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Examination of Impact of Recent Price Collapse in Markets for Recyclate Materials and Required Intervention

Final Report

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Table of Contents

Executive Summary

1. With recycling having risen to 57% of packaging waste, the performance of packaging in terms of the proportion that is recycled is good relative to other waste streams. There are weaknesses in the recycling sector in Ireland so it is important that the emphasis on education regarding the need to recycle is continued if the momentum achieved in recent years is maintained.

2. Recycling is costly and must be paid for. Recent price falls in markets for recovered waste materials have eliminated an important source of income for firms engaged in collecting and recycling waste. If prices for paper, cardboard and plastic materials recover quickly to what are identified as more sustainable price levels then the losses would amount to almost €20 million p.a.

3. The prices that were available on world markets for recovered materials up to August 2008 made the system of waste recovery economically viable and made recycling cost-effective relative to landfill disposal. Recent market disruption means that recovery is no longer economically viable and some products no longer have outlets.

4. The price falls have shown that the true costs of operating waste recovery are considerably higher than previously perceived. At current prices, the value of a tonne of recovered material is about €80 below what it was in 2007. If processing is to continue to be carried out on a commercially viable basis, additional sources of revenues will have to found. However, collection charges are generally set on an annual basis so there is on average a six month delay before waste management operators can access additional revenue. It is necessary for operators to ensure that the business models that are adopted either aim to reduce price volatility by or ensure that this risk is fully incorporated in contractual arrangements.

5. While short term stockpiling is necessary, it is not a solution and could lead to even higher disposal costs in the future. However, the alternatives to stockpiling – landfilling or placing material onto waste to energy markets – would cost waste management operators around €130 and €50 per tonne respectively, in addition to any costs of collection and separation that have already been incurred.

6. There are systemic failures in the sector. Most importantly waste recovery operators sell into markets with prices that are subject to considerable short run volatility, but these firms have high fixed costs and limited opportunities to alter their charging structure in the short term. There is likely to be considerable resistance to increasing waste charges to households and Repak is constrained in its ability to increase membership fees given that obligated firms can opt to self-comply and the possibility exists that some firms might decide to non-comply.

7. Recovered material is building up at recovery sites and the possibility has been raised that the costs of processing and lack of outlets may lead to non-collection of material. Short term measures are required to address the current situation but the systemic weaknesses also require resolution.

8. The principle that the producers of recyclable waste should pay for the costs of its recovery should be maintained. However, this is not to be read as a recommendation for non-intervention since there are weaknesses that must be addressed. The following specific recommendations are made to address the difficulties and weaknesses that have been identified:

   i. Stockpiling should be restricted in the case of any products that will deteriorate. Therefore, paper should be placed on markets or landfilled.
   ii. As waste to energy is preferable from the point of view of the environment and its cost effectiveness the Minister should announce a programme of assistance for segregated mixed paper that cannot be placed on recyclate markets to allow this material to access waste to energy markets in the UK.
   iii. The Environment Fund should be used to fund the cost on the basis that there is a considerable risk that the alternative is stockpiling of material that will soon deteriorate and will ultimately require to be landfilled.
   iv. Should prices remain at current levels and lead to a fall in recycling rates then it is recommended that the landfill levy should undergo a major revision to reconstruct the incentive to recycle.
   v. An announcement of any large increase in the landfill levy should be made six months in advance of the implementation of the increase to allow firms to adjust their pricing. Any such announcement should also clarify how the increased revenue from the levy will be used.
   vi. The Government should explore, in consultations with the industry, opportunities to establish strategic relationships with larger EU Member States to gain access to existing recycling facilities that can undertake secondary and further processing of recovered material and opportunities to further develop EU processing facilities for recovered materials.
   vii. The Government should undertake an examination of the long term costs and benefits that would arise from investing in Ireland's recycling infrastructure to create domestic markets for recovered materials and strengthen the ability to achieve waste management policy objectives.
   viii. Policing practices with respect to the standard of recovered materials that are placed on markets should be reviewed and any necessary actions should be undertaken to ensure the consistent quality of this material.
   ix. The definition of packaging placed on the market by obligated firms should be extended to cover 'all packaging waste first placed on the market' to cover both domestic and commercial waste and support the recording and recycling of packaging waste.
   x. The Department should undertake a full review of the monitoring arrangements of obligated firms that opt for self-compliance with the packaging regulations.
   xi. Responsibility for monitoring compliance with packaging regulations should be transferred from local authorities to the EPA.
   xii. The Government should undertake a review of the structuring of EU compliance schemes comparable to the Irish partnership model.

xiii. Mandatory membership of Repak should be considered.

xiv. A mechanism similar to Repak with responsibility for funding the recovery of the news and pams waste streams should be put in place to ensure that newspaper producers contribute to the costs of recycling on a similar basis as producers of packaging waste.

1. Overview

1.1 Introduction

In line with the waste management hierarchy, Government policy aims to reduce the amount of waste to landfill primarily through waste reduction and recovery. Economic incentives have been developed to promote this change. Due to the lack of waste to energy facilities, waste recovery means in Ireland recycling. However, domestic facilities to undertake recycling processes and domestic markets for most recycled materials have not been developed sufficiently so that only collection, segregation and initial processing for export takes place in Ireland. Even so, this level of processing is not costless and must be financed. In this regard, the producer pays principle has been applied to a considerable extent but the mechanisms that are used utilise a number of market and non-market financial means. The recycling processes are financed through direct payments by waste producers – either through packaging compliance schemes such as Repak or by firms undertaking to self-comply through contracts with waste industry operators – revenues received by waste industry operators from the sale of recovered materials and cross subsidisation of recycling activities from charges applied by industry operators for waste collection.

Of these sources of finance, the most important for waste industry operators who are processing material for recycling are market revenues. This is examined in detail in Sections 2 and 3 below. The analysis shows that following a period of very buoyant global prices for key materials, markets have effectively collapsed in recent months to the extent that this source of revenue has been virtually eliminated. The conclusion reached is that the sector will not be able to continue to operate as previously.

This has major and immediate implications for Irish waste management policy. Achieving the objectives of policy in respect of recovery and diversion from landfill depends on private commercial waste collectors and processors and on local authorities. The extent of the fall in revenues means that it will not be economically viable to continue to collect and process material. This raises the possibility that material could remain uncollected or be handled and disposed of through unregulated channels.

1.2 Overview of Packaging Recycling

Packaging is an important source of waste production and an area in which considerable progress has been made in terms of the percentage recovered. The Waste Management (Packaging) Regulations 1997 place responsibility on companies in Ireland to fund the recovery and recycling of their used packaging. This applies to any company with an annual turnover of €1 million of more which places 10 tonnes or more of packaging on the Irish market. However, the definition under the Regulations of 'packaging placed on the market' does not include commercial 'backdoor' packaging waste. This was done because some firms with significant volumes of backdoor waste are 100% export orientated. However, extending the definition to cover 'all packaging waste first placed on the market' would cover both

domestic and commercial packaging waste and would support the obligation on firms to record and recycle their packaging waste.

Repak was established in 1997 as a producer responsibility scheme to part finance the recovery of packaging waste by collecting fees from obligated firms and distributing this finance to qualifying waste recovery operators. Repak is the only packaging compliance scheme in Ireland that is approved under the 1997 Regulations but membership is not compulsory with self-compliance remaining an accepted option for obligated producers. Since its establishment, it has funded the recovery of over 3.6 million tonnes of used packaging, with 651,000 tonnes in 2007, and has helped Ireland to exceed its targets in 2001 and 2005[1]. Repak estimates that its members accounted for about 60% of the total packaging placed on the Irish market in 2007. This means that self-compliance and, potentially, non-compliance are attractive option for firms responsible for 40% of total packaging waste.

In 2007, Repak funded €24.2 million of recycling activity, primarily through the provision of subsidies to waste management operators undertaking handling packaging material. Such operators would also handles materials not covered under the Repak scheme and part of Repak's remit is to certify the volume of packaging material that is handled in each case and to allocate subsidies on this basis. However, the bulk of the costs incurred by operators were funded by revenues received for recovered materials sold on world markets[2]. While the location of markets depends on the type of material, domestic markets are of importance only in the case of wood and, to a lesser extent, glass and metals. In contrast, the main packaging materials – paper, cardboard and plastics – depend almost totally on export markets with the Chinese market being particularly important. Since the Irish recycling sector has not developed beyond collection, separation and some primary processing, the outputs are raw commodity products. As a result, Irish operators are price takers and the markets are subject to considerable price swings[3].

Cyclicality of prices is typical of commodity markets with changes in growth prospects in markets for consumer products being magnified in terms of their impacts on prices. The dramatic slowdown in global economic prospects during 2008 and the greater increased probability of recession in major consumer markets has greatly impacted markets for recycled papers and plastics. Prices offered by Chinese buyers have collapsed over the past few months and many markets have effectively been closed. These developments are illustrated in Figures 2.1 to 2.9 below. This means that the main source of income for recycling operators has all but disappeared raising

[1] Recycling of packaging material rose from 14% in 1997 to almost 60% in 2007. Ireland packaging recovery targets as agreed with the EU were 25% in 2001 and 50% in 2005. These were met and exceeded in each case. Furthermore, by making transparent to producers the costs of placing packaging on the market, Repak provides an incentive for firms to minimise packaging waste.

[2] The sources of revenues are discussed in greater detail in Section 3.2 below. In addition to providing subsidies to waste industry operators undertaking recycling, a percentage of Repak funding is applied in areas such as supporting kerbside collection points and providing information on recycling.

[3] The use of the term 'operators' in this report refers to firms that are engaged in waste management. These may be collectors who deliver material to waste processors and pay a gate fee – either for recovery or disposal (landfilling) – or firms who undertake both collection and subsequent processing or disposal. Clearly Repak subsidies are paid only to firms undertaking recovery. However, the availability of this revenue and revenues from other sources reducers the gate fees that are charged to collectors at recovery facilities.

the prospect of considerable disruption in processes. While the expectation is that this market disruption is primarily cyclical, this does not mean that a recovery can be considered to be imminent or that prices are likely to regain their previous levels within the foreseeable future. Even if this were the case, the extent of the current market collapse means the sector is unlikely to retain its current structure with many operators under financial pressure sufficient to raise concerns regarding the continuation of their existing operations. Furthermore, the effective closing of some markets means that the physical stockpiling of material has become a necessity.

