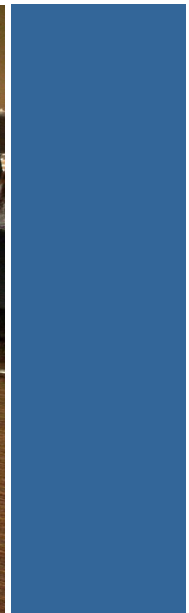


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# National Industrial Symbiosis Programme (NISP) NISP Economic Valuation Report

**Final Report**  
June 16



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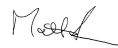
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# NISP Economic Valuation Report

June 16 FINAL

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## EXECUTIVE SUMMARY

This economic valuation report sets out the achievements of the National Industrial Symbiosis Programme (NISP) throughout England, working with industry to develop opportunities using the symbiosis approach. After nearly 5 years NISP has matured into an effective business programme that delivers value to businesses, the environment and community. This has had a positive impact on companies' sales and cost efficiency, as well as delivering environmental and community benefits.

The highlights from our review of the Key Performance Indicators (KPI's) over the past 5 years (cumulative, excluding persistence effects) for English regions only are:

- More than 7 million tonnes of waste have been diverted from landfill, including 0.363m tonnes of hazardous waste;
- Carbon dioxide (equivalent) savings of over 5 million tonnes;
- Virgin materials saved of around 9.7 million tonnes; and
- Water saved of 9.5m tonnes.

This activity promoted by NISP has generated (at the gross level) in excess of £176m of sales and £156m of cost savings for participating companies (excluding additional savings accrued from the persistence effect). This has led directly to over 8,770 jobs being safeguarded and created.

The value of engagement with NISP is evidenced by the high levels of attribution of benefits reported by participating companies. Moreover, the feedback indicates that programme support persists over the long term, and does not necessarily diminish over time.

The report examines the gross and net impact of NISP activities based on an assessment of attribution and persistence. The net impacts have been calculated based on attribution of 60% and persistence of 5 years (with two scenarios, a 20% and a 0% allowance for decay in impacts). This shows that the impact of NISP activity has led to:

- landfill tonnage diverted of between 12.6 million and 21.1 million tonnes (net) and 21.1 million and 35.1 million tonnes (gross);
- decrease in carbon dioxide equivalent of between 10.9m and 18.1m tonnes (net), and 18.1 million and 30.2 million tonnes (gross);
- increase in sales of between £317m and £528m (net), and £528m and £880m (gross); and
- cost savings of between £281m and £468m (net), and £468m and £780m (gross).

The outputs delivered by NISP have been achieved with reduced funding over the past two years. This demonstrates that value for money has improved over the programme with the cost-effectiveness ratios improving across landfill, carbon dioxide (equivalent) savings and virgin materials. For example, the cost per tonne of landfill diverted has fallen from £0.58 in the first year to £0.15 in year five.

The wider value for the community has been measured through the contribution of the programme to GEVA (capturing direct and indirect employment and profit value added) and TEVA (capturing the environmental value). The financial contribution of NISP to GEVA is in the range of £238m to £396m (net), and £396m to £660m (gross). These figures represent an investment multiplier of between 8.6 and 14.3 (net) and 14.3 to 23.9 (gross).

The net total economic value added (TEVA) ranges from £882m to £1,470m (net), and £1,470m to £2,450m (gross), representing an investment multiplier of between 31.9 and 53.2 (net) and 53.2 to 88.6 (gross).

The results show that the impact of NISP on the exchequer, measured as a combination of income tax, corporation tax and VAT, is also significant, with impacts ranging from £89m to £148m (net), and £148m to £247m (gross).

NISP having established the infrastructure to deliver the 'symbiosis process' across industry provides a strong foundation from which to increase the returns from public investment. The triple line benefits achieved to date provide a compelling case for increased investment in the future.

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# 1 INTRODUCTION

## 1.1 Summary

Managed and delivered by International Synergies Ltd (ISL), the National Industrial Symbiosis Programme (NISP) is one of the delivery bodies undertaking initiatives within Defra's resource efficiency funding programme.

Currently in its fifth year of national operation, NISP is now considered a well established and highly successful business opportunity programme effective across both the resource efficiency and waste minimisation agendas. Delivered throughout the UK via a network of regionally based offices, the Programme has grown rapidly since its launch in April 2005.

In terms of value for money NISP has demonstrated delivery on a range of government policy agendas. In addition to significant environmental objectives, benefits have been generated in the areas of productivity, employment, regeneration and private sector investment, and NISP continues to be a net contributor to the Treasury.

While this report focuses on the specified key performance indicators (KPI's) that all Defra funded programmes are required to record and measure, it should be highlighted that there are significant additional benefits delivered by NISP that either are not or cannot be accurately reported. These 'additionalities' include increased training, private investment, international investment, export opportunities and inward investment; along with various other environmental and social benefits arising from synergies.

The issue of leakage is should also be considered when interpreting the results presented in this report. Is known that synergies are created 'off-line' but still as a result of NISP, however the benefits attributed to these synergies are not captured so the reported figures are somewhat understated.

Experience from the first five years suggests that there are no signs of diminishing returns with regards to funding. The most recent year of funding (year five of the programme) represents a low point in the funding, a disproportionately higher return for additional investment could be expected as all additional effort would go direct to delivery. This present a strong case for further investment

## 1.2 Assignment Purpose and Approach

The purpose of this report is to present the results of the NISP programme for the English regions from 2005/6 to 2009/10, and to calculate the financial and economic benefits generated through the programme. Chapter 2 of this report outlines the output metrics by which NISP's performance is measured. A brief explanation of each output is provided, along with the annual results. Chapter 3 presents the results in terms of the NISP key performance indicators, and discusses the various means and methods of interpreting the data. The issues of persistence and attribution are discussed. The various scenarios that have been modelled are described, and then the results for each scenario are presented in both tabular and graphical form. Chapter 4 concentrates on

the economic impacts of NISP and presents economic data for each of the modelled scenarios.

