OAKDENE HOLLINS

Competitiveness Improvements Potentially Available from Resource Efficiency Savings

for

Defra

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This report has been prepared by: **Dan Eatherley & Steve Slater**

Checked as a final copy by: **Katie Deegan**

Reviewed by: **David Fitzsimons**

Date: **13th October 2009**

Contact: **sslater@oakdenehollins.co.uk**

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Abbreviations

ABI	Annual Business Inquiry
Defra	Department for the Environment, Food & Rural Affairs
GVA	Gross Value Added
MWh	Mega Watt Hour
ONS	Office for National Statistics
RE	Resource Efficiency
RPI	Retail Prices Index
SIC	Standard Industrial Classification

Summary

A study for Defra in 2007 quantified the financial savings associated with resource efficiency across a range of business sectors and sub-sectors[1], and in the UK economy as a whole. The study focused on resource efficiency (RE) opportunities, requiring no, or low, financial investment, that reduced the consumption of energy, the quantity of materials waste produced and the consumption of water.

The present study, conducted by consultancy Oakdene Hollins Ltd in May 2009, seeks to place the 2007 estimates in the context of the competitiveness of businesses where savings opportunities with out capital investment were identified. This study uses the most recently available sector and sub-sector level economic data published by the Office for National Statistics (ONS) in its Annual Business Inquiry (ABI) for comparisons.

The study reveals that, if they were to be realised, the total annual resource efficiency benefits of £6.4 billion would be the equivalent of more than half the average year-on-year growth in profitability of the total UK economy that was achieved in the five years to 2007 and approximately one-third of the growth in gross value added during the same period.

Response to any action to implement appropriate resource efficiency measures is likely to be more favourable in those industries that appear to offer the greatest opportunity to improve profitability. Within the overall figures, therefore, this report identifies a number of business sectors and sub-sectors whose gross profitability would benefit significantly from the savings.

The greatest single savings opportunity is in the Road Freight Transport sub-sector, which could improve gross profitability by some 40% through improving fuel efficiency. Two further industries that the research identifies as offering significant energy savings are Agriculture and Warehousing, both of which could improve profitability by some 5.5%.

The opportunities in material waste efficiency measures are also substantial in the Food & Drink sub-sector, with the equivalent of 7% of gross annual profits to be won with no, or low, financial investment.

The implementation of savings in water consumption in Agriculture and Forestry could, perhaps, improve the profitability of these sectors by nearly 4%.

[1] Defra. 2007. *Quantification of the business benefits of resource efficiency.*

1 Introduction

In 2007, Oakdene Hollins Ltd and Grant Thornton UK LLP were commissioned by the Department for Environment, Food and Rural Affairs (Defra) to quantify, in financial terms, the business benefits of resource efficiency in the UK. The report focused on efficiency benefits from no, or low[1], financial investment, in:

- The consumption of energy,
- The quantity of waste produced, and
- The consumption of water.

The total value of no-cost or low-cost resource efficiency benefits was estimated to range between £5.6 billion and £7.4 billion (mean £6.4 billion) annual savings opportunity[2]. Energy (52% of the total) and waste (41% of the total) are the two areas where the most opportunity was identified (Table 1).

Table 1: Summary of the estimated RE opportunities across the UK economy

Resource	Estimated savings opportunity (£M)	Percentage of total estimated savings
Energy	3,349	52%
Waste	2,659	41%
Water	441	7%
Total	**6,449**	**100%**

Source: Defra. 2007. *Quantification of the business benefits of resource efficiency.*

The 2007 study identified those business sectors or sub-sectors with the most to gain from improving resource efficiency. These are summarised in Table 2. In order to assess the significance of the savings identified, they need to be set in the context of the UK economy as a whole, and in the context of the specific business sector to which they apply. A seemingly large opportunity may in reality be negligible when compared with that sector's overall turnover, gross value added (GVA), or profitability. This desk-based study seeks to do this by comparing the estimated savings opportunities with whole UK, and sector-specific, economic data.

[1] 'Low' in the context of this study means resource efficiency interventions with a payback period of less than one year

[2] This represents the current short term (annual) resource savings opportunity and would remain (all else remaining equal) year on year if no intervention was undertaken.

Table 2: A summary of the significant energy, waste and water savings opportunities by subsector

Energy			Waste			Water		
Activity	**Estimated savings opportunity (£M)**	**% of overall energy savings**	**Activity**	**Estimated savings opportunity (£M)**	**% of overall waste savings**	**Activity**	**Estimated savings opportunity (£M)**	**% of overall water savings**
Transport (road freight)	2,017	60.3%	Food & drink	858	32.3%	Public administration	86	19.4%
Chemicals, rubber & plastics	189	5.7%	Retail	489	18.3%	Food & drink	60	13.6%
Retail	141	4.2%	Construction	239	9.0%	Education	40	9.0%
Hotels & catering	109	3.3%	Chemicals, rubber & plastics	235	8.8%	Chemicals, rubber & plastics	39	8.8%
Commercial offices	101	3.0%	Sports & Services[1]	233	8.8%	Agriculture	38	8.6%
Basic metals / mechanical engineering	83	2.5%	Machinery, electrical & transport equipment	195	7.3%	Health & social work	30	6.9%
Food & drink	77	2.3%	Hotels & catering	70	2.6%			
Warehouses	77	2.3%						
Other	555	16.4%	Other	340	12.9%	Other	148	33.7%
Totals	**3,349**	**100.0%**		**2,659**	**100.0%**		**441**	**100.0%**

Source: Defra. 2007. *Quantification of the business benefits of resource efficiency.*

1. Previously described as "Travel Agents"

2 Study method

For each resource type (energy, waste and water), focus was placed on those business sub-sectors for which the 2007 Defra report estimated the most significant savings opportunities (Table 2). Economic data were obtained from the Annual Business Inquiry (ABI) published by the Office for National Statistics (ONS)[1].