1.3 Outline of Report

Against this background, Repak has asked Peter Bacon & Associates to examine the nature and extent of the current market disruption and its impact on the recycling sector. While the work is cognisant of the need for short term measures to address the immediate difficulties, the focus is not restricted to this timeframe and issues relating to the structure of the sector are also examined. However, it is important to state that the research has been undertaken over a relatively short time frame during which the market disruption has continued. It is not possible to identify at this stage whether prices have currently undershot to an unsustainably low level and it is also too early for evidence of long term disruption in the recycling sector to emerge.

The Terms of Reference identify the objectives of the work as to:

- Describe and examine the current market conditions for recyclate materials in the light of global market disturbance and recent large falls in the prices for raw materials. This is undertaken in Section 2.
- Outline the implications of the current market situation for waste management services in Ireland, with particular reference to large and smaller scale waste management contractors, households, local authorities, Repak and the Government's policy on recycling and sustainable waste management. This analysis is undertaken in Section 3.
- Identify a range of policy options for intervention which could address the difficulties that have arisen, and which would merit further examination as to the balance of costs and benefits that would accrue to each in the light of existing environmental policy objectives. This is contained in Section 4.

2. Recyclate Markets and Prices

2.1 Contextual Data on Recycling

According to the latest official figures, total municipal waste production in Ireland in 2006 was 3.4 million tonnes[4]. This is the latest date for which official estimates are available and represented an increase of 11.3% over 2005. Of this, just under 2 million tonnes (58%) was household waste and 1.3 million tonnes (39%) was commercial waste. The volume of waste that is generated is closely related to growth in real GDP. Ireland's GDP grew by 6% in real terms in 2007 and is forecast to fall by 1.3% in 2008. This provides an estimate for 2008 of 2.07 million tonnes of household waste and 1.39 million tonnes of commercial waste[5].

Regarding paper and cardboard, a total of 1.06 million tonnes was handled in 2006 of which 588,556 tonnes (55.3%) were recovered. Using a similar projection to above would provide an estimate of 615,760 tonnes for recovery in 2008 with a constant rate of recovery. A total of 327,141 tonnes of plastics were managed in 2006 with 63,526 (19.4%) tonnes recovered. The projected tonnage for recovery of plastics in 2008 is therefore 66,462 tonnes. In 2006, only 0.7% of paper and cardboard and 12.3% of plastics were recycled in Ireland. This implies an export tonnage of 611,500 tonnes of paper and cardboard and 58,000 tonnes of plastics in 2008. Just over 50% of the exported paper and cardboard recovered arises from packaging while 83% of exported plastic recovered is packaging[6].

The EPA data show that 57% of packaging waste – 590,000 tonnes out of 1.029 million tonnes that were generated – was recycled in 2006. Packaging waste accounted for 30% of all municipal waste in 2006 but for 53% of municipal waste that was recycled. Thus, the proportion of packaging waste recycled compares favourably with the 36.1% of all municipal waste that was recycled. It is also much higher than the 37.9% of biodegradable waste that was recycled.

In 2006, Repak recorded 603,000 tonnes of packaging recycled. Of this, commercial packaging recycled accounted for 430,000 tonnes (71%) and domestic packaging recycled for 173,000 tonnes (29%). Using the EPA estimate of total commercial packaging recycling of 726,000 tonnes (page 16 of EPA report) means that the Repak recordings account for 59% of the total recycled. The EPA estimates household

[4] EPA (2007) *National Waste Report 2006*. Municipal waste includes household waste, commercial waste and street cleaning. As such, the category is defined according to the origin of the waste rather than the materials involved and household waste in particular tends to contain a wide variety of materials. Partial separation of materials by households is achieved through different bin colours and kerbside bring centres. Hazardous materials, waste water, manufacturing and mining waste and construction and demolition waste are excluded and separately defined and quantified in the EPA data.

[5] Figures from Repak indicate that the volume of packaging waste that was placed on the market by its members rose by 8% in 2007 but forecasts for 2008 indicate a fall of 3% this year. If it is assumed that these trends are indicative of trends in overall waste generation, implying that funded waste recovery was a constant percentage of waste produced in 2006-08, then using these data provides similar projections for waste in 2008.

[6] Of course, not all of this waste falls within the remit of Repak although promotional activities by Repak work to support recycling in general.

recycling at 394,000 tonnes (page 11 EPA report) meaning that the Repak recording of 173,000 recycled tonnes was 44% of the total undertaken. This shows that the performance of packaging in terms of the proportion that is recycled is good relative to other waste streams. This means that there are weaknesses in recycling in Ireland that extend beyond the packaging waste streams that are the focus of this report. As a result, actions to address the specific issues that are examined in this report should be considered in the wider context of the need to address these wider issues.

While some data are available for the prices received by Irish operators, these are subject to variables such as the quality of the material, their scale and their location within the country. Clearly these are important variables in determining the viability of these operations but for the purposes of this section – i.e. to identify long term trends in prices and place recent price falls in context – a longer term consistent data source is required. The main such source relates to the UK but contains information on global prices and the prices offered by merchants. Since transport costs between Ireland and China will not differ significantly from the UK, these prices are appropriate for the purposes here.

All prices are in UK£ per tonne of material. However, it is important to note that the past year has seen significant changes in the UK£/Euro exchange rate following a period of relatively stable rates. The impact of this development on Euro prices is examined in Section 3[7]. A range of UK prices is reported for each month. The prices used in this analysis are the mid-points of these ranges.

2.2 Paper and Cardboard Prices

Data are available for a range of paper types but three categories – mixed papers, cardboard (old kls) and newspapers (news and pams) – dominate the sector in terms of volumes. Of these, mixed papers and cardboard are of interest to Repak since newspaper producers are not included among obligated producers other than through the requirement that unsold papers are collected from retailers and recycled. This means that a considerable amount of the material that is separated by operators and sold as paper has come from producers who are not members of Repak. As a result, the producer responsibility mechanism is not all inclusive.

In the UK, paper mills remain an important outlet for recovered paper and cardboard. However, no such outlet exists in Ireland and only a small percentage of recovered paper in Ireland, estimated to be in the region of 5%, is sent to UK paper mills[8]. This means that prices on export markets are of most relevance to Ireland.

Two relevant datasets are available. The first relates to the prices paid by merchants in the UK and is available for the full period since 2001. The second is for export

[7] It is recognised that most commodity waste markets are denominated in US$. However, the analysis shows that the trend in the UK£/Euro exchange rate over the past year has acted to further impact the prices that are available to Irish waste recover operators.

[8] This contrasts with EPA data that identify the UK as the main export market for paper recovered in Ireland. This may arise from the use of the UK-based merchants and the UK as a collection point for forwarding material.

prices but is only available since the beginning of 2004. However, these prices may be a better representation of the prices available to Irish operators.

Mixed Papers

The trend in prices paid by merchants for mixed papers is shown in Figure 2.1. The graph also shows a 12 month moving average of prices. This smoothes out short term fluctuations and makes the trend easier to identify.

Figure 2.1: Merchant Prices for Mixed Paper (2001-08)

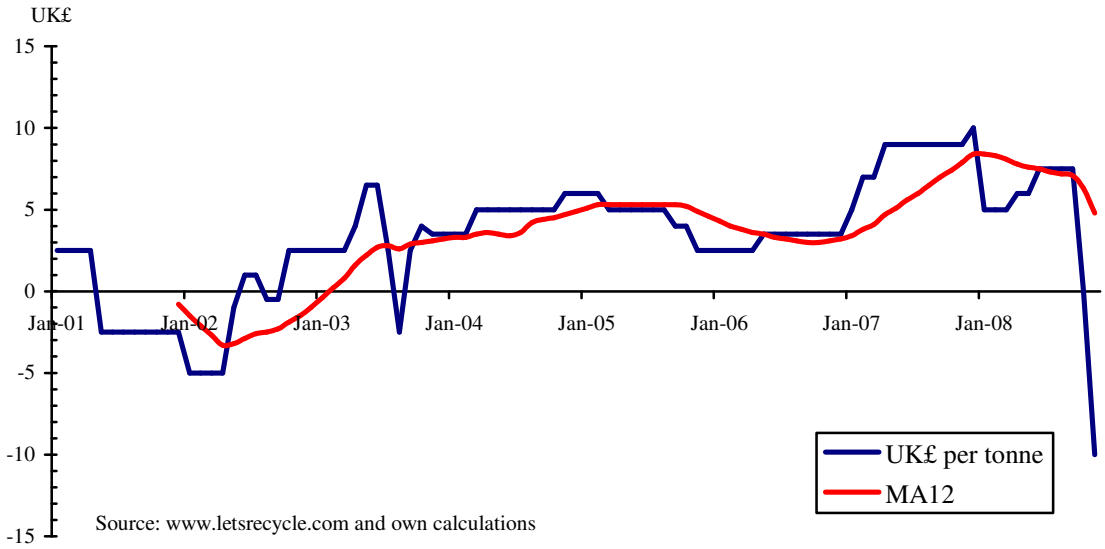
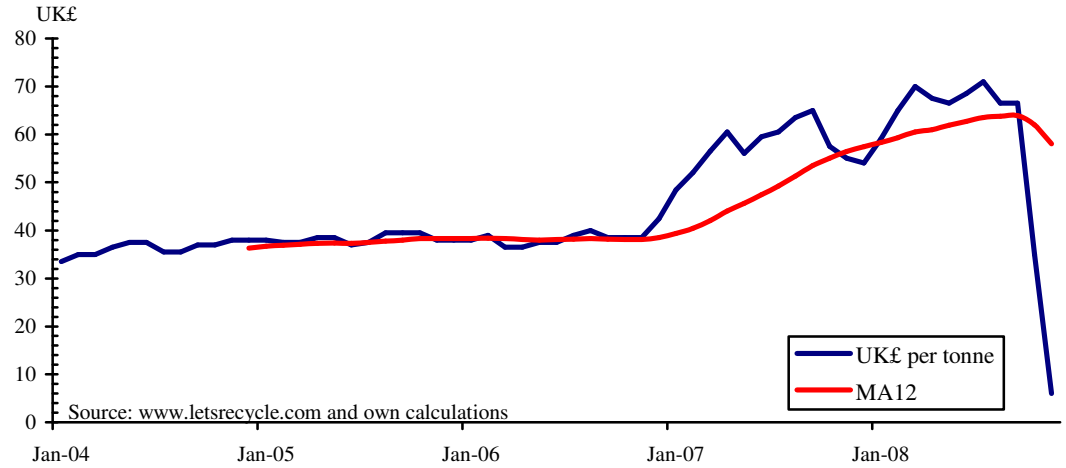


Figure 2.1 shows that prices for mixed papers paid by merchants, while low, remained positive during most of the period since 2003 following a period of very low prices during the global slowdown in 2001-02. Prices rose steadily during 2007 from close to the long run average around £4 per tonne to a high of £10 at year end. However, this price level unsustainable and prices moved down during 2008 before collapsing from £7.50 in September to zero in October and a negative price of -£10 in November i.e. merchants are charging operators £10 per tonne to receive mixed papers. The upward trend in prices has turned down since early 2008 with the 12 month average far above the current market price.