## 2 ACHIEVEMENTS & EXPERIENCE TO DATE

### 2.1 NISP Output Metrics

Outputs resulting from an industrial symbiosis engagement can be classified in two broad terms:

- environmental; and
- economic.

Under the Defra Programme funding arrangement, all participating programmes are required to measure seven key cross-programme comparable outputs (metrics) for two categories. The five environmental metrics are:

- diversion of landfill waste (tonnes);
- reduction in carbon dioxide emissions (in tonnes);
- elimination of hazardous waste (tonnes);
- virgin materials saved (tonnes); and
- reduction in the use of potable water (tonnes/cubic m<sup>3</sup>).

The two economic outputs are:

- additional sales to industry (£); and
- cost savings (£).

The data presented in the following chapters is provided in whole for years 1 to 4 of the programme and an estimate of year 5 has been made based on data gathered for the first two quarters of year 5, taking into account seasonal effects reported in previous years. However, it should also be noted that the programme was not fully functional in year 1 as NISP was in the early stages of funding and was 'ramping up' operations.

NOTE: All figures presented in Section 2.1.1 and Section 2.1.2 refer to benefits attributed to new synergies delivered in each corresponding year of operation, and the numbers do not take into account the effects of 'persistence' (refer to section 3.1.3 for further details on 'persistence').

#### 2.1.1 *Economic Metrics*

##### **Additional Sales**

One of the economic benefits resulting from industrial symbiosis activity is the capability to sell goods to another party, an opportunity that would not have existed without engagement in a NISP synergy. 'Additional sales' represent the value of sales directly resulting from engagement in a NISP synergy and thus new business generated. This new business generated is distinct from normal sales development and is the sales growth resulting from NISP involvement. An example of additional sales is the sale of goods produced from plastic, where waste plastic is diverted from landfill and re-



processed into granules which are then used as a primary input in plastic extrusion. Additional sales by organisations contribute to an increase in the profitability of an organisation and thus feed through to additional corporate tax revenue to the exchequer (surplus in the case of third sector organisations).

**Table 2.1 Total Additional Sales (Gross)**

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Sales (£m)	16.5	81.4	25.4	27.7	25.0	176.1

The gross amount of additional sales, reported by companies', is in excess of £176m for the first five years of the NISP programme. The second year of operations reported the highest increase in sales with £81.5m, while the last three years (years 3, 4 and 5) all consistently reported additional sales greater than £25m.

### Cost Savings

NISP results in cost savings to firms who successfully complete industrial synergies in a number of ways, however the most common means of cost savings are related to avoided disposal costs for waste materials, and reduced purchasing costs as a result of sourcing products and materials through the synergy.

Normal firm behaviour would, in the short term, transmit part of the cost savings into increased profits. Over a longer time period it is expected that a cost base reduction may be passed on to consumers in the form of a price reduction. Depending on the demand elasticity of the underlying products, it is expected that there may be an increase in demand and thus the impact of the cost savings (which would go straight to the 'bottom line') has significant implications for profitability and potentially provide for a long-term sustainable investment for growth.

**Table 2.2: Total Cost Savings (Gross)**

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Cost Savings (£m)	36.4	34.3	33.1	27.3	25.0	156.1

The first five years of Defra funding of NISP have yielded just over £156m of cost savings. Annual figures show that cost savings have consistently been between £25m and £37m per annum.

## 2.1.2 Environmental Metrics

### Materials diverted from Landfill (Tonnes)

The Landfill Directive (formally known as the EC Landfill Directive 1999/31) came into force in England and Wales in 2002 and is helping change the way waste is managed through restricting the types and amounts of waste that can be sent to landfill. This directive works in conjunction with the landfill tax, which acts as an incentive for businesses to tackle waste through a more efficient use of resources. Landfill Diversion is measured as the waste diverted from landfill in tonnes per year.

**Table 2.3: Total Landfill Diverted (Gross)**

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Landfill Diverted (million tonnes)	0.86	0.93	1.60	1.83	1.80	7.02

Over the first five years of NISP, more than 7 million tonnes of waste has been diverted from landfill. The last three years of the programme show that NISP has consistently diverted waste from landfill, with each years figures falling with the range of 1.60 and 1.83 million tonnes per annum.

### Carbon Dioxide (CO<sub>2</sub>) Equivalent Saved (Tonnes)

Reducing emissions that contribute to global warming (measured in carbon dioxide equivalents) and more efficient use of resources are seen as two key government objectives within the environment agenda. The reduction of greenhouse gases (measured in tonnes of CO<sub>2</sub> equivalent) is an official Defra metric, and thus results in this study are presented in terms of tonnes of CO<sub>2</sub> equivalent saved.

**Table 2.4: Total CO<sub>2</sub> Equivalent Reductions (Gross)**

CO <sub>2</sub> Reductions	Year 1	Year 2	Year 3	Year 4	Year 5	Total
CO <sub>2</sub> Equiv. Reduction (million tonnes)	0.33	1.69	2.41	0.81	0.80	6.04

Carbon dioxide savings within the NISP programme has varied over the five years. Savings of CO<sub>2</sub> from NISP synergies total over 6 million tonnes for the five year programme.