For each sub-sector of interest, the following were obtained:

- Total turnover (£ million)
- Approximate GVA[2] at basic prices (£ million)
- Total employment costs (£ million)
- Profit (£ million) – estimated using a proxy measure – that of a measure of gross profitability calculated by subtracting total employment costs from GVA.

Data from 2007 were used for comparisons in this study, as these were the most recent available. Economic data from earlier years were used for calculating year-on-year trends. In addition, comparisons were made against data for the whole UK economy, also using ABI data.

Potential savings were compared with turnover, GVA and profitability for each sub-sector and for the economy as a whole. Of particular interest is the comparison with our proxy measure for gross profitability, which would be directly impacted from the savings, given the low (or no) investment required.

It is noted that the business sectors and sub-sectors addressed by the ABI economic data, and therefore used in this report, are based on 2003 UK Standard Industrial Classifications (SICs). Some sector-specific resource efficiency opportunities identified by the 2007 report are not directly related to SIC groupings. Care has therefore been taken in preparing this report to ensure that the data used for the comparisons are based on sector definitions that are as closely aligned to the Defra report as the available evidence will allow.

[1] http://www.statistics.gov.uk/abi/

[2] According to the ABI website: "Gross value added (GVA) represents the amount that individual businesses, industries or sectors contribute to the economy. Broadly, this is measured by the income generated by the business, industry or sector less their intermediate consumption of goods and services used up in order to produce their output. GVA consists of labour costs (e.g. wages and salaries) and an operating surplus (or loss). The latter is a good approximation to profits."

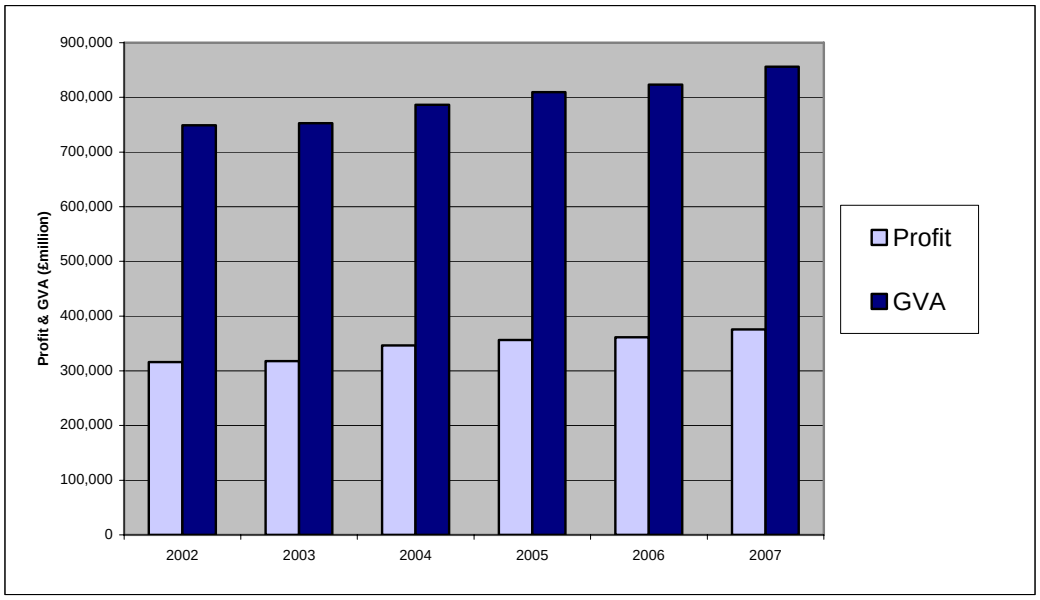
3 Findings

3.1 Overall summary

Fully implementing the potential resource efficiency savings estimated in the 2007 Defra report would have a significant impact on the UK economy.

Figure 1 charts the profitability and Gross Value Added (GVA) of the whole UK economy between 2002 and 2007 in real terms[1] at 2007 prices.