The trend in export prices for mixed papers is shown in Figure 2.2. As stated this may be more relevant to Irish operators in terms of the prices that are available. The picture is even clearer here. Prices had been stable in the £35 to £40 range from early 2004 to the end of 2006 but then rose rapidly. From December 2006 prices rose from £42.50 to £71 in July 2008 an increase of 67% in 19 months.

Figure 2.2: Export Prices for Mixed Papers (2004-08)

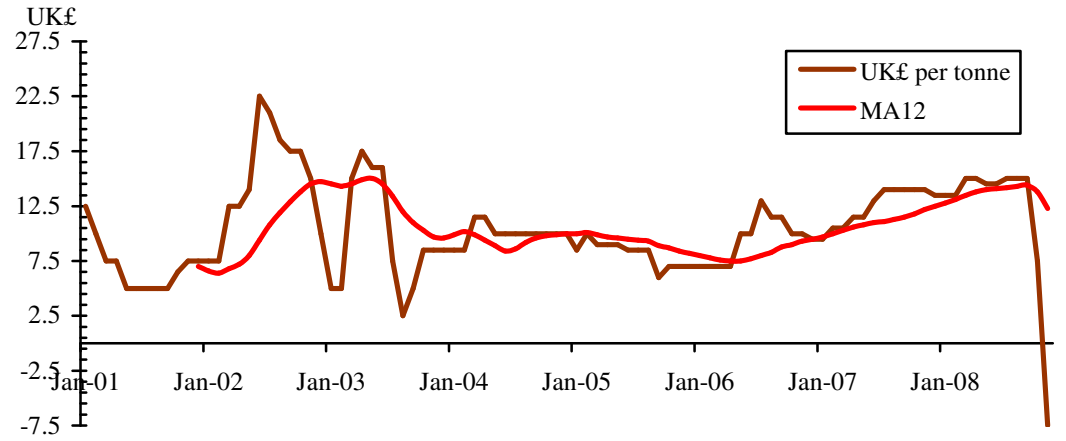


This rate of increase in prices during 2007 and the first half of 2008 was clearly unsustainable and also meant that prices had risen to well above their long run level. The experience of the earlier period would suggest that this long run level is around £40 per tonne. As indicated by the prices offered by merchants prices have since collapsed to £35 in October and £6 currently. At this level the market is effectively closed since transport costs alone would make this price level non-viable.

Cardboard

The prices offered by merchants for cardboard (old kls) in the UK are shown in Figure 2.3. This market has been particularly volatile in the past as evidenced by the experience during the slowdown in 2002-03. However, the period since 2004 has been much more stable with prices rising ahead of inflation although not as much as in the case of other paper. Prices rose from around £9 per tonne in 2004 to early 2006 to a high of £15 in July 2008. Again, this rate of increase of almost 60% in the 18 months from January 2007 was unsustainable and put prices above the long run level closer to £10 per tonne.

Figure 2.3: Merchant Prices for Cardboard (2001-08)

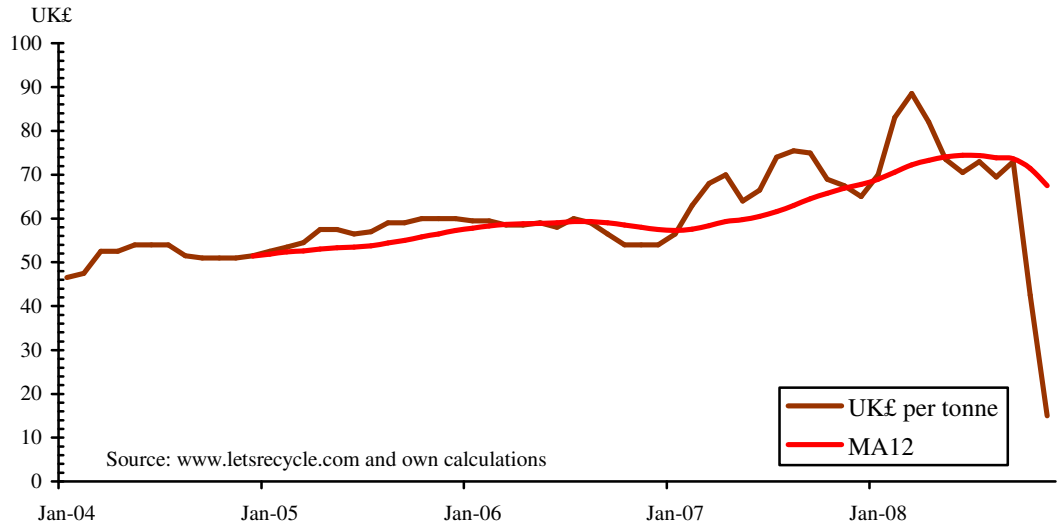


Source: www.letsrecycle.com and own calculations

As with paper, prices offered by merchants fell by 50% in October and are now well below trend with a negative value of -£7.50 per tonne.

The price trend for exports of cardboard, shown in Figure 2.4 is similar. Prices rose steadily from around £50 per tonne in early 2004 but accelerated from January 2007. The peak here was earlier, in March 2008 at over £88, again following a rise of around 60% in 18 months. So while there timing of the increase was somewhat different, there are considerable similarities in these price patterns.

Figure 2.4: Export Prices for Cardboard (2004-08)



As with other markets the export price for cardboard has now collapsed, in this case to under £20. It may be noted that the price trend in this market has led changes in the other markets discussed by about 3 months. While there is no guarantee that this market will similarly lead any recovery it might be important to see some reversal here before other markets begin to recover.

2.3 Plastics Prices

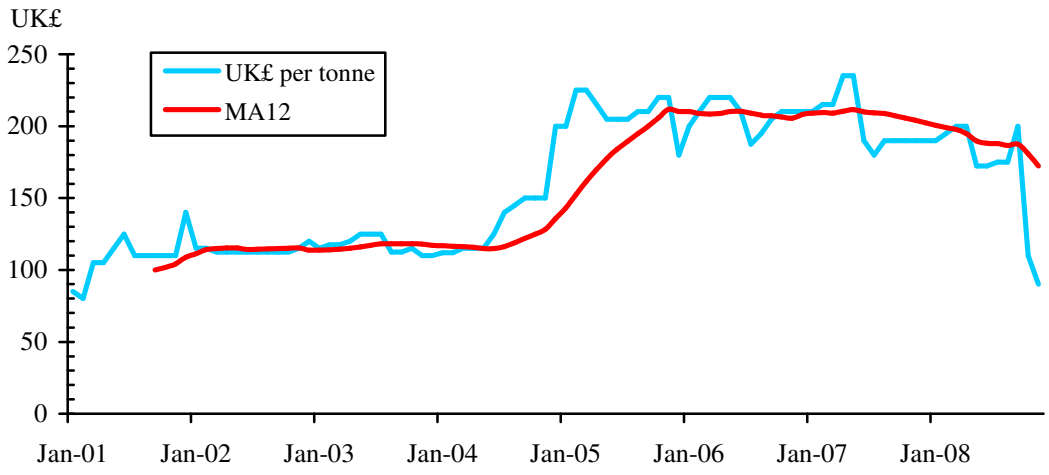
As in the case of paper, prices are available for a number of different categories of recovered plastics. The two main divisions are between plastic film and bottles, with future sub-divisions based on the density and colour of the material. The two categories that are considered to be of most relevance to the Irish recycling sector, given the extent of separation that is undertaken, are mixed colour, low density plastic film (LDPE), and mixed plastic bottles[9]. The dataset does not provide prices for export markets so the analysis uses prices offered by merchants in the UK.

The price of plastic film is shown in Figure 2.5. While this shows a similar collapse in prices in recent months, the story is rather different than in the case of paper and cardboard. Figure 2.5 shows that plastic prices were relatively stable up to mid-2004

[9] The prices available in each case would be bottom half of the range of prices for all categories of plastics, but not among the lowest prices reported. In general, fully segregated natural colour plastics would command higher prices but price falls have been encountered for all categories.

at around £115 per tonne. Prices rose rapidly during the latter half of 2004 peaking at £225 in early 2005. In contrast to paper markets, prices then stabilised in a range of £190 to £210 up to mid-2008 when they began to ease. In recent months the rate of decrease has accelerated with prices halving to £110 in October and to £90 in November.

Figure 2.5: Merchant Prices for Plastic Film (2001-08)

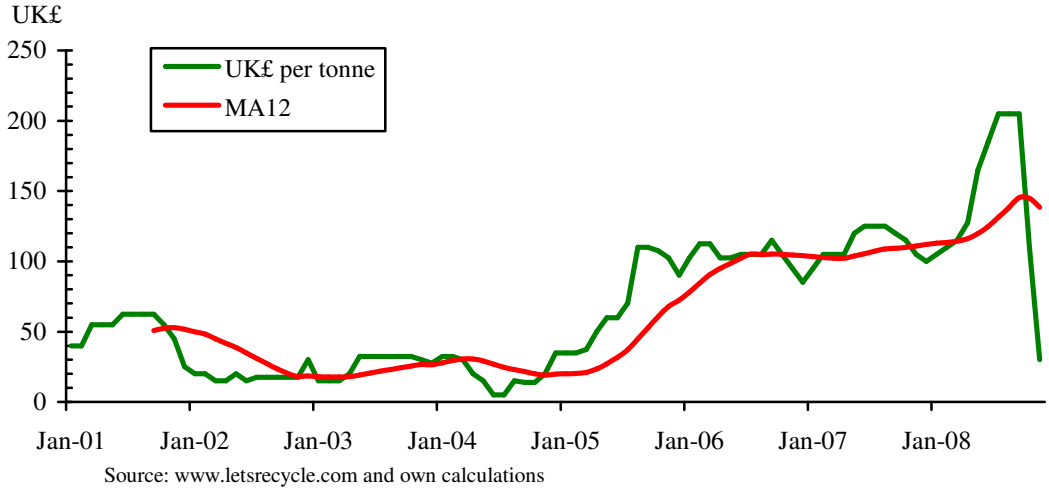


Source: www.letsrecycle.com and own calculations

Unlike the case of paper and cardboard markets it is not as clear that these markets reached excessive levels. While the rate of increase in 2005 was probably unsustainable, the market had appeared to reach a new long term sustainable level of prices above £180. It is also worth noting that unlike in the case of paper, the price has now returned to close to the level that existed during the earlier economic slowdown in 2002-03 and has not totally collapsed.