### Hazardous Waste eliminated (Tonnes)

The Hazardous Waste Directive<sup>1</sup> (HWD) defines hazardous waste as waste catalogued on a list drawn up by the European Commission. Waste is defined as hazardous if contains one or more of 14 specified hazardous properties. Hazardous waste poses particular risk to health and the environment so it is especially important that it is managed properly.

**Table 2.5: Total Hazardous Materials Diverted (Gross)**

Hazardous materials (t)	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Haz materials ('000 t)	-	296.47	45.72	15.44	6.00	363.63

The total amount of hazardous waste diverted through NISP synergies over the first five years of the programme is reported at just over 363,626 tonnes. It is worth highlighting that the bulk of this, just over 296,000 tonnes, was achieved in year two of the

<sup>1</sup> The Hazardous Waste Directive (2005) for England and Wales (Source: DEFRA website)

programme. Hazardous waste diverted is a subset of landfill diverted, but because of its importance its is reported separately.

### Virgin Materials Saved (Tonnes)

Virgin material displacement is a measurement in tonnes per year of raw materials saved or offset by increased efficiencies or a change to a more sustainable, renewable material. An example of a virgin material saved is mined coal ‘saved’ when a waste material is used as a substitute fuel for power generation or combustion in a manufacturing process, such as in cement kilns.

*Table 2.6: Total Virgin Materials Saved (Gross)*

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Virgin Materials (million tonnes)	-	4.06	1.93	1.96	1.75	9.70

This is the highest performing environmental metric in absolute terms with savings of around 9.7 million tonnes of virgin material over the first five years of the programme. After an initially high reported saving in year 2, the past three years have reported consistent savings of between 1.75 and 1.96 million tonnes per annum.

### Water Saved (Tonnes)

NISP’s record of IS activities to date has seen two type of synergies unfold that bring about water savings. In the first instance water is saved through an improvement in resource allocation which indirectly brings about a more efficient system of water usage. In other words, water savings is a positive externality stemming out of a matching process of resource allocation between two entities. This type of synergy has been increasingly overtaken by a more direct method of water saving for which water is the essential good which matches two companies together in the process of industrial symbiosis. An example of this type of synergy is a brewery and a water processing company that get together to help the brewery implement a more efficient system of water usage and disposal of processed water through know-how brought about by the water processing company.

*Table 2.7: Total Water Saving (Gross)*

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Water (million tonnes)	0.26	2.24	6.71	0.25	0.10	9.57

Water savings amounted to just over 9.5m tonnes through NISP synergies. Recent initiatives in broadening the scope of water savings across the industry have seen NISP engage in the potential for industrial symbiosis of water reuse with both the food and drink sector and the metal finishing sector<sup>2</sup>. These sectors are quite significant industrial water users and present the potential for further symbiosis work in the re-use of waste

<sup>2</sup> Project funded by a regional development authority (RDA)

water. However, it is worth noting that the projection for year 5 is lower than any previous year.

## 2.2 Funding

Table 2.8 below presents the funding that NISP has received over the five years of operations.

*Table 2.8: Total NISP Funding*

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Funding (£m)	£3.50	£6.00	£8.25	£5.03	£4.88	£27.65
Change in funding from previous year (%)	-	71%	38%	-39%	-3%	N/A

The level of funding NISP has received has varied over the five years, peaking in year three with a total of £8.25m.

## 2.3 Summary of Achievements

As demonstrated in this chapter, NISP has delivered against all of the seven KPI's and has achieved impressive results during its first five years of operations. It is noticeable that no clear trend exists when comparing the gross outputs reported each year and the level of funding received in each year. This is most noticeable however for the landfill category, where the highest outputs were reported in years four and five, which correspond to the two years with the least funding (with the exception of the first years funding). A potential reason for this could be that the NISP programme is becoming more efficient over time, delivering better results with less resources, therefore delivering better value for money.

It is also worth noting that a number of the metrics report large variance between years, with little consistency across the five year programme. This is most noticeable in the 'water' and 'hazardous waste' metrics, and can be attributed to extremely large, potentially one of synergies that dominate the metric in certain years (e.g. year 2 in the hazardous waste category, year 3 in the water category and year 2 in the virgin material category).

## 3 INTERPRETATION OF RESULTS

### 3.1 Output Measurement, Leakage, Attribution and Persistence

#### 3.1.1 Auditing of Results

Measuring programme outputs is a collaboration process between participating companies and NISP representatives. Once a synergy is completed, the resulting output data is recorded and stored on NISP's own data system, CRISP. In order to verify data quality and ensure reliability and consistency of reporting, ISL commissioned an independent auditor, Databuild, to perform this task. Databuild are a market research consultancy specialising in researching businesses for government and other public sector bodies. The role played by Databuild is crucial in evaluating mechanisms used by NISP and developing them into a more robust methodology that would fully evaluate the contribution made by NISP to business in the UK.

#### 3.1.2 Attribution

Attribution levels aim to define the importance of NISP's role in facilitating a synergy. Levels of attribution are measured from 0% to 100%, the greater the value, the greater the importance NISP played in completing the synergy. The calculation of attribution levels is not an exact science and it can be open to an element of subjectivity. The previous economic analysis undertaken by Scott Wilson assigned individual 'attribution' levels to each synergy, based on the audit conducted by Databuild. An average figure of 60% attribution across the first 4 years of operation has been calculated and is used in this report (presented as the 'net' figure). The gross figures (excluding attribution) have also been modelled and are presented also.

