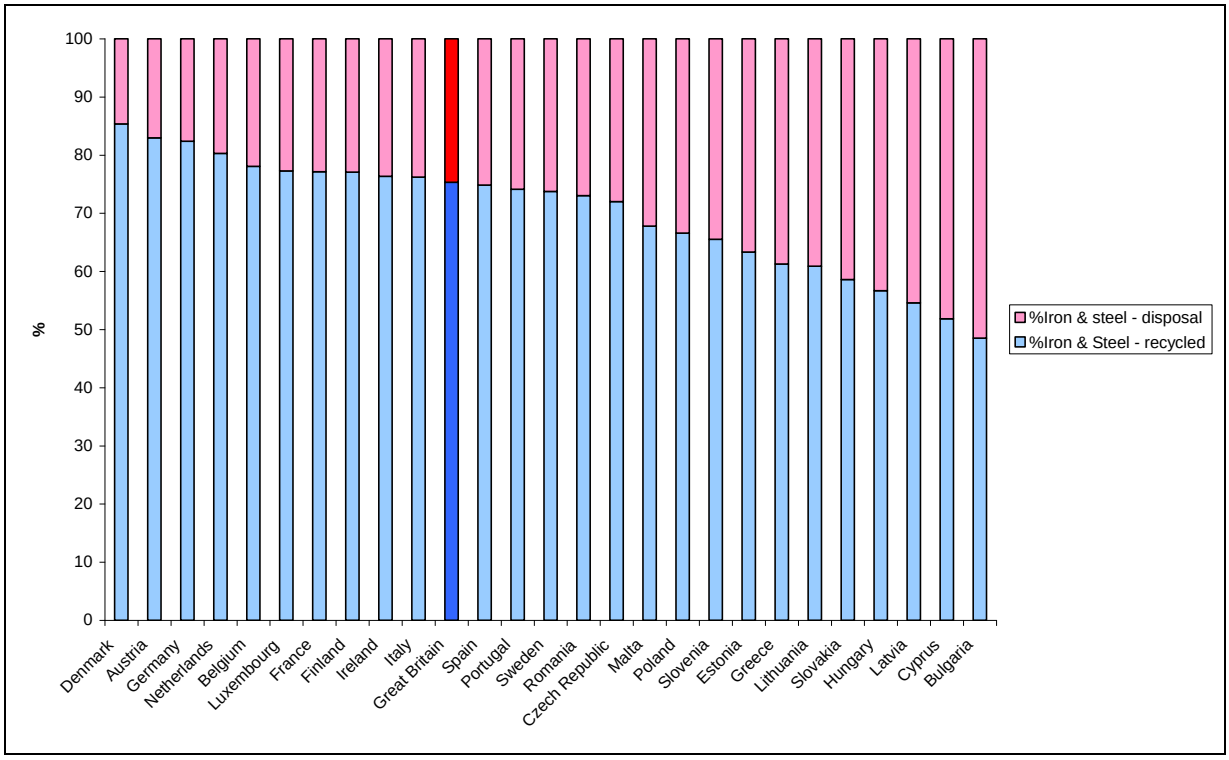


Figure 7: Aluminium - disposal and recycling in EU27

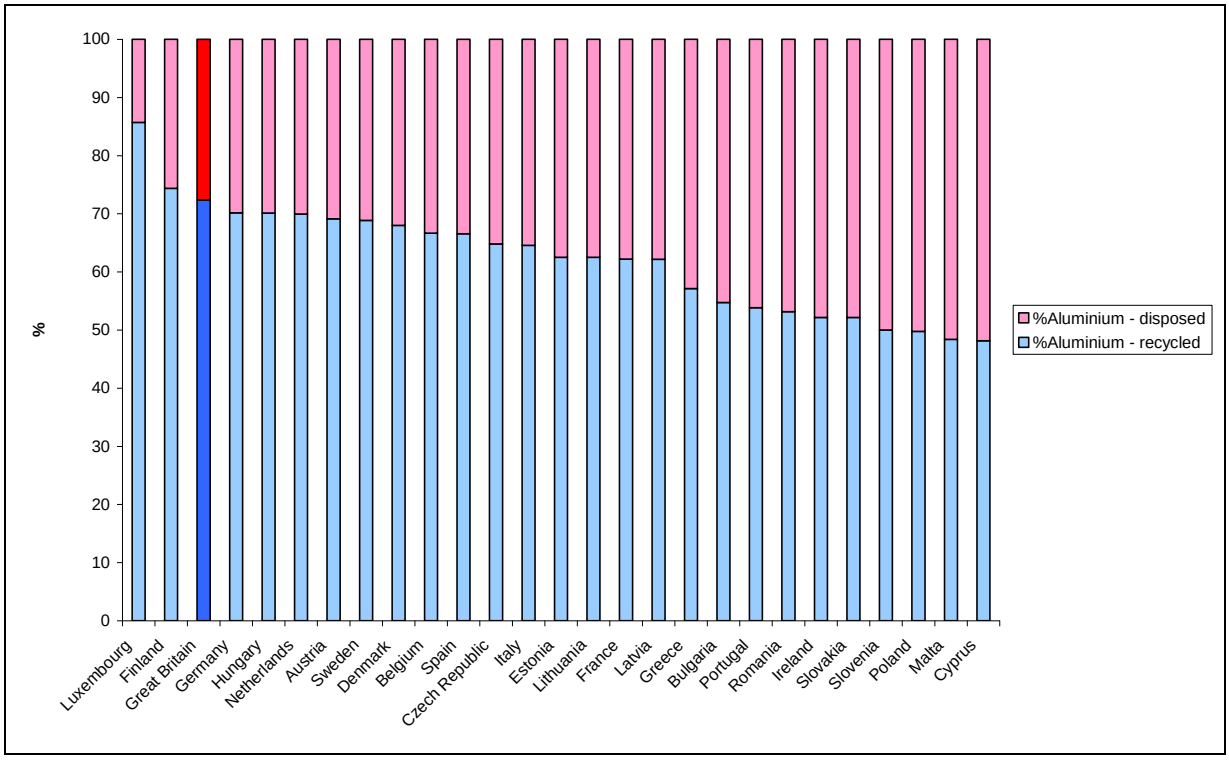


Figure 8: Wood - disposal and recycling in EU27

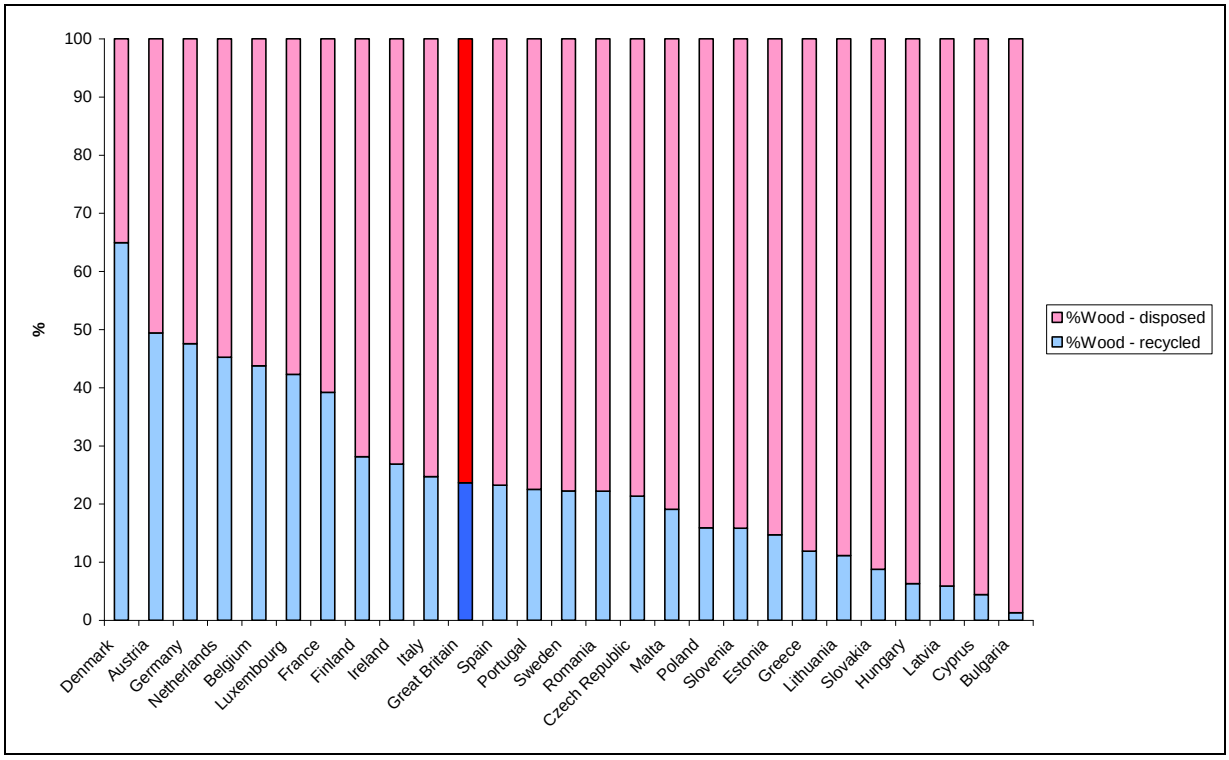