The market for plastic bottles is shown in Figure 2.6. It is largely similar to plastic film except for a large spike in prices in mid-2008. Prices were suppressed in 2002-03 but recovered rapidly in 2005. They remained in the range of £100 to £120 for most of the period up to May 2008 before spiking to over £200 in September and subsequently collapsing to £110 in October and £30 in November.

Figure 2.6: Merchant Prices for Plastic Bottles (2001-08)



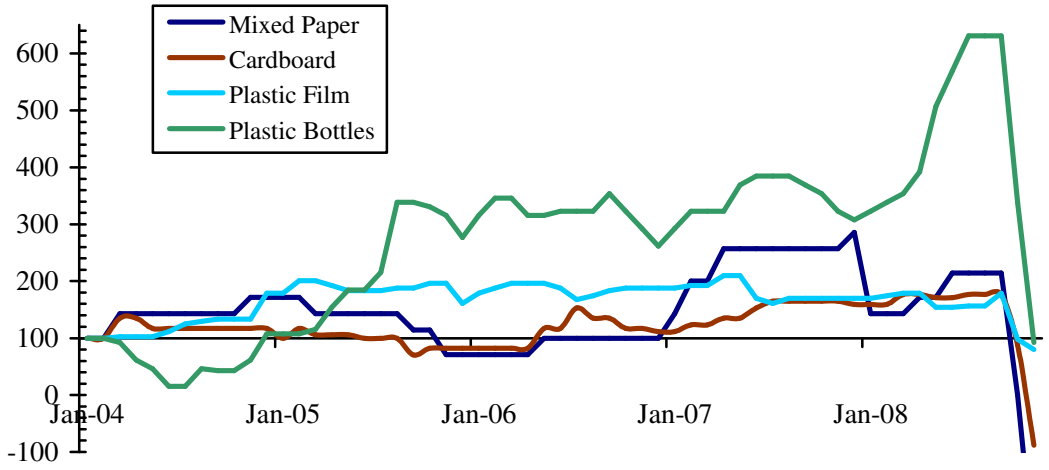
Source: www.letsrecycle.com and own calculations

This market would appear to be subject to some form of speculation with the price spike in 2008 likely to be related to the price of oil which also spiked in this period before collapsing by 50% between May and October 2008. Once again, the current slowdown has caused the price to return to the levels experienced in the economic slowdown in 2002-03.

These charts show that the markets for all these materials have undergone a severe price fall in recent months. These falls have followed a period of stable or rising prices stretching back about 4 years. However, in terms of the long term trend and what might be considered to be the long term sustainable price there are differences. The main difference is that prices in paper and cardboard markets are now far below any prices which have been experienced over this full period. Indeed, removing these materials from operators premises is now a substantial net cost i.e. there is no contribution to revenue so all processing costs must be paid by waste producers or through cross subsidisation from the waste charges that are levied for the collection of material. Plastics have also undergone severe price falls but the story is somewhat different. Here prices have fallen back to the levels experienced in the last economic slowdown.

One way to demonstrate these developments is shown in Figure 2.7. This shows price indices with base January 2004 for the main products. Clearly, as with any index, the base year will be important in determining the shape of the graph but January 2004 represents a good base, it being during a period of relatively stable prices before the upward trends emerged.

Figure 2.7: Price Indices for Paper and Plastics (Jan 04=100)



Source: www.letsrecycle.com and own calculations

Figure 2.7 clearly shows that the price of plastic bottles in particular reached unsustainable levels during 2008. A similar boom occurred in paper in early 2007 which partially corrected in early 2008[10]. Both plastic bottles and plastic film are now close to their price levels in January 2004. This is not atypical of what might be expected to confront price takers in a commodity market that is subject to cyclical swings. As a result, while severe price falls have occurred in plastics markets, the real

[10] These indices are drawn using prices offered by merchants rather than in export markets for paper.

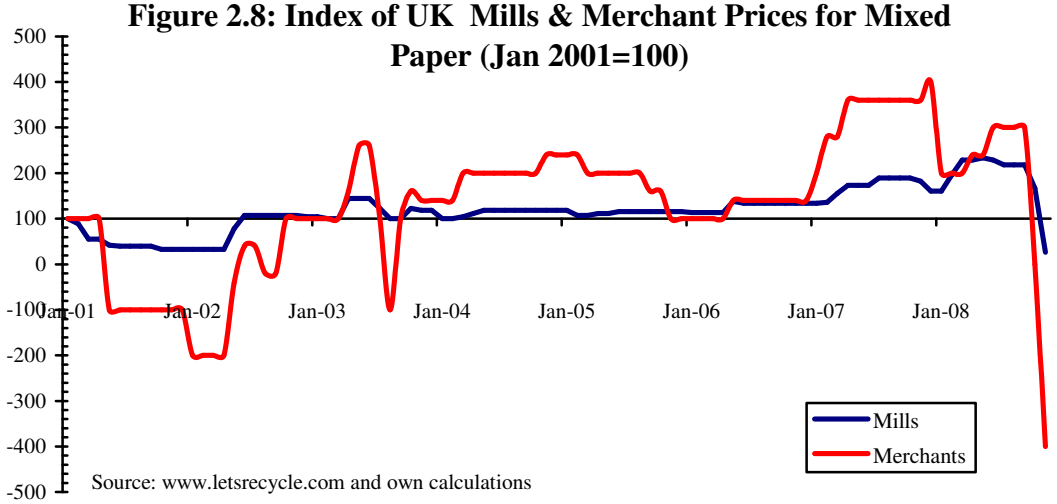
story relates to paper and cardboard markets which have collapsed to well below what might be expected on the basis of price trends in recent years.

2.4 Other Markets and Materials

This disruption has been reflected in other recyclate markets also but not to the same extent. Two markets available to Irish operators are illustrated below. The first is the price paid by UK paper mills. These account for in the region of 60% of the paper that is recycled in the UK. An index of prices is shown in Figure 2.8 with the prices offered by merchants in the UK included for comparison purposes. While world prices will clearly have an impact on the prices that are available from the UK mills, the market is different from the global commodity market that is faced by Irish operators (as represented by the prices paid by merchants).

It would be expected that price changes by the mills would be less sudden and divergences from the long term sustainable level would be less extreme. There is a limited number of UK paper mills so each has some degree of control over their prices. While competition law forbids collusion, economic theory would indicate that these firms will closely watch competitors' prices and would be likely to operate in a manner to ensure that UK paper prices are not as volatile as the data for prices on world markets would suggest. This would be in the mills' interests but will also provide a certain degree of stability to their suppliers. The relative stability of prices will also be supported by the fact that recycling operators, while continuing to be price takers in principle, would have a greater degree of market power relative to the available outlets than would be the case with exports on global commodity markets. This relative price stability is clearly seen in Figure 2.8.

Figure 2.8: Index of UK Mills & Merchant Prices for Mixed Paper (Jan 2001=100)

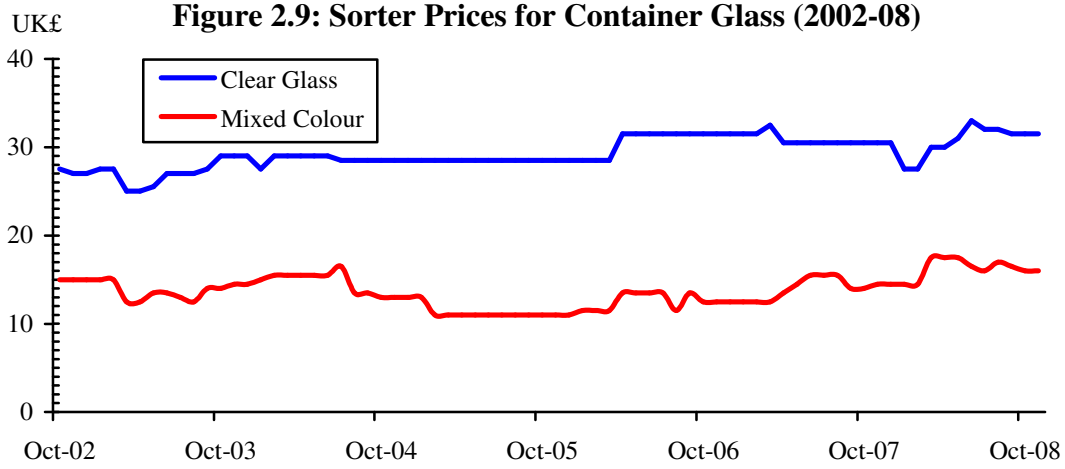


Source: www.letsrecycle.com and own calculations

However, it should also be noted from Figure 2.8 that the prices being offered by merchants have generally exceeded those available from the mills in recent years, often by a considerable margin. This has provided a power incentive for the diversion of material to world markets, principally China, and has greatly weaken the recycling sector in Europe. Similar effects have been seen in other markets for recyclate materials across Europe. As a result, these developments have a pan European dimension that is not limited to the difficulties being faced by Irish operators.

A somewhat similar situation exists in the glass recycling market. Ireland has no glass recycling in the Republic but about 80,000 tonnes per annum is recycled by Quinn in the North which accounts for most of the glass that is recovered in the Republic. Most UK glass is recycled either domestically or in Europe. Figure 2.9 shows UK prices for glass delivered to sorters.

Figure 2.9: Sorter Prices for Container Glass (2002-08)



Source: www.letsrecycle.com and own calculations

As can be seen, this market has been very stable with no evidence of the recent turmoil. Over the whole period from October 2004 to October 2008, prices for clear glass containers rose by 14.5% and by 6.7% for coloured glass. While insufficient to maintain real values, particularly given the rate of cost inflation for collectors, these markets provide a relatively stable environment for the industry.

While the different products involved would mean that a response similar to paper and plastic markets should not be expected, the price stability seen in the glass market is in part a reflection of the availability of domestic markets for UK producers of material for recycling.

In summary, the evidence indicates that the severe price falls in markets for recycled paper and plastics is not typical of all markets for recyclate materials. Thus, while the global economic market is undoubtedly the trigger for the price falls that have been seen, these markets have seen greatly exaggerated falls. Furthermore, there is reason to believe that the existence of a domestic recycling sector that processes material beyond segregation, can act to reduce volatility in prices and provide stability for operators.