#### 3.1.3 Persistence

Persistence is defined as the level of output a particular synergy is expected to deliver in subsequent years once the initial synergy has been completed. For instance, if a particular synergy delivers output in the first year of the programme, there is a rational expectation that the participating entities will continue to utilise the new resource pool in the following years. Hence the outputs from a synergy will grow, fall or remain constant beyond the initial engagement and these are assigned a pre-determined rate which is dependent on the type of metric and synergy.

The number of years that a synergy continues to add benefits is dependant on the decay factor used, for example, a *decay factor* of 20% will mean 100% of the benefits are reported in year 1, 80% in year 2, 60% in year 3, 40% in year 4 and 20% in year 5. It should be noted that other studies have seen positive decay factors, i.e. that the benefit of the synergy increases over time as opposed to decreasing.

The consultancy Oakdene Hollins were commissioned by Defra to report on the results of BREW funded programmes (of which NISP is one) during the period 2006/07<sup>3</sup>. The resulting report recommended the following approach for the calculation and measurement of persistence:

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<sup>3</sup> Business Resource Efficiency and Waste (BREW) Programme: Metrics Results for 2006/07, September 2008, Defra

- There should be a default figure if persistence cannot be estimated or no evidence exists. This default is where the benefit declines to zero over five years. This is intermediate between the benefit persisting infinitely and the benefit only being estimated for the first year.
- Where delivery bodies focus on a particular sector, retrospective sectoral surveys could establish the degree of spill-over benefit from demonstration projects or other interventions.

For the purpose of this report, the following two scenarios have been modelled:

- 1) persistence effect has been modelled with a decay factor of 20%, including benefits that are realised post 2010 (due to the decay factor of 20%, benefits will be counted for a maximum of 5 years);
- 2) persistence effect has been modelled with no decay factor (i.e. 100% of the benefits from the synergy are counted for the synergy) for a total of 5 years, including benefits realised post 2010.

Results for the two scenarios detailed above are presented below as gross figures and net figures, assuming an attribution level of 60%.

### 3.1.4 Scenario Building

Table 3.1 below presents a summary of the four scenarios that have been modelled. The scenarios include the two different methodologies for applying the persistence factor, and the gross and net outputs.

**Table 3.1 Summary of Modelled Scenarios**

Other Metrics	Persistence Effect Decay (% per annum)	Net / Gross
Scenario Net 1	20%	Net (60% attribution)
Scenario Net 2	0%	Net (60% attribution)
Scenario Gross 1	20%	Gross
Scenario Gross 2	0%	Gross

## 3.2 Results

This section presents a summary of the modelled results (output metrics and value for money) for four scenarios.

Table 3.2 presents the outputs metrics for each of the 7 NISP KPI's, measured in tonnes, pounds or cubic metres, for each of the scenarios under the various attribution and persistence assumptions.

Table 3.3 presents the value for money of the NISP programme. Under the assumption of equal resource allocation between the seven KPI metrics, a value for money indicator can be derived as a relative measure of the cost-effectiveness for all the metrics. For comparison purposes of unit savings for the seven metrics, the total

amount of direct Defra funds invested into NISP for the 5 years of operations (2005/06 to 2009/10) is taken as the total expenditure level. This figure is divided into seven equal amounts to derive a cost input amount for each of the seven measured outputs. Therefore, the figures presented in Table 3.2 give an indication of the cost (in £ GBP) of each unit of the NISP KPI. For example, based on the assumptions used in Scenario 'Net 1', each tonne of waste diverted away from landfill had a cost of £0.31 (based on the level of NISP funding over the period).

Further details of each of the scenarios, including year by year data are provided in Appendix B.

**Table 3.2 Total Output**

Output Metric	Scenario Net 1	Scenario Net 2	Scenario Gross 1	Scenario Gross 2
Landfill diverted (t million)	12.64	21.07	21.07	35.11
CO <sub>2</sub> reduction (t million)	10.87	18.11	18.11	30.19
Virgin materials (t million)	17.47	29.11	29.11	48.52
Hazardous Mat. (t million)	0.65	1.09	1.09	1.82
Water (t million)	17.23	28.71	28.71	47.85
Sales (£ million)	316.98	528.29	528.29	880.49
Cost savings (£ million)	280.95	468.25	468.25	780.41

**Table 3.3 Value for Money**

£ per Unit Output	Scenario Net 1	Scenario Net 2	Scenario Gross 1	Scenario Gross 2
Landfill diverted (£/t)	0.31	0.19	0.19	0.11
CO <sub>2</sub> reduction (£/t)	0.36	0.22	0.22	0.13
Virgin materials (£/t)	0.23	0.14	0.14	0.08
Hazardous Materials (£/t)	6.04	3.62	3.62	2.17
Water (£/t)	0.23	0.14	0.14	0.08
Sales (£/£)	0.012	0.007	0.007	0.004
Cost savings (£/£)	0.014	0.008	0.008	0.005

Figure 3.1 below presents the data in Tables 3.1 and 3.2 in graphical form.