Figure 1: Profitability and GVA of the UK economy – adjusted for inflation



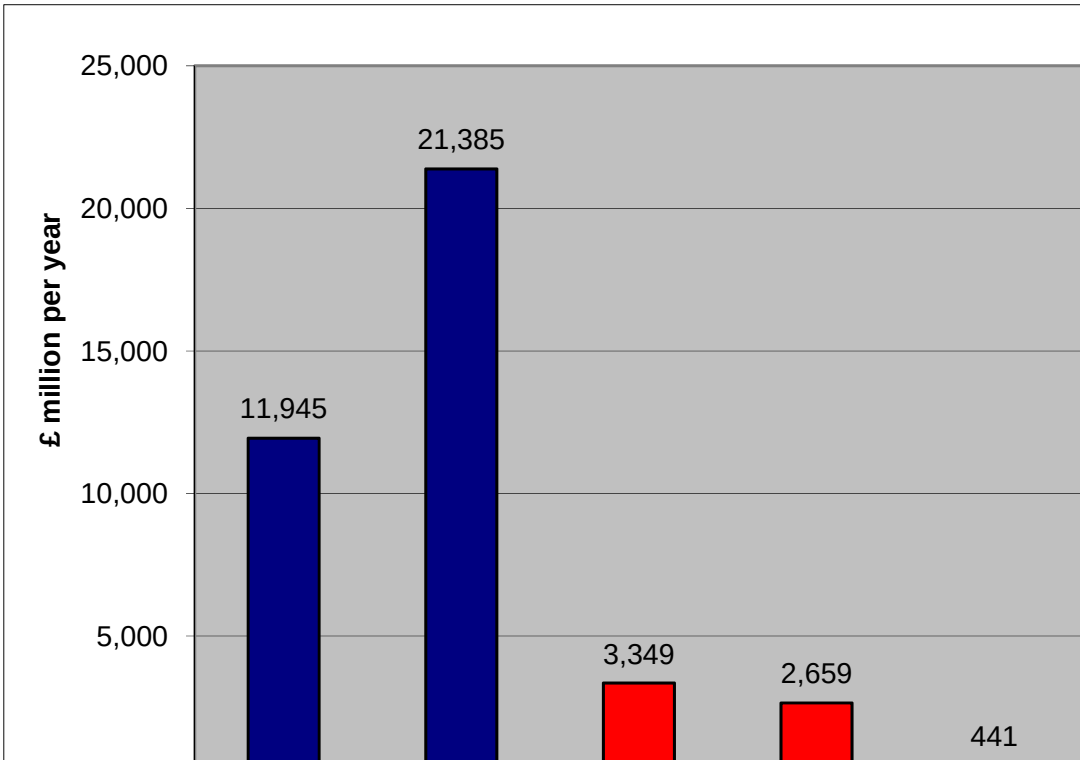
Source: ABI & ONS (for RPI).

From the ABI data it is calculated that, during this five year period, the profitability of the UK economy grew by an average of £11.9 billion per annum and GVA by an average £21.4 billion per annum.

[1] Profitability was calculated by subtracting Total Employment Costs from Total GVA for each year. The figure calculated was then adjusted for inflation to 2007 prices using the Retail Prices Index (RPI) also published on the ONS website.

Figure 2 summarizes the savings opportunities for energy, waste and water compared with these annual growth figures. The total savings opportunity calculated for the whole UK economy, £6.449 billion, represents over half the annual profitability growth and approximately one-third of GVA growth.

Figure 2: Resource efficiency savings compared with average annual growth in the UK economy's profitability and GVA



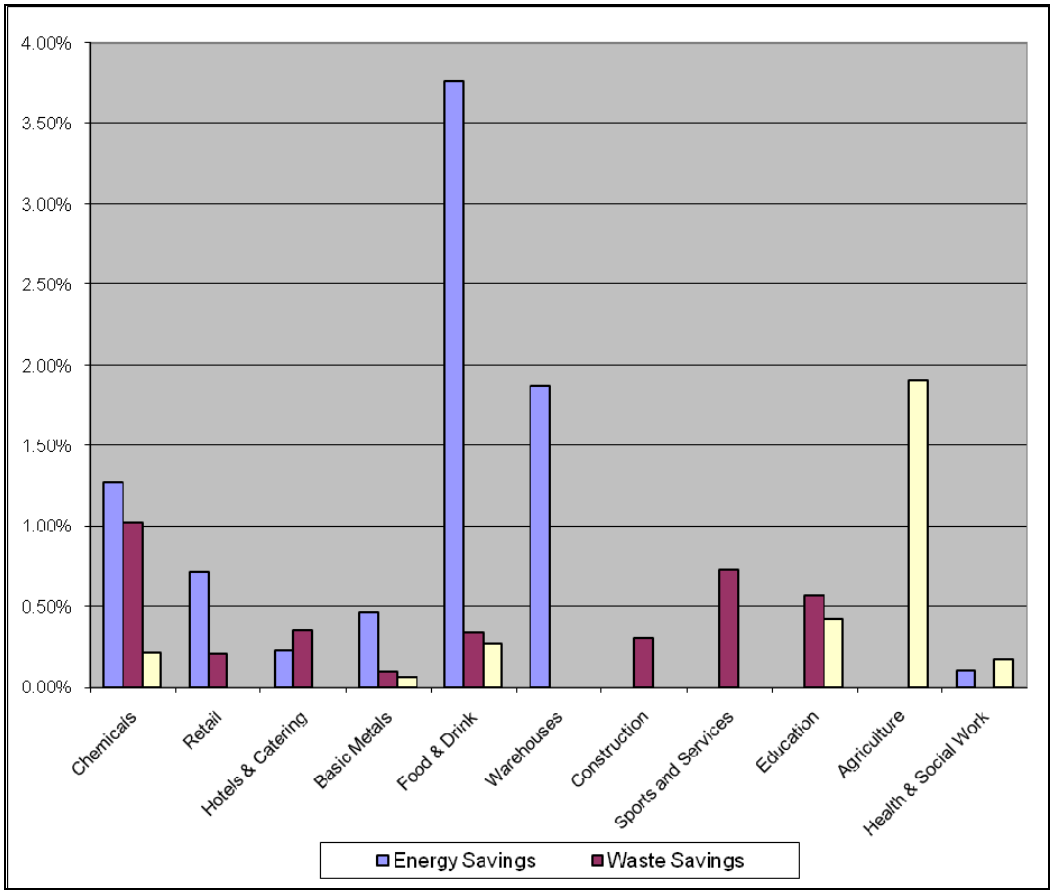
Source: ABI & ONS (for RPI). NB: "Profit growth" refers to average annual profit growth from 2002 to 2007. "GVA growth" refers to average annual GVA growth from 2002 to 2007.