3. Economics of Recycling Sector

3.1 Export Revenue Projections

Impact of Exchange Rates

The analysis in Section 2 used prices expressed in UK£ as offered to UK operators. For most of the period covered there has been a fairly stable UK£/Euro exchange rate so the trend in Euro prices would have been similar to that illustrated. Of course currencies constantly vary in value but €1 was worth approximately UK£0.70 in October 1998 (using the inferred value from a basket of currencies) in October 2003 and again in October 2007. In the 4 years to October 2007 the range of the Euro was only UK£0.66 to £0.70. However, this has not been the case for the past year and particularly for the past few months.

Figure 3.1 shows the rapid appreciation of the Euro against the UK£ over the past year. The Euro was worth just over £0.70 in mid October 2007. By mid October 2008 it had risen to £0.78. Since then the rise has accelerated to just under £0.86.

Figure 3.1: Euro-UK£ Exchange Rate (Oct 2007 – Nov 2008)

Note: The vertical scale on this figure shows UK£ per Euro at the daily closing price for the period. The range on the scale is €1 = £0.69 up to £0.86 with a closing price on 17th November of £0.8429.

Table 3.1 shows the impact of this appreciation in terms of the Euro prices that are available to Irish operators, using the UK prices for materials as above and mid-month exchange rate values. The extent of the price falls that have occurred in recent months tend to obscure the impact of currency changes on these markets. However, when the months of October and November 2008 are excluded the importance of this issue becomes more obvious. Exchange rate changes were sufficient to effectively wipe out the price gains that occurred in October 2007 to September 2008 in markets for mixed papers, cardboard and plastic film. This shows that not only are the price falls facing operators in recent months somewhat greater when calculated in Euro than the analysis above suggests, but that the sector cannot avail of one of the major benefits of Ireland's membership of the Euro i.e. reduction of exchange rate risk.

Table 3.1: Prices for Recyclate Materials in Euro at Market Exchange Rates

	Mixed Paper £	Mixed Paper €	Cardboard £	Cardboard €	Plastic Film £	Plastic Film €	Plastic Bottles £	Plastic Bottles €
Oct-07	57.50	82.71	69.00	99.25	190.00	273.30	115.00	165.42
Nov-07	55.00	76.97	67.50	94.46	190.00	265.88	105.00	146.94
Dec-07	54.00	75.49	65.00	90.87	190.00	265.62	100.00	139.80
Jan-08	59.00	78.20	70.00	92.78	190.00	251.82	105.00	139.17
Feb-08	65.00	86.82	83.00	110.86	195.00	260.45	110.00	146.92
Mar-08	70.00	90.16	88.50	113.99	200.00	257.60	115.00	148.12
Apr-08	67.50	83.91	82.00	101.94	200.00	248.63	127.50	158.50
May-08	66.50	83.82	73.50	92.64	172.50	217.42	165.00	207.97
Jun-08	68.50	86.76	70.50	89.30	172.50	218.49	185.00	234.33
Jul-08	71.00	89.48	73.00	92.00	175.00	220.54	205.00	258.35
Aug-08	66.50	84.48	69.50	88.29	175.00	222.31	205.00	260.42
Sep-08	66.50	83.85	73.00	92.04	200.00	252.18	205.00	258.48
Oct-08	35.00	44.79	42.50	54.38	110.00	140.75	110.00	140.75
Nov-08	6.00	7.02	17.50	20.49	90.00	105.36	30.00	35.12
% change	-89.6%	-91.5%	-74.6%	-79.4%	-52.6%	-61.4%	-73.9%	-78.8%
% change Oct 07 – Sept 08	15.7%	1.4%	5.8%	-7.3%	5.3%	-7.7%	78.3%	56.3%

The EPA database shows that 36.1%, or 1.12 million tonnes, of municipal waste was recovered in 2006. Using the earlier assumption this gives a projection of 1.17 million tonnes in 2008. Of this, paper and cardboard account for an estimated 615,760 tonnes and plastics for 66,462 tonnes, giving a projected total for these materials of 682,222 tonnes in 2008. Consultations with industry operators provide estimates, shown in greater detail in Table 3.3 below, that allow for the further breakdown of these categories. These data, show that paper and cardboard comprise mixed papers, cardboard and news and pams and accounted for 85% of the total of material surveyed in the consultations[11]. These sub-categories account for 49%, 8% and 28% respectively of the total. Applying these relative proportions to the 2008 projections of the EPA data provides the estimate that recycling of mixed papers – excluding news and pams – will amount to 355,000 tonnes, cardboard to 58,000 tonnes with news and pams amounting to about 203,000 tonnes.

The data in Table 3.2 show that mixed plastics accounted for 4.5% and plastic bottles for 4% of the material surveyed in the consultations i.e. they account for 53% and 47% of the total respectively. Applying this to the projected total of just over 66,000 tonnes gives an estimate of 35,000 tonnes of mixed plastics and 31,000 tonnes of plastics bottles in 2008.

Table 3.2 provides an estimate of the value of this material using the prices for November 2007 and those currently available as shown above for November. These calculation indicate that the fall in prices, should existing prices persist for a year, would reduce the value of material that is exported by €38.2 million.

[11] As noted earlier, news and pams arise from waste that is not defined as packaging placed on the market under the 1997 regulations.

Table 3.2: Projected Volumes and Values of Recovered Materials (UK prices)

	Volume (tonnes) 2008	Nov 2007		Nov 2008		
		Price (€ per tonne)	Value (€000s)	Price (€ per tonne)	Value (€000s)	Change (€000s)
Mixed paper	355,000	76.97	27,324	7.02	2,492	-24,832
Cardboard	58,000	94.46	5,479	20.49	1,188	-4,290
Plastic film	35,000	265.88	9,306	105.36	3,688	-5,618
Plastic bottles	31,000	146.94	4,555	35.12	1,089	-3,466
			46,664		8,457	-38,207

However, it should be remembered that these calculations use UK data and assume that similar conditions will exist in Ireland. In addition, the 'Mixed Plastics' output is valued using the UK Data for plastic film but as discussed below, differences between the reported UK price for this material and the prices that Irish operate report suggest that a different definition may be applicable. To address this issue, data on the prices received by Irish operators were collected to assess the potential impact of the price falls.

3.2 Operator Costs & Revenues

The most immediate impact of the fall in prices will be felt by medium-sized segregating plants. The cost of collecting and processing waste for recycling depends on the type of collected material i.e. backdoor (segregated waste from producers) or front-door (primarily recycling bins from households and small businesses). The former is relatively cheap to handle as the main cost involved relates to collection with low additional costs. Typically the total cost would be in the region of €70 per tonne although this may be lower in some parts of large urban areas where there has been considerable competition for these waste streams. Collection costs from households are considerably higher but vary according to whether an urban or rural area is involved. On average it costs in the region of €2.30 per bin per lift for collecting and processing material from households. This gives an annual cost of €60 per household with each household providing around 300kg of material. This gives a cost of €200 per tonne for material from household recycling bins. Of this, about €70 per tonne (35%) arises from the cost of segregating the material collected.

The EPA data for 2006 show that out of a total of 1.12 million tonnes of waste from household and commercial sources that was recovered, 394,000 (35%) was from households and 65% from commercial sources. If these percentages are applied to the cost estimates of €70 per tonne for recovering segregated commercial waste and €200 per tonne for household waste, then this gives an average cost per tonne of €115.50. Since most of this material is exported in the case of paper, cardboard and plastics, an additional cost will arise to transport the segregated material to ports. Clearly this will vary according to the location of the recycling centre with low costs in the Dublin area but a cost per tonne of perhaps €10 per tonne from inland locations. Thus, the average total cost per tonne to deliver segregated recyclate to ports is about €120.

Revenues are earned from three sources:

- The sale of segregated materials at market prices. This accounted for an average of about €80 per tonne across all materials in recent years. This more than paid for the cost of managing backdoor waste and amounted to 40% of the cost of domestic waste recycled. Averaging across both waste streams, market revenues amounted to 67% of the cost of collecting the waste;
- Repak subsidies which vary considerably depending on the source of the waste. A subsidy of €12 per tonne (17% of the cost of managing the waste) is paid for commercial waste largely as an incentive to firms to record the waste and maintain an audit trail. The cost of recycling this waste is the responsibility of the producer and is paid for as a commercial transaction between the producer and the waste management contractor. In the case of domestic waste, the average subsidy amounted to €72 per tonne which is 36% of the total cost of collection and segregation[12]. On the basis that, by weight, waste for recycling is 35% of domestic origin and 65% of commercial origin, this means an average subsidy of €33 (27.5% of the average cost); and
- Cross subsidisation from waste disposal charges amounting to an average of €16 per tonne or 13% of the average cost[13].

It is immediately clear that the key income stream to cover the costs of recycling is revenue earned from selling the materials that are recovered. Any fall in these revenues will have to be made up from increased charges under the other headings unless an alternative source of income is identified. The typical composition of a tonne of material received for recycling is shown in Table 3.3 along with the prices received during 2008 up to August and prices received in recent weeks for segregated material[14]. This allows the value per tonne of material to be estimated. All prices are in Euro per tonne for freight alongside ship (FAS) i.e. delivered to ports for export.

The sharp price falls in recyclate markets are reflected in this table. At current prices, the market value of recovered material has been eliminated. Overall, the fall in the value of a tonne of material that is accepted for recycling, when current prices are compared to the prices that were available earlier in 2008, is just under €90.

[12] The cost of managing domestic waste has been calculated on the basis of €2.30 per lift and includes the costs of collection. However, collection is usually seen as a fixed cost to be borne irrespective of how the waste is subsequently managed. As a result, it is more usual to relate the subsidy to the additional costs of segregation and placing recovered material on the market and the Repak scheme operates on this basis.

[13] If these average revenues per tonne from these three sources are totalled they amount to €129 per tonne or 107.5% of costs. This indicates a margin of 7.5% on operations which appears reasonable. However, it is repeated that this study has not undertaken an in-depth examination of the commercial realities of the recycling industry and it cannot be confirmed to what extent the costs given for waste management operations include some allowance for capital costs and depreciation.

[14] EPA data discussed above indicate that paper and cardboard accounted for 588,556 tonnes and plastics for 63,526 tonnes of recovered material in 2006, a ratio of 9.3:1. These estimates from industry operators indicate that various papers account for 85% of volumes received for segregation and plastics for 8.5%, a ratio of 10:1. These are considered to be sufficiently close to suggest that the data that has been obtained from consultations are an accurate reflection of the industry.