Figure 3.1 Comparison of Modelled Scenarios for NISP KPI's – 5 Year Totals

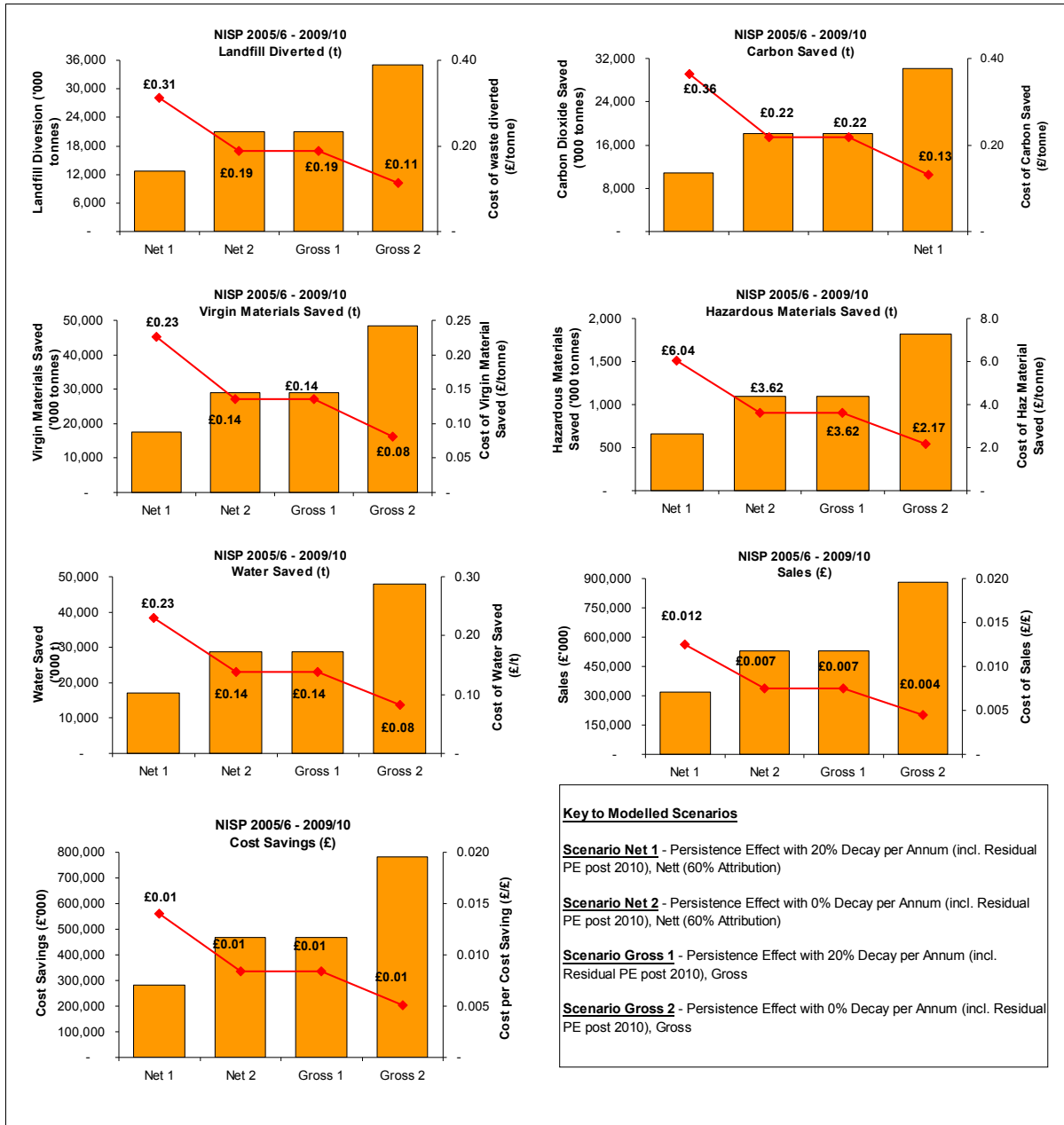
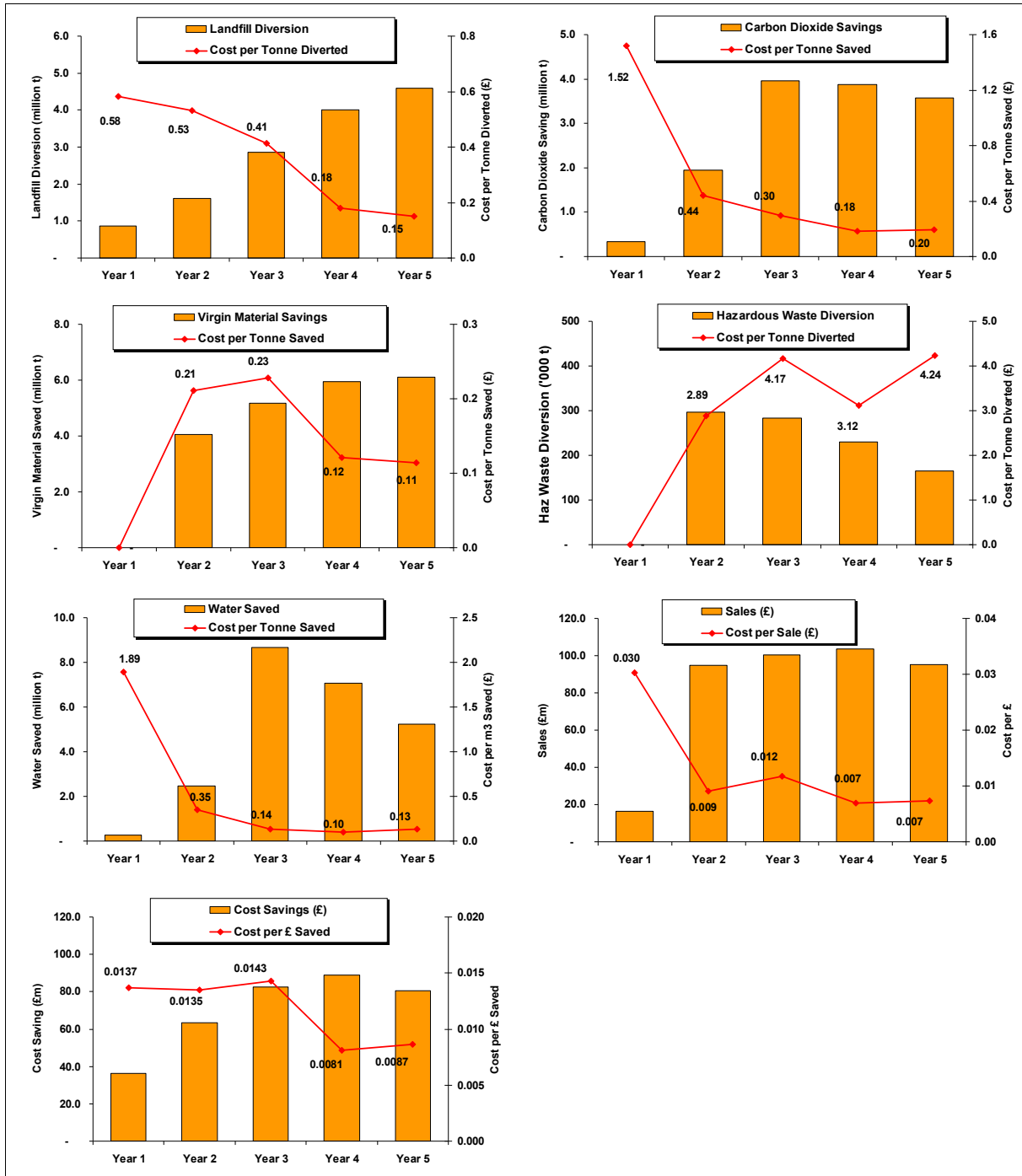