Figure 3 summarizes the relative significance of the potential energy, waste and water savings opportunities compared with gross value added for a number of key business sectors and sub-sectors.

It was found that the greatest single savings opportunity is in the Road Freight Transport sub-sector where improving fuel efficiency would achieve savings of just over £2 billion. This figure represents almost 18% of the sub-sector's GVA. Because of the magnitude of this opportunity, this figure is excluded from Figure 3 in order for comparisons in the other sectors to be more readily viewed.

As will be seen from the chart, the opportunity in the Food & Drink sub-sector is also substantial, with the equivalent of 3.8% of GVA to be won by taking waste efficiency measures.

Figure 3: Selected resource efficiency opportunities as a percentage of sectoral GVA (excl. Road Freight Transport)



The following sections consider each resource efficiency measure, broken down by energy, material waste and water, and identify the business sectors and sub-sectors with the most significant opportunities.

3.2 Energy

3.2.1 Whole UK economy

The 2007 Defra report estimates that the UK economy as a whole could save approximately £3.3 billion per year through low- or no-cost energy saving measures. This figure broadly approximates to 4.5% of the total non-domestic annual expenditure on energy in the UK.

The figure also represents 0.4% of the UK's GVA in 2007, and, if realised, would represent a 0.9% increase in gross profitability (Table 3).

Table 3: Comparison of energy savings against the whole UK economy

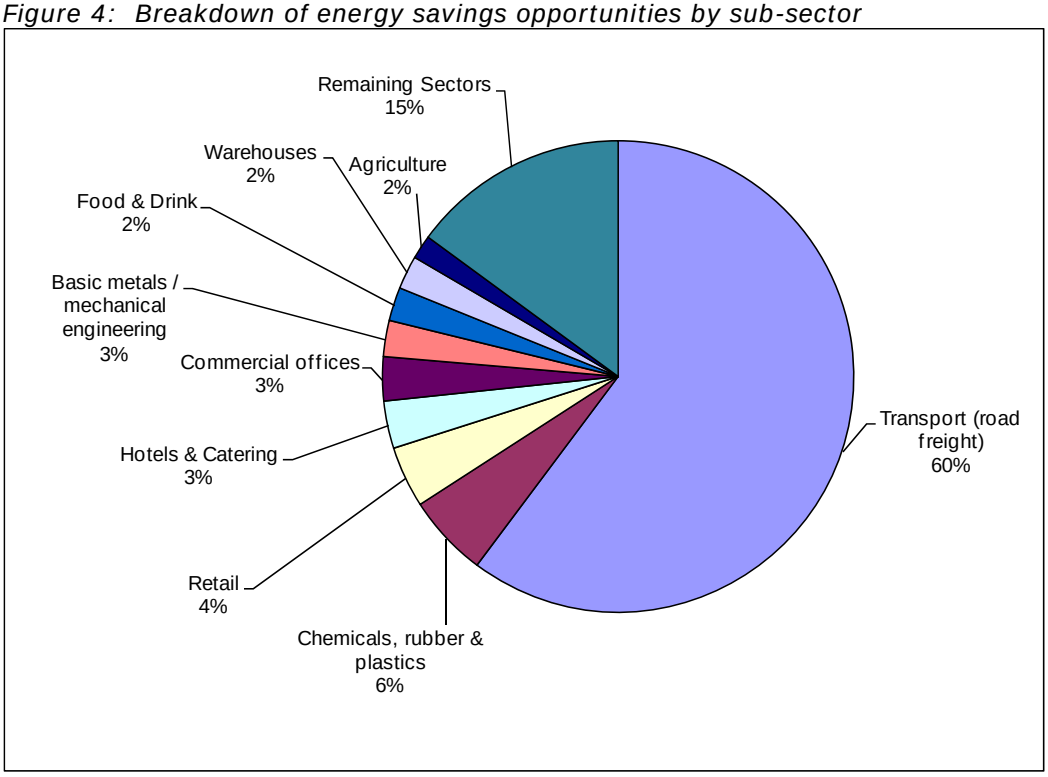
Estimated Saving	£3,349m
Saving as % of Whole Economy's Total Turnover in 2007	0.12%
Saving as % of Whole Economy's GVA in 2007	0.39%
Saving as % of Whole Economy's Profit in 2007	0.89%

Source: ABI

3.2.2 Significant sub-sectors

Figure 4 compares the potential energy savings from all sectors of the UK economy.