Table 3.3: Composition and Value of Material Segregated (€per Tonne)

		Up to August 2008		Current		Fall in Value
		Price	Value	Price	Value	
Mixed Paper	49.0%	70	34.30	-10	-4.90	-39.20
Cardboard	8.0%	90	7.20	20	1.60	-5.60
Mixed plastics	4.5%	0	0.00	-60	-2.70	-2.70
Plastic bottles	4.0%	160	6.40	0	0.00	-6.40
Steel	1.0%	120	1.20	0	0.00	-1.20
Aluminium	0.5%	800	4.00	100	0.50	-3.50
News & pams	28.0%	140	39.20	30	8.40	-30.80
Waste	5.0%	-130	-6.50	-130	-6.50	0.00
Total per tonne	100%		85.80		-3.60	-89.40

Source: Consultations with operators. These prices do not equate precisely with those in Section 2 due to differences in specifications and in location i.e. merchants at gate compared with FAS. The main difference relates to the Irish specification of 'Mixed plastics' which differs from the UK data on 'Plastic film'. About 5% of material collected for recycling is contaminate that must be landfilled with a cost of €130 per tonne to include gate fees, landfill levy and handling costs.

It is possible to use these data to provide an estimate of the fall in the value of the markets for the paper, cardboard and plastics materials. This is shown in Table 3.4.

Table 3.4: Fall in Value of Recovered Materials, Nov07-08 (Irish price data)

	Annual Tonnes	Change per tonne (€)	Change in Value (€000s)
Mixed paper	355,000	-80	-28,400
Cardboard	58,000	-70	-4,060
Mixed Plastic	35,000	-60	-2,100
Plastic bottles	31,000	-160	-4,960
			-39,520

Using this approach and Irish data indicates that the falls in prices will cost the sector €39.5 million in a year should current prices persist, when compared with prices that were being received earlier in 2008. Given that the calculation above using data from the UK dataset estimated the lost value at €38.2 million (Table 3.2), it can be concluded that the fall in prices for paper, cardboard and plastics would cost the Irish recycling sector €39 million, should current prices persist.

This has clear implications for the commercial viability of waste collection and recovery operations. While this is discussed further below, this study has not examined the profitability of waste management operators over recent years and so cannot reach a definitive conclusion beyond reporting on opinions expressed by operators However, there are also potentially important implications for waste management policy that go beyond the viability of these firms. Achieving the objective of diverting material from landfill depends crucially on making recycling a financially more attractive option relative to landfill. This has been achieved through a number of interventions with the landfill levy playing a role. This levy, along with restrictions on landfill capacity and strict enforcement of environmental regulations at landfills, acts to push up the price of landfill. The implications of the fall in the value

of segregated material is that the net cost of recycling has now risen when compared to the situation before the price collapse, but there has been no change in the value of the levy. As a result, the possibility arises that the previous financial incentive in favour of recycling may have weakened.

This gives rise to two questions. First, what is the relative balance in the current market of landfill and recycling? Second, what does this imply for the landfill levy taking into account the impact that changes to the levy would have on the sector?

The data above can be used to answer the first question. Prior to the fall in market prices there was a strong incentive to recycle. For commercial waste, revenue per tonne arose from €86 per tonne from market sales and €12 from Repak giving a total of €98 per tonne[15]. The average cost of managing the waste was €70 giving a net negative cost i.e. an excess of revenue over cost, of €28 per tonne if the material was recycled. If landfilled, it cost €130 per tonne[16]. The difference amounting to €158 per tonne provided the incentive to recycle.

For domestic waste the calculation was somewhat different but gave the same result. Sale of material amounted to €86 per tonne and the Repak subsidy averaged €72 per tonne. Costs amounted to €200 per tonne giving a net cost of recycling of €42. Again the difference of €88 compared with landfill was sufficient to make recycling attractive.

Current prices for materials mean that the incentives is greatly weakened since the value of materials placed on the market is negative €4 per tonne. For commercial waste, revenues amount to the €12 payment from Repak meaning that the net cost of recycling now €62. This is still sufficiently lower than the €130 landfill fee to mean that recycling remains attractive.

For domestic waste, the Repak subsidy of €72 mean that net costs of recycling now amounts to €132, approximately the same as the landfill cost meaning there is no *a priori* incentive to recycle.

However, some other points should be noted. First, if an operator decides to landfill rather than recycle, they will still face the cost of collecting the material. The consultations suggest that these account for about €130 per tonne of the total €200 cost. On this basis, the cost of landfill will now be €260 per tonne compared to €128 per tonne for recycling. It is possible that an operator deciding to increase landfilling could avail of some economies of scale to reduce collecting costs but this calculation would suggest that the incentive remains in place. Second, for an operator who also manages a landfill, the cost of landfilling, priced at the marginal cost of replacing capacity, the incentive would be greatly weakened. This would be particularly the

[15] As this calculation is not undertaken to illustrate the commercial viability of operations but to illustrate the decision process, any cross subsidisation of recycling operations by waste charges earned within the business is excluded.

[16] It should be noted that while €130 per tonne for landfill is actually below published prices which average around €150 per tonne in landfills operated by the local authorities, consultations suggest that large operators may be able to get access to landfill at €10 to €15 per tonne lower than the price that is used here. Furthermore, landfill operators with their own waste stream face lower marginal costs for landfilling. The cost of replacement capacity for such operators may be as low as €80.

case for an operator with considerable long term capacity that would not need to replace capacity in the near term. It is conceivable that such an operator may decide to price landfill for own waste streams close to zero. This would wipe out any incentive to recycle. Third, there is an in-built incentive in the regulations to comply with policy. While this may not be sufficient to deter a movement away from recycling in the short term while current market conditions prevail, this would mean that operators would have an incentive to push up prices and recycle to comply with regulations once the current contractual period has ended.

This discussion means that the fall in market prices has potentially important implications for the system of financial incentives that underlies the objective of increasing recycling rates. While it cannot be concluded that the balance of incentives has shifted decisively, it is clear that it is weakened. In the longer term, the likely movement of prices back towards their projected levels plus the ability of operators to push for higher prices would reverse this somewhat. In the short run, the only option would be to push up the price of landfill. In effect this means immediately increasing the landfill levy i.e. the second question above.

Increasing the landfill levy would undoubtedly shift the balance back in favour of recycling. The calculation above indicates that to achieve this in the case of domestic waste, the levy would need to increase by at least €10. However, there are other considerations. The first is that an immediate increase in the levy would have an impact on waste management operators that have already seen a loss of market revenue. Since it would be necessary to push up the levy for all waste streams this would impact on costs for all waste collected. As prices are generally set on an annual basis this would hit a sector that is already under pressure relative to the last few years. The second issue is that the landfill levy precedes the period over which prices for recycled materials have risen. It was introduced at €15 per tonne in 2002 with an option to increase by €5 per tonne per annum. This was only used on one occasion when it was increased to €20 per tonne in 2006. As shown in Section 2 above, prices on recyclate markets were much lower in 2002 and the prices projected below on the basis of their long run trends are higher than they were in 2002 for the main products. Clearly, the 2006 increase was not related to market price changes.

As a result of these considerations, it is not concluded that there is a strong case to increase the landfill levy in the short run on the basis that this would provide a good incentive to recycle. The maximum allowable increase is currently €5 and this would not make a great difference to the incentives facing operators. Other considerations as discussed mean that there are reasons not to act. However, the fact remains that the market collapse has altered the incentive structure and, should current market prices persist and there be a resulting move away from recycling, the case for a large restating of the levy would be strengthened.

3.3 Price Projections

The key assumption underlying the calculations of the cost of the market collapse is that current prices will persist. However, the analysis in Section 2 above does not fully support this assumption. Therefore, some projections are provided below, on the basis of recent price trends, for prices over the next year or so. As in any market,

providing price projections is fraught with difficulty. However, the analysis in Section 2, combined with discussions with operators, allows for some tentative indications to be put forward.

Mixed Papers & Cardboard

The analysis showed that paper prices had collapsed following a period of unsustainable and accelerating inflation in prices since about the end of 2005. Given that there is likely to be a quite prolonged downturn in world markets, demand will remain soft for a while but the current paper price must be considered to be an undershoot of the equilibrium level. Against this background, while the very low prices could persist for a number of months, a return to prices close to the averages seen in 2004-05 would appear reasonable. This would eliminate all the price rises of the inflationary period and allow for more sustainable price rises as the economy recovers beyond 2009. This suggests a price of around UK£38 per tonne for mixed papers and £58 per tonne for cardboard. The evidence from the discussions in the previous sections would suggest that Irish prices will be perhaps 10% below these prices before exchange conversion. On this basis, and assuming that the UK£/Euro exchange rate settles down at around €1 = £0.80, this gives a price projection of €43 for mixed paper and €65 per tonne for cardboard. These prices are clearly well above those currently available but represent falls of approximately 39% and 28% respectively relative to the prices that were available earlier in 2008.

Plastic Film & Bottles

The analysis in Section 2 showed that prices for plastics have returned to the levels seen in the last economic downturn in 2003-03. The price of oil may also be a consideration in these markets. It is again possible that these prices will undershoot but the best projection is that prices will remain close to the levels in 2002-03 over the next year. This provides a price of UK£22.50 for mixed plastic bottles and £115 for LDPE plastic film. Converting to Euro – and assuming that similar prices are available in Ireland – this gives a price projection of around €28 for mixed plastic bottles and €144 for plastic film. As noted earlier, this plastic price does not refer to the mixed plastic product that is produced in Ireland while the price for bottles is well below the inflated prices of €160 that were available during 2008. Table 3.5 revises the calculations in Table 3.4 on the basis that prices recover somewhat in line with these projections.

Table 3.5: Fall in Value of Recovered Materials using Projected Prices

	Annual Tonnes	Projected Price (€ per tonne)	Change per tonne (€)	Change in Value (€000s)
Mixed paper	355,000	43	-37	-13,135
Cardboard	58,000	65	-25	-1,450
Mixed Plastic	35,000	-30	-30	-1,050
Plastic bottles	31,000	28	-132	-4,092
Total (annual)				-19,727

Since the UK data do not provide a dataset for Mixed Plastics, it is assumed in this table that 50% of the recent fall in the data obtained from Irish operators is recovered. This calculation shows an annual loss of revenue for recycling paper and plastics amounting to €19.7 million or just about half the previous estimate arising from price

falls in these markets. Price falls in markets for other materials, in particular metals and news & pams, will be additional.