Figure 3.2 below presents the gross achievements of NISP for each of the five years of operation (note that the persistence effect has not been included in these numbers). The charts show the gross output for each of the 7 KPI's and the value for money achieved in each year.



Figure 3.2 Gross Annual Benefits for NISP KPI's (Persistence Effect not Included)



It can be seen from Figure 3.2 above that for a number of the metric, most notably landfill diversion, carbon dioxide (equivalent) savings, water conservation and sales, that value for money has increased progressively throughout the five year period. This suggests that the programme is becoming more efficient and, now that the initial infrastructure is well established, further investment would translate directly into additional benefits.

## 4 ECONOMIC IMPACT OF NISP

### 4.1 Introduction

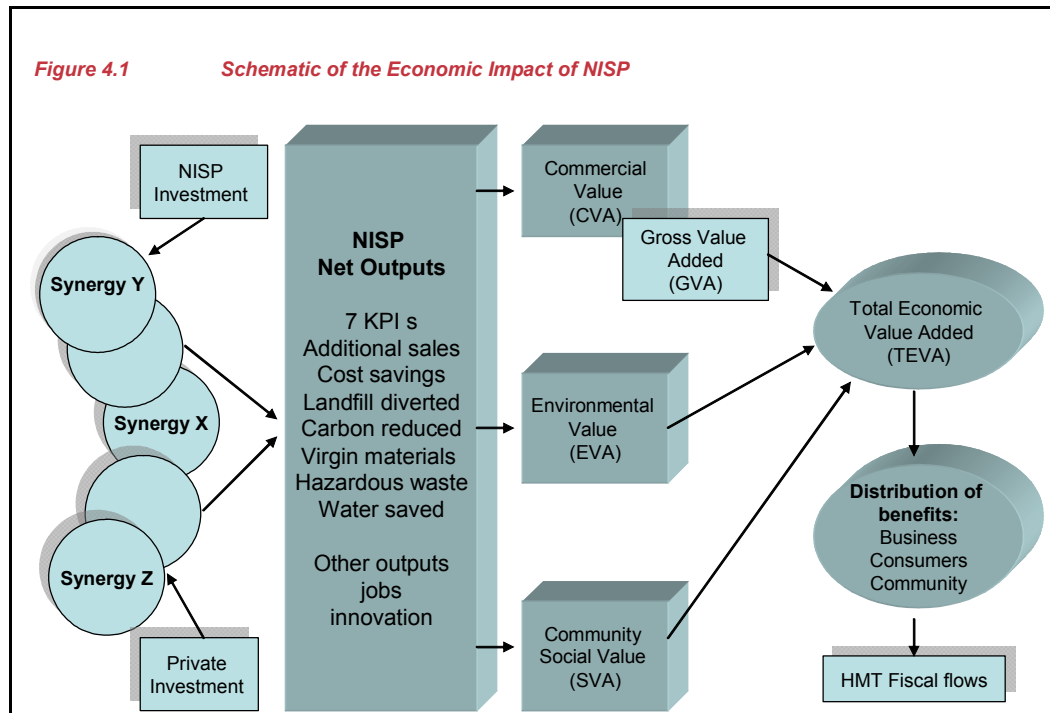
This section presents a range of indicators that outline the economic impacts of NISP. The economic impact estimates are based on the results of the NISP activity in the first four full years of the programme and Q1 and Q2 of year five (with the full year five results estimated based on the Q1 and Q2 results and previous years data).

In the previous section the value for money indicators were presented which outlined the primary cost-effectiveness the metrics achieved. These verified outputs, along with other monitoring information collected by NISP and impact assumptions about such activities, are used to derive the economic impact estimates.

The analysis is presented at the aggregate programme level and seeks to explore the *triple line benefits* of the programme's activities. By triple line we mean the economic, environmental and social benefits from investing in the better utilisation of business resources by employing the NISP approach.

### 4.2 Economic Impact - Measurement & Definitions

The economic impact of NISP is presented using a number of indicators to reflect the wide range of impacts that arise from its activities. These impacts are schematically set out in Figure 4.1. This shows that the investment that takes place through the NISP process (investment via Defra and other public funding partners, along with the private sector) gives rise to a range of social, economic and environmental outputs captured through the seven KPI metrics and secondary indicators recorded by NISP.