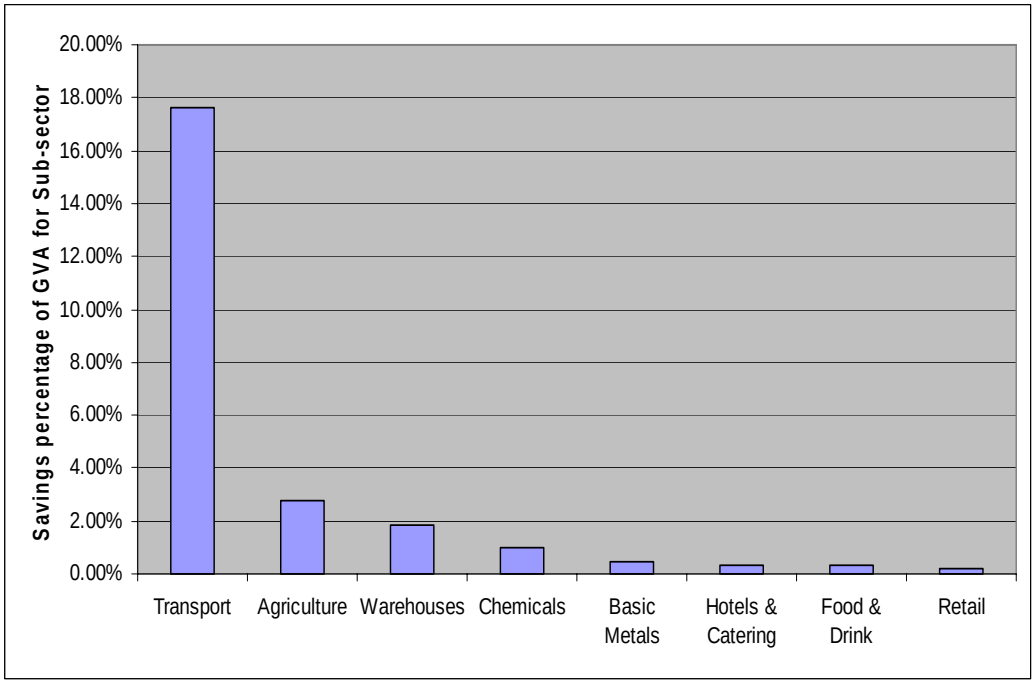
Figure 4: Breakdown of energy savings opportunities by sub-sector



Source: Defra. 2007. *Quantification of the business benefits of resource efficiency*.

Figure 5 plots the energy savings opportunity as a percentage of GVA for seven of the eight sub-sectors identified as having significant savings.

Figure 5 Energy savings opportunities as a percentage of sub-sectoral GVA for selected UK business sub-sectors



As will be seen, the sub-sector with by far the largest savings opportunities from improved energy efficiency (61% of the total) is Road Freight Transport, where an estimated £2.02 billion is available. Realising the estimated £2.02 billion saving in freight transport would make a substantial impact. This represents almost 18% of the sub-sector's GVA, and over 40% of gross profitability (Table 4).

Table 4: Impact of energy savings on the Road Freight sub-sector

Estimated Saving	**£2,017m**
Saving as % of Sector's Total Turnover in 2007	7.66%
Saving as % of Sector's GVA in 2007	17.60%
Saving as % of Sector's Profit in 2007	40.43%

Source: ABI data on sub-sector '60.24 - Freight transport by road'

Of the remaining seven sub-sectors, energy savings to be won in the Agriculture and Warehousing sub-sectors appear to be the most significant when compared to GVA. Here it is noted that, although the absolute energy savings opportunity for the Agriculture sector (£55 million) and the Warehousing sector (£77 million) are substantially less than that for Chemicals (£189 million), making energy savings in the former sub-sectors would have a disproportionately greater impact. For example, the

opportunity represents some 5.5% of gross profitability in Agriculture versus 1.9% in Chemicals (Table 5).

Table 5: Impact of energy savings on Agriculture, Warehousing and Chemicals sub-sectors

	Agriculture	Warehousing	Chemicals
Estimated Saving	**£55m**	**£77m**	**£189m**
Saving as % of Sector's Total Turnover in 2007	0.25%	0.77%	0.30%
Saving as % of Sector's GVA in 2007	2.74%	1.87%	1.02%
Saving as % of Sector's Profit in 2007	5.54%	5.48%	1.86%

Source: ABI data on sub-sector '63.12 - Storage and warehousing', sector '24 – Manufacture of chemicals, chemical products and man-made fibres', and sectors '01 and 02 - Agriculture, hunting and forestry'

3.3 Waste

3.3.1 Whole UK economy

The 2007 Defra report estimates that the UK economy as a whole could benefit by approximately £2.659 billion through low- or no-cost material waste saving measures. As Table 6 shows, this represents 0.31% of the UK's GVA in 2007, and, if realised, would result in a 0.7% increase in gross profitability.