Figure 9: Textiles - disposal and recycling in EU27

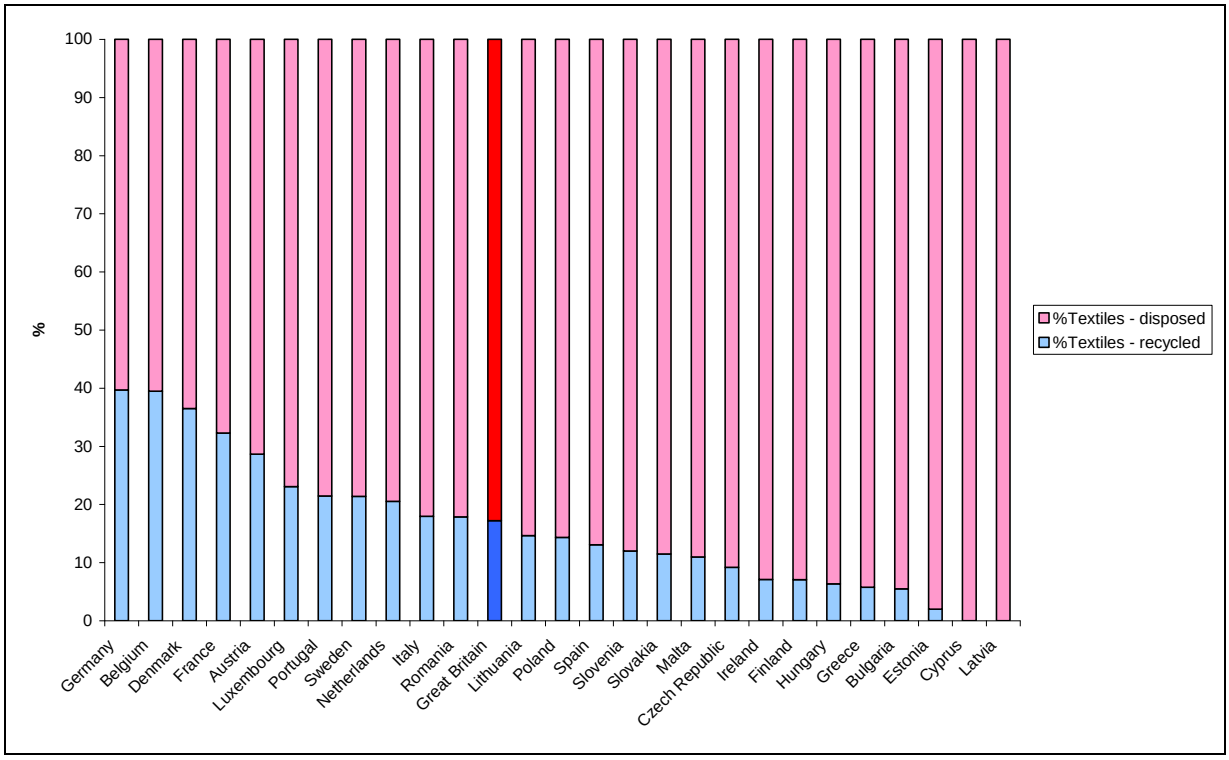
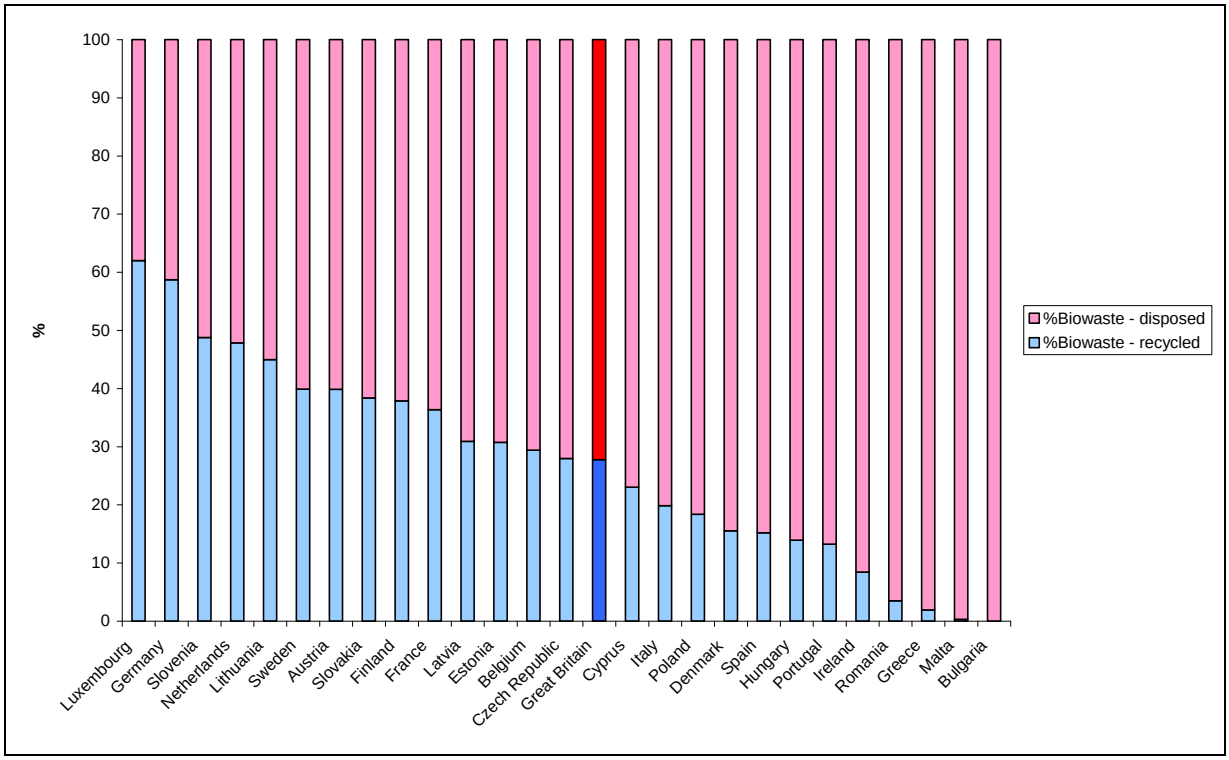


Figure 10: Biowaste - disposal and recycling in EU27



Source for all material data: Prognos (2008)

The role of landfill bans in promoting recycling

Despite the continued efforts of the European Commission to drive forward policies that increase recycling in Europe and severely restrict the continued dominant use of landfill, it is still the case that around half of all the key recyclable materials generated in the EU are being sent to disposal and not to recycling.