These *triple line benefits* are distributed across businesses, consumers, the community and the Exchequer. Specifically the following benefits arise:

- **Businesses:** through additional sales and cost savings or what is defined as Commercial Value Added (CVA) which gives rise to additional Gross Value Added (GVA);
- **Consumers:** the potential benefit of price reductions achieved by firms reducing their cost base being passed on to consumers;
- **Community:** regeneration benefits from safeguarding employment and creating new employment through the resources reduction synergy programmes (termed Social Value Added or SVA) and the benefits from reduced carbon damage (termed Environmental Value Added or EVA);
- **Exchequer fiscal flows:** increased GVA leads to an increase in taxes paid through corporate taxes, income taxes and VAT; and
- **Wider benefits:** through increased rates of innovation (new learning) with the potential for increased exporting.

The rest of this section outlines the approach to measuring the above economic impacts.

#### 4.2.1 Commercial Value Added (CVA)

The commercial value added is the addition of the two primary commercial metrics monitored by NISP; additional sales and cost savings made at the firm/synergy level. These two synergy benefits contribute to a given firm's financial performance and profitability and are referred to as 'commercial value added' (CVA). This is not a term

used in official statistics and a better measure might be to use the profit on the additional sales rather than the additional sales, although this would be more difficult to measure.

#### 4.2.2 *Gross Value Added (GVA)*

Gross value added (GVA) is a very specific economic term and provides a measure of the difference between outputs (a firm's sales) and intermediate inputs (materials & services required to achieve a given sales output). Essentially it provides a measure of (factor) income (wages & profits).

A proportion of the additional sales generated by NISP interventions will give rise to additional GVA for the economy. A simple proxy for this is to assume that on average GVA is equal to the national GVA average (this could be adjusted on a sector basis but serves to provide an estimate). National GVA/turnover is approximately 31%<sup>4</sup>. Therefore for every £100,000 of attributed sales some £31,000 of additional GVA would be generated – that is additional wages & profits.

Cost savings as a result of landfill tax avoidance or associated transport costs from waste disposal, in the short term, may transmit directly into increased profits for a firm. Over time this cost base reduction may be passed on to consumers in a price reduction. For simplicity a rule of halves is used and it is assumed that 50% of any cost reduction benefit is captured by firms and the balance by consumers. A price reduction for consumers would result in either increased savings or spending elsewhere in the economy. This measurement approach is a form of partial equilibrium analysis and only a general equilibrium approach would truly track the final effects through the economy.

Therefore a proxy for the GVA generated by NISP interventions is the combination of GVA from sales (using the national average ratio of GVA/turnover) and cost savings captured by firms (of which it is assumed that 50% may be passed on to consumers over the long run according to market conditions).

#### 4.2.3 *Total Economic Value Added (TEVA)*

The HMT Green Book states that monetary values for the environment should be incorporated - where possible - to provide a more balanced assessment in making investment choices. Therefore, in assessing the total economic impact of a public intervention the concept of total economic value (used in the conservation field) recognises that combining strict economic values (e.g. GVA) with wider benefits (e.g. monetary values for environmental outputs) provides a better measure of overall economic benefit or economic damage avoided. The measure of total economic value added (TEVA) therefore simply combines the narrow GVA definition outlined above with the monetary benefits for environmental values (as measured by two of the five NISP environmental KPIs).

In presenting a TEVA figure for NISP interventions the issue of double counting needs to be considered. For example where attributed cost savings include an environmental tax saved this in part reflects a 'price' for this environmental cost avoided. Also in

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<sup>4</sup> Source: Annual Business Inquiry data for 2004

presenting a total economic impact figure of NISP activities not all of the environmental outputs measured have an 'accepted' value or price.

To illustrate the TEVA of NISP interventions we incorporate monetary values for landfill (using stated values of landfill tax) and CO<sup>2</sup> (based on the Shadow Price of Carbon<sup>5</sup>). These values are added to GVA (adjusting for double counting by assuming half of the stated value for landfill tax) to approximate for the total impact of investment through NISP.

#### 4.2.4 *Community Regeneration Benefits*

Resource efficiency programmes work in a wide ranging manner and is more than just waste management and waste reduction. In monitoring NISP activities and achievements, information on employment safeguarded and created is compiled for each synergy and this provides an estimate of gross and net employment supported.

In estimating the total employment contribution of NISP interventions, employment safeguarded and created estimates are factored by an indirect and induced employment multiplier of 1.6<sup>6</sup>. This employment multiplier represents the result of further spending by those jobs retained/created through an indirect effect (supply chain impacts) and induced effect (income impacts) at a national level.

#### 4.2.5 *Exchequer fiscal flows*

The Exchequer fiscal impact can be derived from examining three principal tax benefits:

- *Corporation tax*: this is based on the additional profits generated from NISP interventions and is based on a share of GVA calculated. Within the average 31% GVA/sales ratio business profits make up approximately 15%. The corporation tax impact is based on taking 26% (a proxy for the average corporate tax rate) of the profit value within NISP attributed GVA;
- *Income tax from additional employment*: the calculation of the income tax effect of the net employment created and safeguarded employment is based on using a marginal tax rate of 22% and assuming that on average each job generates a taxable income of £18,000; and
- *VAT on additional sales*: the additional sales metric (adjusted for attribution) is assumed to be a VAT inclusive value. 17.5% of this sales value is therefore taken as an estimate of the VAT contribution<sup>7</sup>.