Table 6: Comparison of waste savings against the whole UK economy

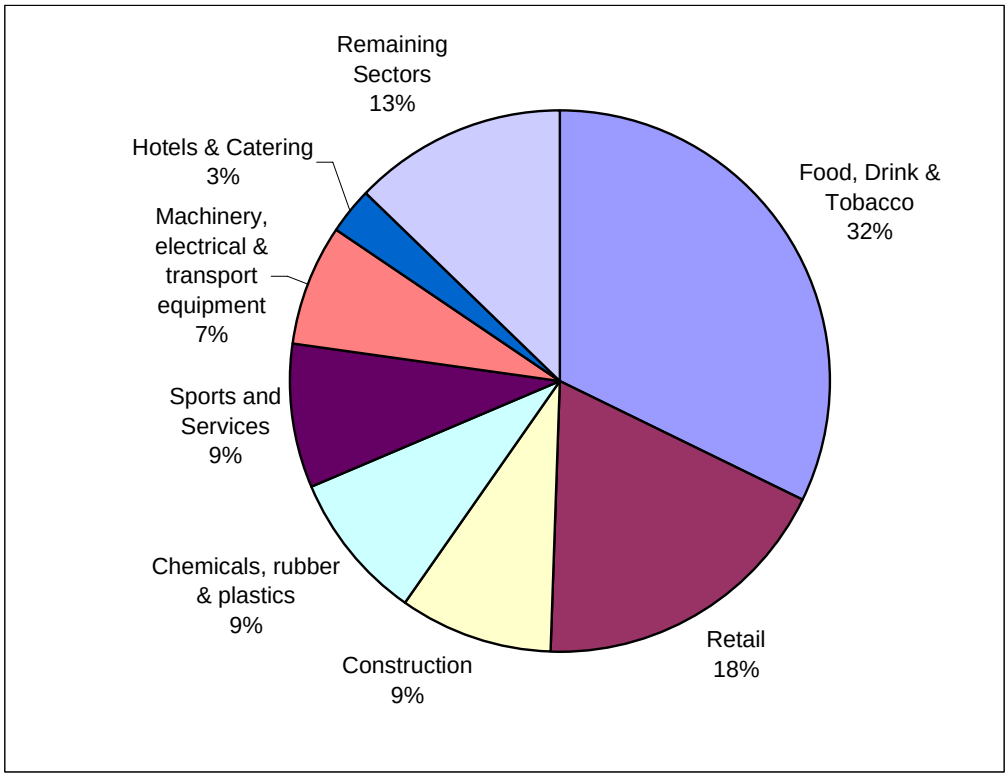
Estimated Saving	**£2,659m**
Saving as % of Whole Economy's Total Turnover in 2007	0.10%
Saving as % of Whole Economy's GVA in 2007	0.31%
Saving as % of Whole Economy's Profit in 2007	0.71%

Source: ABI

3.3.2 Significant sub-sectors

Figure 6 compares the potential material waste savings from all sectors of the UK economy.

Figure 6: Breakdown of waste savings opportunities by sub-sector



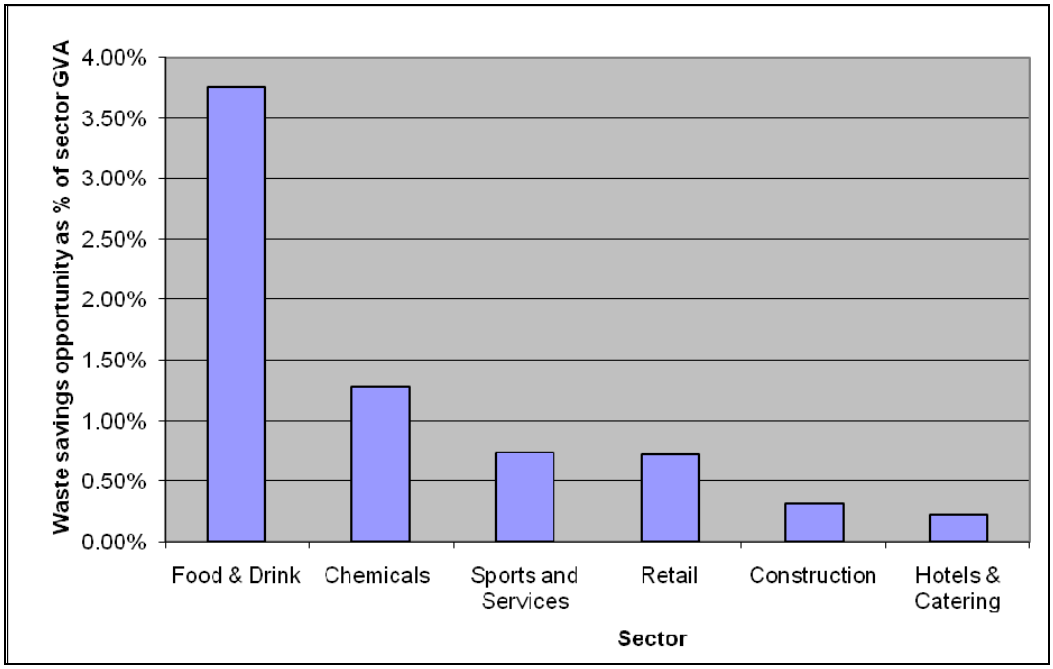
Source: Defra. 2007. *Quantification of the business benefits of resource efficiency.*[1]

Nearly 50% of the financial benefits from waste savings come from just two sub-sectors: Food, Drink & Tobacco and Retail. An estimated £1.35 billion in savings could be realised from taking low- or no-cost waste reduction measures in these sub-sectors alone.