In all Member States, a wide range of regulatory and fiscal mechanisms are in use for waste management. They are designed to shape the waste and resources management market and to direct material away from landfill. These include landfill taxes or levies, producer responsibility measures and trading schemes. In a number of EU countries, increasing use is being made of restrictions on the landfilling (and sometimes incineration) of specific materials or waste streams. In the UK, this has so far been restricted to a few materials, such as tyres, but a policy review is underway.

Defra have indicated a willingness to consider the option of banning specific recyclable materials from landfill as one measure to drive up recycling performance. A research study has recently been published, commissioned from Green Alliance, examining the nature and impacts of landfill bans in other countries and their role in UK waste policy[xxxi].

A further major piece of work has been commissioned from Eunomia Research and Consulting by WRAP and funded by Defra, the Scottish Government and the Welsh Assembly Government.

This will extend the Green Alliance study by also examining in comprehensive detail the potential environmental benefits of landfill bans in the UK and it will add considerably to the headline assessment done for this short desk study. This is due to report in autumn 2009.

Friends of the Earth considers landfill and incineration bans on recyclable materials to be a valuable policy tool in driving recycling performance upward, increasing resource efficiency and reducing carbon emissions.

However, evidence we have already seen from Flanders[ii], and which is well documented and reported, indicates that banning unsorted waste and waste sorted for recycling from landfill, and banning most recyclables from incineration, has a real role to play as part of a suite of policies to drive recycling rates upward.

In Flanders material bans, as well as ‘pay as you throw’ charging for MSW collection, producer responsibility measures and intensive communication programmes, have seen Flanders report a 70% recycling rate, well above our most ambitious targets in England and still well ahead of England’s best performing local authorities under the current policy regime.

Conclusions

EU policies on waste and resources management have succeeded in improving recycling performance in most Member States, and the recent agreement of the new WFD sets new targets for recycling across Europe.

However, if the EU limits itself to *only reaching* the recycling targets set out in the WFD, and not *improving* upon them (like some Member States are already able to do) then we will continue to see the scandal of significant wasted resources being buried or burned that could be sensibly recycled.

Indeed, although it will be argued that much of this potentially recyclable material which is presently disposed of primarily through landfill forms the economic basis of the waste management industry, it is the case that this valuable resource could provide the basis for the development of an expanded recycling and resource management industry, creating many more 'green jobs' in reprocessing, sorting and collecting of recyclables and realising the intrinsic value based in those wasted materials.

This paper has provided a basic headline assessment of the carbon emissions value and the monetary value that potentially could be realised if comprehensive bans on the landfilling and incineration of key recyclable materials were implemented across Europe. It is only a snapshot, using existing data sources, and is intended as an illustration of the order of magnitude of this challenge and not as a definitive statement. Further detailed research will provide a clearer view on the detail, but the broad indicator is clear.

Whilst landfill bans are not a measure alone that will drive forward recycling performance, they are a significant potential tool for policy makers across Europe, and further study is encouraged of those jurisdictions that have successfully implemented such measures and are reporting high recycling performance.

With Europe needing to realise every option available to it in the battle to minimise the impact of climate change[xxxii], the further contribution of recycling to winning that battle should not be underestimated.

In addition, the issue of resource availability has become more prominent in recent years, particularly with the spike in prices of many resources in 2008. The European Commission published its 'Raw Materials Initiative'[iii] in November 2008 in response to these concerns. Given this context, it is surprising that the Commission – and many Member State governments – have done so little to make sure that valuable secondary raw materials aren't dumped in the ground or burned.

It is time for 'gone to waste' to be a thing of the past.

Acknowledgements

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