3.4 Impact of Market Collapse on Stakeholders

Waste management contractors, large and small scale operations

It is projected that 1.17 million tonnes of municipal waste will be recovered in 2008. With an average fall in value of almost €90 per tonne compared to prices earlier in the year, and €80 per tonne when compared with prices received in recent years, this means that the fall in prices, should recent prices persist for a year, would mean lost revenue amounting to €94 million using the latter figure. Should prices move back towards projected levels than the loss would be about 50% of this amount.

This lost revenue will have to be recouped. Larger operators will try to push up gate fees and explore other outlets for the material. In the short term this will involve stockpiling and this may enable them to pass through the period of price undershoot and place material on the market at prices closer to sustainable levels. However, the cost of stockpiling and also the risk of degradation of paper means that the usefulness of this option is limited.

In the UK where stockpiling has been undertaken over the past month, the Independent Waste Paper Processors Association (IWPPA) notes that low grade recovered paper, particularly when it has been recovered from households, rapidly deteriorates if stored for more than a few months to the extent that it is no longer suitable for papermaking[17]. This deterioration is very rapid if the paper is stored outside while internal storing is very expensive given the nature and market value of the material. It is unlikely that these costs would be recouped even if the material remained of adequate quality. If it deteriorates then it would have to be disposed of, and all the costs of collection, processing, storage would be lost along with the additional costs of landfilling. As a result, there are considerable risks and potential costs associated with stockpiling and it may be preferable that the costs are borne upfront rather than undertaking a potentially risky approach to defer the costs.

It should be noted from above that recycling, with a cost in the region of €70 per tonne for the more expensive household materials, has been a cost effective option relative to landfill. Landfill currently costs around €130 on average although large volumes have been contracted at prices down to €115. This clear incentive has been a key element in the uptrend in diversion from landfill to recovery in waste management. However, the materials prices seen recently mean that continuing to segregate materials for recycling is not commercially viable, but landfill is not an economic option. However, should markets close altogether or continue to be effectively closed as in recent weeks for some materials, landfilling may be the only option given the limitations of stockpiling.

Further reprocessing to improve quality to enable access to the waste to energy market in the UK would provide another option for removing material that has been

[17] Statement issued by IWPPA (UK) on 18th November 2008. See www.letsrecycle.com

collected and stockpiled. However, the quality of material that is generally produced by the segregation process in Ireland is not generally adequate for this market. As a result, accessing this market would involve considerable additional costs from transport and paying a merchant to undertake the processing. Industry operators estimate that these costs would amount to in the region of €50 per tonne on top of the existing costs. Again this is not an economically sustainable option although it may be a more cost effective alternative to landfilling material for which no market can be found.

Against this, it is clear that inflated prices have provided some comfort for operators in recent years and some will have the resources available to manage the situation. However the options open to small collectors without any processing operations are limited. They will face increased gate fees at segregation centres. The only options would appear to be greatly increased waste charges, non-collection or vertical integration with larger operators. The first appears inevitable over the next few years. If the prices that are available for recovered materials remain at their current levels than the need to make up the lost revenue through higher collections charges would add about €24 to the annual domestic waste charge[18]. The earlier calculations using projected prices suggest that prices may move to a more sustainable level such that the lost revenues are 50% of this. Should this happen, then the increased required would be about €12 per household. This increase would be in addition to any increase that is required as a result of increases in collection and processing costs.

The ability of collectors to implement this increase would be made particularly difficult if current proposals to introduce 'brown bins' and raise the landfill levy are implemented. The increases in charges that would result from these developments would likely lead to considerable resistance to any further increases. While it is too early to identify trends at this stage, there is reason to expect that the current market collapse night provide an impetus towards much greater consolidation in the collection sector.

Repak

Total Repak expenditure in 2007 was €24.2 million. However, current forecasts indicate that the economic slowdown is likely to result in lower income from members in 2008 and 2009. It is clear that the losses in paper, cardboard and plastics revenue in the recycling sector, which will be in the range of €20 million if prices quickly rise to projected levels and close to €40 million if they remain at current levels cannot be recouped from Repak. In any case, Repak's members only account for a part of packaging waste in Ireland – Repak estimates that members account for 60% of packaging waste – and packaging is only part of all paper and plastics waste. Using current membership rates and with stringent enforcement of compliance, it is estimated that mandatory membership of Repak would raise revenues by close to €10 million. This would go some way to addressing the shortfall if the system was reformed to achieve mandatory compliance. Even so, a considerable shortfall in revenues would remain, but there would be an opportunity to increase membership

[18] This is calculated on the basis of an average household producing 300kg of material each year. The value of this material has fallen from about €80 per tonne in 2007 to zero at current prices. This amount would be recouped through an increased charge of €24.

fees. In the absence of mandatory compliance any effort to increase membership fees would make self-compliance a more attractive proposition for firms. This is particularly the case since self-compliance appears to be poorly policed[19]. This is particularly important since, should the membership base contract, the subsidies that could be provided to operators would fall thereby compounding the problems that have emerged.

Ultimately, the 1997 regulations require that firms pay for the cost of recycling packaging material they place on the market. The net cost of recycling has risen. Since the industry operates on a commercial basis, this will be passed on. As a result, the cost to be borne by firms will rise, unless markets recover very strongly in the short term. It is therefore increasingly important that these costs are equitably distributed to ensure that the full range of firms placing packaging waste on the market are included in paying for recycling.

Households

The reduction in revenue of €80 per tonne will have to be recovered by operators if they are to continue to cover their costs. With an average weight of 300kg of recyclable material supplied per household this will immediately add €24 to household waste charges. While waste charges vary, this would represent an increase of around 8% on annual charges. This is approximately 3 times the forecast consumer inflation rate for 2009. Households are also likely to face higher charges as a result of new regulations on brown bins and the prospect of the landfill levy rising.

Local authorities

The situation facing local authorities is not unlike large waste management operators in the private sector but the options to push up waste collections charges may be even more limited. Some local authorities have strong market positions due to their ownership of landfills and the fact that of the local authorities that continue to collect domestic waste, there is a tendency towards concentration in large urban areas and withdrawal from collection in many areas. The fall in prices on markets is a direct loss of revenue to local authorities engaged in recycling. Local authority collection costs also tend to be high and opportunities to cut these costs are limited due to social commitments[20]. However, local authorities do not work as commercial entities and non-collection of material would be unlikely to result. Local authorities are less likely to stockpile material in the hope the prices will recover and will off-load it even at prices that are well below economically viable levels. This provides an option to get through the cyclical downturn but clearly some adjustment in budgets or in operations will be needed if prices move to a lower level for a protracted period.

[19] This statement is based on anecdotal evidence from the consultations. No dataset is available to confirm this perception. Data on the costs of self-compliance relative to Repak membership are not readily available although Repak is one of the lowest cost packaging compliance schemes in Europe. It may also be noted that the maximum fee applicable to firms choosing to self comply is €15,000. Some Repak member firms pay annual sums which are multiples of this figure in respect of packaging materials placed by them on the market.

[20] A formal examination of the cost structures of local authorities with reference to their waste management activities is outside the scope of this study, but costs may also be relatively high due to work practices in the local authorities.

Government policy on recycling and sustainable waste management

Government policy is based on a combination of regulation and economic incentives. The incentive structure of the past number of years has determined that recycling has been a cost effective and commercially viable way to manage waste. This has meant that compliance is high and policing costs low. Even with the falls in prices it remains economically attractive relative to landfilling, but it is no longer commercially viable. The increased need to subsidise recovery processes risks introducing a powerful incentive to work outside the system and avoid costs by handling waste through unregulated channels. The previously increasing trend in illegal dumping has been reversed in recent years but the increased cost of compliance with waste regulations, should current market prices for recovered materials persist and should new regulations be introduced, may once again make this an attractive option. In the short term, the effective closure of some markets and the need to stockpile material risks undermining the ability of the waste management system to divert waste from landfill as material will soon degrade and become unsuitable for further processing. Segregated recyclable material for which markets cannot be found will soon need to be treated as waste for disposal, as discussed above, thereby increasing the proportion of waste going to landfill.

The recent price falls show that the waste management system that has been developed has a number of serious weaknesses that were disguised by the high prices that were available for materials. Key to this is the truism that recycling is costly and must be paid for. If payment is not enforced then there is an incentive to avoid the costs through breaking the rules. The enforcement mechanisms have not been developed with an over-reliance on cyclical economic incentives.

Buoyant global markets for raw materials have hidden the fact that the Irish recycling sector engages in little more than segregation with little value added. The materials are then placed on commodity markets with Irish operators having no market power i.e. they are price takers. Added to this is the fact that the material from some operators has been poor so that Ireland is not seen as a good source of material. With higher transport costs and little opportunities to develop domestic economies of scale the Irish operators will be hardest hit when prices fall and last to recover.

The market disruption also shows that there seems to have been a lack of effective costing of regulations in this area. While market prices remained high the net cost of recovering material that needed to be paid by producers remained low. What is now clear is that the process of waste recovery is costly and while this does not mean that the objectives of policy are inappropriate from the point of view of social costs and benefits, it does mean that the true costs have not had to be fully internalised up to this. In other words, it has not been necessary up to this for waste producers, and ultimately consumers since costs must be passed on, to fully bear the long term costs of recovering recyclable material. This has meant that compliance has been relatively straightforward. However, the actual cost of complying with the regulations and achieving objectives is higher than previously perceived. This requires that there is a reappraisal of the balance between the incentives to comply with the regulations in order to achieve policy objectives and the need to police compliance to ensure that objectives are reached.

4. Failures and Recommendations for Action

4.1 Summary of Conclusions

According to the latest official figures, total municipal waste production in Ireland in 2006 was 3.4 million tonnes. It is forecast that in 2008 there will be 2.07 million tonnes of household waste and 1.39 million tonnes of commercial waste. The EPA data show that 57% of packaging waste was recycled in 2006, well above the 36.1% of all municipal waste and 37.9% of biodegradable waste that was recycled. In 2006, Repak recorded 603,000 tonnes of packaging recycled. Of this, commercial packaging recycled accounted for 430,000 tonnes (71%) and domestic packaging recycled for 173,000 tonnes (29%). This means that there are weaknesses in recycling in Ireland that extend beyond the packaging waste streams that are the focus of this report.

Recycling is costly and must be paid for. The analysis in this report has shown that price falls in markets for recovered waste materials have eliminated an important source of income for firms engaged in collecting and recycling waste. If current prices for paper, cardboard and plastic materials continue to persist, it is estimated that this lost revenue would amount to about €39 million in a full year in respect of these waste streams alone. If prices were to recover quickly to what have been identified as more sustainable price levels then the losses would amount to almost €20 million.