Across six of the seven sub-sectors identified as having significant waste savings opportunities (Figure 6), the Food, Drink & Tobacco industry also has the greatest potential relative to sector-specific GVA (Figure 7).

[1] "Sports and Services" is a classification that in the 2007 study was described as "Travel Agents".

Figure 7: Waste savings opportunities as a percentage of sub-sectoral GVA



The £858 million waste savings to be won in Food, Drink & Tobacco would represent 3.8% of the sector's GVA and over 7% of the industry's total gross profitability in 2007 (Table 7).

Table 7 also shows that the relative impacts of the gross financial savings in other key sub-sectors. For example, the waste savings opportunity in Retail was the second highest identified, but compared to the sub-sector's GVA and profitability it is less important. Relative to these financial measures the waste savings to be won in the Chemicals sub-sector, at £235 million, or 2.3% of gross profitability, appear more significant. By contrast, the £489 million savings estimated for Retail represent only around 1.6% of gross profitability in this sub-sector.

Table 7: Impact of waste savings on the Food, Drink & Tobacco, Retail and Chemicals sub-sectors

	Food, Drink & Tobacco	Retail	Chemicals
Estimated Saving	£858m	£489m	£235m
Saving as % of Sector's Total Turnover in 2007	1.05%	0.17%	0.37%
Saving as % of Sector's GVA in 2007	3.76%	0.72%	1.27%
Saving as % of Sector's Profit in 2007	7.37%	1.62%	2.31%

Source: ABI data on Sectors '15 & 16 - Manufacture of food products, beverages and tobacco', '52 - Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods, and '24 - Manufacture of chemicals, chemical products and man-made fibres'.

3.4 Water

3.4.1 Whole UK economy

The 2007 Defra report estimates that the UK economy as a whole could benefit by approximately £441 million through low- or no-cost water saving measures - a considerably lower opportunity than savings available through reducing energy consumption and waste production. For example, this figure represents only 0.05% of the UK economy's GVA in 2007 (Table 8), whereas the estimated energy or waste savings represent 0.4% and 0.3% of GVA respectively.

Table 8: Comparison of water savings against the whole UK economy

Estimated Saving	£441m
Saving as % of Whole Economy's Total Turnover in 2007	0.02%
Saving as % of Whole Economy's GVA in 2007	0.05%
Saving as % of Whole Economy's Profit in 2007	0.12%

Source: ABI

3.4.2 Significant sub-sectors

In comparison to the benefits to be won from energy and waste efficiency improvements, the financial benefits of saving water are also relatively small in any individual sector or sub-sector. The sector of most interest in terms of water savings opportunity is Public Administration. The £85.8 million savings estimated for this sub-sector represent almost 20% of the total UK water savings opportunity (Figure 8). Clearly the ABI does not publish economic data on Public Administration, but given the large size of the sector, even the realisation of the total estimated water savings would be unlikely to impact significantly on its economic performance.

The ABI does, however, publish economic data for five of the six sub-sectors identified as having significant water savings opportunities (Figure 8). Of these, Agriculture appears to have the greatest potential saving from water efficiency relative to its GVA (Figure 9).

Figure 8: Breakdown of water savings opportunities by sub-sector

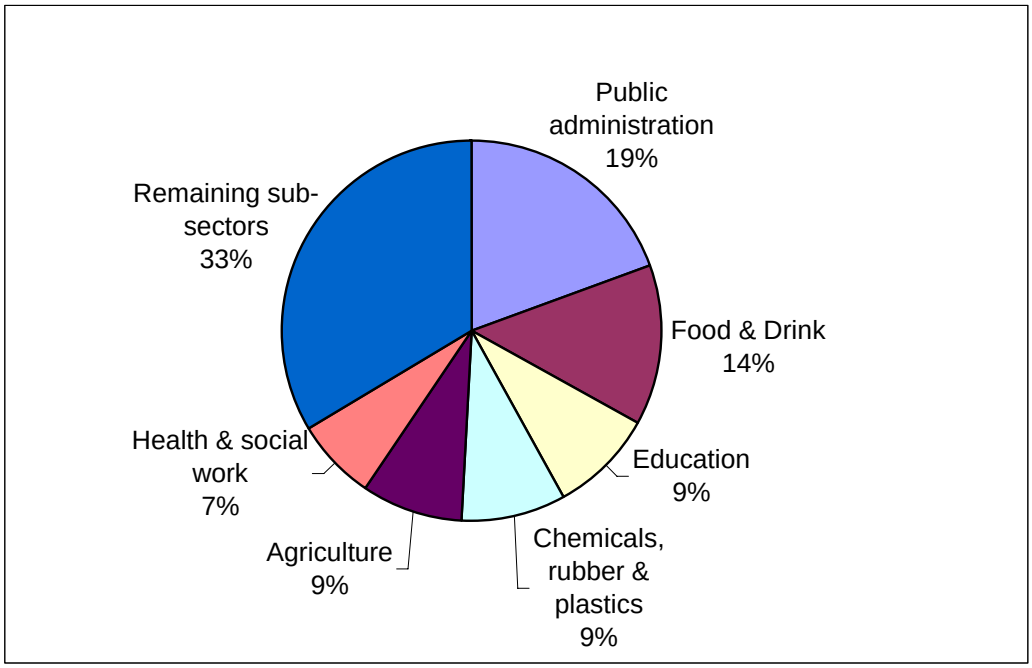


Figure 9: Water savings opportunities as a percentage of sub-sectoral GVA for selected UK business sectors

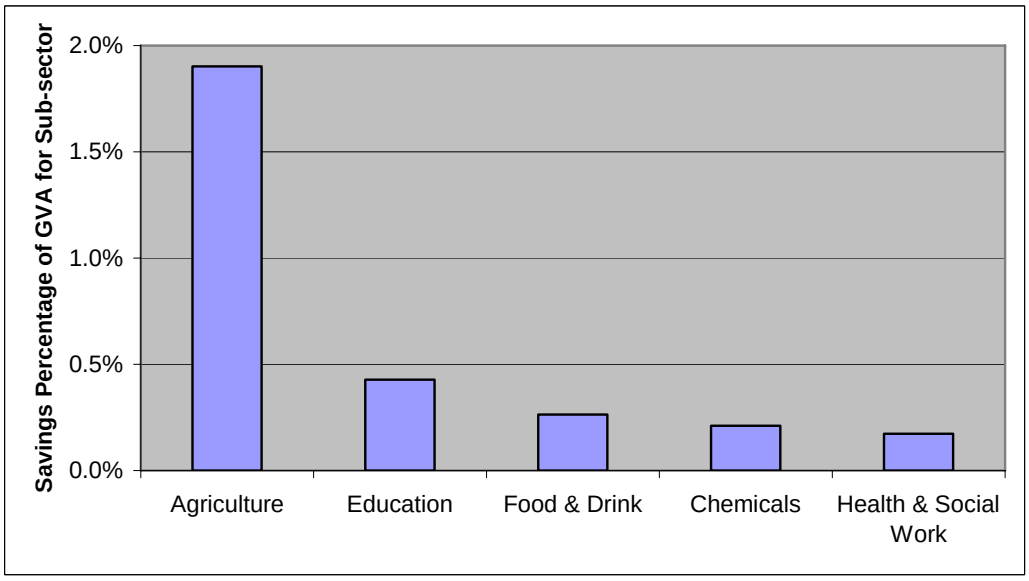


Table 9 presents additional data which set into context the water savings opportunity estimated for Agriculture. Although modest, the £37.8 million savings opportunity is equivalent to nearly 4% of the industry's gross profitability. Not all agricultural users pay for water, many having access to bore holes and extraction rights of their own land. This comparatively large impact may reflect the pricing assumptions in the original report rather than an achievable financial saving.

Table 9: Impact of water savings on the Agriculture sub-sector

Estimated RE Saving	**£38m**
RE Saving as % of Sector's Total Turnover in 2007	0.97%
RE Saving as % of Sector's GVA in 2007	1.90%
RE Saving as % of Sector's Profit in 2007	3.84%

Source: ABI data on sectors: '01 and 02 - Agriculture, hunting and forestry'

4 Conclusions & recommendations

As will be seen from the foregoing, implementing the savings estimated in the 2007 Defra report would represent a significant impact on the profitability of businesses across the whole UK economy.

The study reveals that, if they were to be realised, the total annual resource efficiency benefits of £6.4 billion would be the equivalent of more than half the average year-on-year growth in profitability of the total UK economy that was achieved in the five years to 2007.

The study has also found that several business sub-sectors could benefit disproportionately, in terms of profitability, by taking immediate low or no-cost resource efficiency measures. These sub-sectors are listed in Table 10.

Table 10: Recommended focus areas for resource efficiency activity

Sub-sector	Focus
Road Freight Transport	Energy
Food, Drink & Tobacco	Waste
Warehousing	Energy
Chemicals	Energy & Waste
Retail	Waste
Agriculture	Energy & Water

The response to any action to implement appropriate resource efficiency measures is likely to be more favourable in the sectors listed in Table 10 since they would appear to offer a comparatively simple, zero capital opportunity to improve profitability.

There are caveats on these findings:

1. Our measure of profitability in each sector is based on a proxy taken from gross value added measures and not from a direct measure of actual profitability.
2. The 2007 study relied in part on resource efficiency case study evidence from 2006 and earlier. Comparing more recent proxy measures of profitability with this data widens the confidence limits.
3. The price data for the resources identified in the 2007 study were 2006 base year. Comparing these values with a more recent proxy measure of profitability also widens confidence limits.