The prices that were available on world markets for recovered materials up to August 2008 made the system of waste recovery economically viable and made recycling cost-effective relative to landfill disposal. Recent market disruption means that recovery is no longer economically viable and some products no longer have outlets. While the recent decision by the Minister to effectively facilitate some stockpiling to occur[21] is understandable, necessary and welcome given the crisis that was emerging, this is not a solution and could lead to even higher costs in the future. As discussed in the previous section, the costs associated with stockpiling and the risk of deterioration mean that this option is of limited use beyond providing a short term mechanism to store materials where markets have effectively closed. However, the alternatives to stockpiling, which are effectively limited to landfilling or accessing waste to energy markets, would cost waste management operators around €130 and €50 per tonne respectively, in addition to any costs of collection and separation that have already been incurred.

The price falls have shown that the true costs of operating waste recovery in order to achieve policy targets are considerably higher than previously perceived. If processing is to continue to be carried out on a commercially viable basis, additional sources of revenues will have to found. It is likely that markets will go through a period when prices undershoot their long term sustainable levels. It is likely that it will take a considerable period for prices to regain these levels.

[21] 'Minister Gormley Comments on Recyclates Market' Press Release from Department of the Environment, Heritage and Local Government, 31st October, 2008

Alongside this it is clear that there are systemic failures in the sector. The clearest weakness is that waste recovery operators sell into markets with prices that are subject to considerable short run volatility, but these firms have high fixed costs and limited opportunities to alter their charging structure in the short term to make up for lost revenues due to falls in market prices for recovered materials. Collection charges, which must make up for the lower revenue from sales, are set on an annual basis so the average contract has six months to run. As a result, there is on average a six month delay before waste management operators can access additional revenue. There is also likely to be considerable resistance to increasing waste charges to households. Repak subsidies cover part of the costs of recovery but Repak is limited in its ability to increase membership fees given that obligated firms can opt to self-comply.

It is beyond the scope of this study to ascertain levels of profitability in the waste management sector, but the consultations that have been undertaken show that material is building up at recovery sites and the possibility has been raised that the costs of processing and lack of outlets may lead to non-collection of material. Short term measures are required to address the current situation but the systemic weaknesses also require resolution.

The system that has been implemented to recover packaging waste is based on creating mechanisms whereby the producers of waste pay the costs of its recovery. Lower prices in markets for recovered materials mean that the net costs of recovery are now higher than previously. At current prices, the value of a tonne of recovered material is about €80 below what it was in 2007. If prices recover to the levels that have been identified as their sustainable levels i.e. the projected price levels identified in Section 3 above, then producers of paper, cardboard and plastics will have to pay about €20 million more per annum than in 2007. The recommendations below are designed to ensure that the system can raise these revenues.

4.2 Proposed Short term Measures

The immediate challenge is to find an outlet for stockpiled material. Failure to do so will block the ability of the waste management system to operate and will ultimately lead to higher costs and landfilling of existing material as it will soon deteriorate. **It is recommended that stockpiling should be restricted in the case of any products that are likely to deteriorate. Therefore, paper products should be placed on markets or landfilled.**

It is preferable from the point of view of the environment that the material is placed on the waste to energy market in the UK. This is also the more cost effective option from the point of view of waste management operators. The net cost of preparing material for waste to energy and transport to the UK is estimated at around €50 per tonne in addition to the costs of collection and primary separation, compared to around €130 per tonne for landfilling. The recent market price for mixed paper has been around -€10 per tonne i.e. it costs €10 to place it on the market. However, demand has been very low and insufficient to clear the material. **It is recommended that the Minister should announce a programme of assistance for segregated**

mixed paper that cannot be placed on recyclate markets to allow this material to access waste to energy markets in the UK. The volume of material that would need to be put on the waste to energy market will depend on how prices in the recyclate market change in the short term. As a result, it is not possible to be precise regarding the cost of eliminating paper stockpiles through waste to energy, but it is possible to estimate a maximum cost using a worst case scenario. Assume the market remains effectively closed for the next six months. This would mean that about 180,000 tonnes of mixed paper would need to be processed for use in waste to energy. It should be noted that even at current prices, there is an incentive for waste management operators to place mixed paper on world markets where buyers can be found. As a result, this programme does not aim to create a competitive alternative to existing markets but to avoid the stockpiling of paper in cases where no market exists. **This programme should operate for six months only.** Beyond this, waste management operators should fund the processing of this material through increased waste charges[22].

It is recommended that the Environment Fund should be used to fund these costs on the basis that there is a considerable risk that the alternative is temporary stockpiling of material that will soon deteriorate and will ultimately require to be landfilled.

While it is recognised that the fall in market prices has weakened the incentive to recycle, this does not mean that the landfill levy should be increased at this time as this would place a drain on th finances of operators. **Should prices remain at current levels and lead to a fall in recycling rates then it is recommended that the landfill levy should undergo a major revision to reconstruct the incentive to recycle.** The extent of this revision should be based on developments.

It is recommended that the announcement of a large increase in the landfill levy should be made six months in advance of the implementation of the increase. This will allow collectors to adjust their pricing to reflect this higher charge. **It is also recommended that any such announcement should be accompanied by clarification of how the increased revenue from the levy will be used.**

Even if market prices begin to recover in the short term, Irish producers of recyclate materials are price takers with very little power on world markets. Longer term recommendations in this regard are discussed below. **In the short run, it is recommended that the Government should begin to explore options to establish strategic relationships with larger EU member States to gain access to existing recycling facilities in Europe that can undertake secondary and further processing of recovered material.**

4.3 Longer Term Measures

The main recommendation is that the principle that the producers of recyclable waste should pay for the costs of its recovery should be maintained. However,

[22] The actions undertaken under the Farm Plastics Recycling Scheme in 2006 and 2007 provide precedent for the allocation of funds to handle waste materials.

this is not a recommendation of non-intervention since there are weaknesses that must be addressed if this principle is to be maintained while also minimising the long run costs of recycling. There are two key areas where intervention is required to address long term challenges: the need to reduce the dependence on global commodity markets and mechanisms to ensure that the true costs of recovery are fully perceived by waste producers.

The Irish materials recovery sector produces low grade material which must then be exported as lack of scale makes further processing economically non-viable in Ireland. However, the threat to Ireland's waste management system that is posed by the effective closure of some markets shows that it is inadequate to depend just on world markets. There is a clear market failure here since the private sector has shown that it is unwilling to invest in facilities to provide domestic markets for recovered products. Indeed, such outlets as existed in the past for glass, paper and steel have disappeared. **Therefore, it is recommended that the Government should undertake an examination of the costs and benefits that would arise from investing in the recycling infrastructure to create domestic markets for recovered materials and strengthen the ability to achieve waste management policy objectives.**

Small domestic scale will always be an issue to be handled. This would be partly addressed if access was available to recyclate processors in larger European economies. However, this requires longer term strategic alliances since recent years have shown that short term contracts with merchants will divert materials to the more volatile Asian markets. **It is recommended that the Government should explore with EU member states at Ministerial level, and in consultation with Repak, the Irish Waste Management Association and the EPA, opportunities to develop EU processing facilities for recovered materials.** It is worth noting that, along with Ireland, a number of other EU states have seen losses of domestic recycling capacity as domestic material was diverted to Asia to access the higher short term prices in recent years.

As the true costs of recycling will need to be internalised by the waste management system, the incentive to work outside the systems that have been developed will increase. Stricter policing to ensure compliance will be required. Consultations have indicated that some of the material exiting Irish recovery plants has been of particularly poor quality such that Ireland is not perceived to be a source of good quality material**. It is recommended that policing practices in this respect and criteria to be applied should be reviewed and any necessary actions that are identified by this review should be undertaken to address this issue.**

Obligated firms can comply with the 1997 Packaging Regulations either through membership of Repak or through self compliance. However, the inability of Repak to increase membership fees without risking its revenue base, in addition to the high proportion of self compliance or non-compliance, suggests that this system is not working as well as might be expected. On average, membership of compliance schemes is about 90% in Europe – when measured by volume of material placed on the market – compared with 60% in Ireland.

Companies in Ireland meeting certain criteria are obliged to fund the recovery and recycling of packaging they place on the market. However, the definition under the Regulations of 'packaging placed on the market' does not include commercial 'backdoor' packaging waste. **It is recommended that this definition should be extended to cover 'all packaging waste first placed on the market' to cover both domestic and commercial packaging waste and support the obligation on firms to record and recycle their packaging waste.**

Currently, the local authorities have responsibility for policing firms opting for self-compliance. However, there have been very few instances of action being taken to enforce compliance. Furthermore, local authorities also operate as waste collectors and recyclers. It is noted that the EPA was given responsibility to ensure compliance with the WEEE regulations and the EPA would appear to be the appropriate agency to which to assign this responsibility in the packaging sector also. **It is recommended that the Department should undertake a full review of self compliance and its monitoring. Notwithstanding the outcome of such a review, it is recommended that responsibility for monitoring compliance with packaging regulations should be transferred to the EPA.**

While various systems have been implemented around Europe, some countries such as Italy have adopted mandatory requirements for obligated firms to join a compliance scheme. Mandatory membership of a compliance scheme has not been introduced in Ireland. One possible argument against mandatory membership might be that since only one scheme – Repak – currently exists, there would be no competition. However, the consultants do not perceive that there would be anything to gain from introducing competition by replicating Repak's operations in another scheme[23]. The key area for competition is in waste management operations and while there are currently many firms operating in this sector there is likely to be considerable consolidation over the next few years. **It is recommended that the Government undertake a review of the structuring of compliance schemes within the EU, particularly those in France, Belgium and Italy which are most comparable to the Irish partnership model. It is also recommended that mandatory membership of Repak should be introduced unless evidence is produced to indicate that there would be an efficiency gain by introducing a competitor in this area to replicate the operations of Repak.** Responsibility for overseeing overall compliance with the regulations should remain with the EPA.

Newspapers are excluded from the requirements placed on obligated firms to support recycling of packaging. However, newspapers enter similar waste streams and amount to over 28% of the volume of material that is recovered and up to 50% of domestic recycling bins. **It is recommended that a mechanism similar to Repak with responsibility for funding the recovery of the news and pams waste streams should be put in place to ensure that newspapers contribute to the costs of recycling on a similar basis as producers of packaging waste.**

[23] The overall recycling rate in Germany fell from 73% in 2003 to 66.5% in 2006. During this period, competition was introduced as a reform to an earlier system of a monopoly take-back scheme.