The combination of these tax impacts represents the flow to the exchequer as a result of the attributed synergy outputs from NISP. From the Treasury's perspective it will have invested tax revenues (to deliver an environmental policy target) through NISP and the ratio of this investment to tax receipts can be represented in the form of a tax multiplier.

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<sup>5</sup> DEFRA Social Cost of Carbon and Shadow Price of Carbon, 2007

<sup>6</sup> The composite (supply and income) employment multiplier increases the larger the area of interest. The size of the multiplier varies from 2.21 to 1.38 at the local level to 1.38 to 1.56 at the regional level (Source: English Partnerships and the Regional Development Agencies Additionality: A Full Guide May 2001). HMT EGRUP Guidance documented composite multipliers at the regional level of up to 1.7. We have used an average of 1.6 to illustrate the wider employment impact of NISP.

<sup>7</sup> It is recognised that the current rate of VAT is 15% however during the NISP period of operation, VAT stood at 17.5% for the majority of NISP's operations.

### 4.3 Economic Impact – Results

This section presents a summary of the modelled economic impacts of NISP over the period 2005/06 to 2009/10.

Table 4.1 presents the economic benefits, in millions of pounds, for each of the scenarios under the various attribution and persistence assumptions. The economic benefits presented are:

- i) Gross Economic Value Added (GEVA)
- ii) Total Economic Value Added (TEVA)
- iii) Jobs Output (measured in jobs)
- iv) Fiscal Impacts

Table 4.2 presents the economic multipliers for the NISP programme for the period 2005/6 to 2009/10. The figures presented in Table 4.2 gives an indication of the economic return NISP has delivered for each £1 invested in the programme over its five operational years for the ten scenarios.

**Table 4.1** *Total Output*

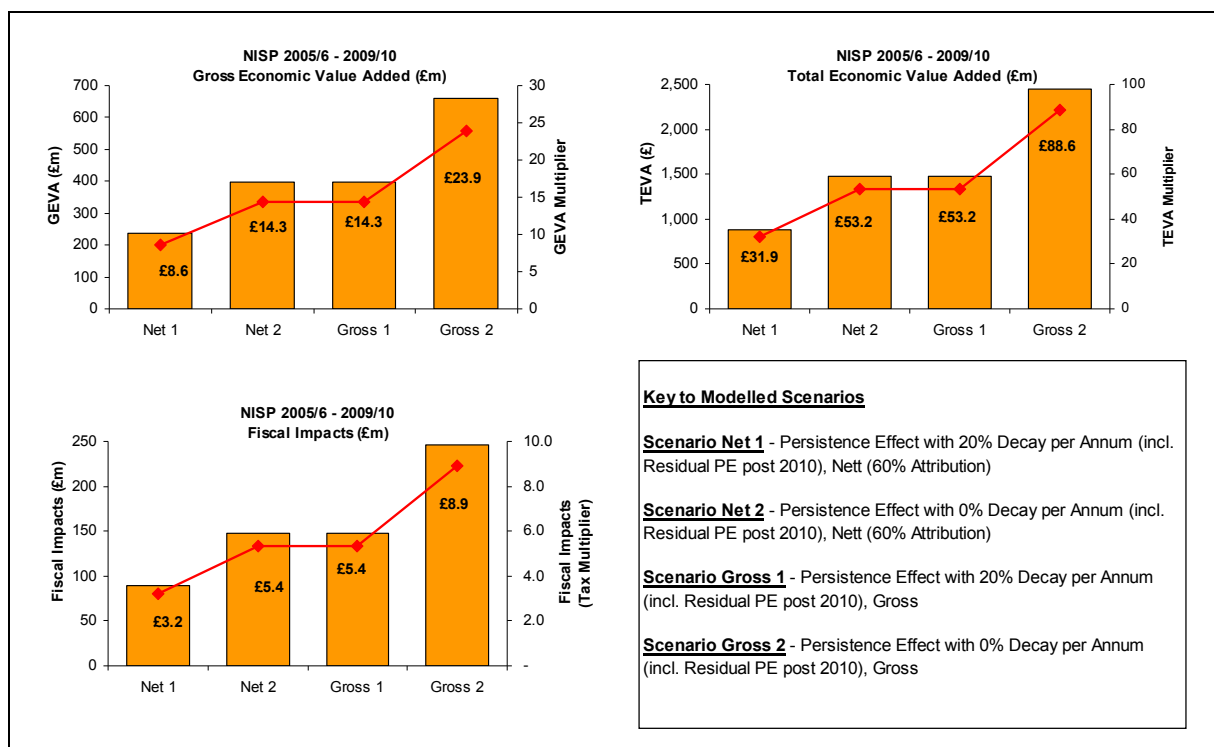
Total Output	Scenario Net 1	Scenario Net 2	Scenario Gross 1	Scenario Gross 2
GEVA (£m)	237.5	395.8	395.8	659.6
TEVA (£m)	882.1	1470.2	1470.2	2450.4
Job Outputs (jobs)	19.0	31.7	31.7	52.8
Fiscal Impacts (£m)	88.8	148.0	148.0	246.6

**Table 4.2** *Investment Multipliers*

£ Spent per Unit Output	Scenario Net 1	Scenario Net 2	Scenario Gross 1	Scenario Gross 2
Sales multiplier (CVA)	21.6	36.0	36.0	60.1
GVA multiplier (GEVA)	8.6	14.3	14.3	23.9
Total multiplier (TEVA)	31.9	53.2	53.2	88.6
Tax multiplier (Fiscal)	3.2	5.4	5.4	8.9

Figure 4.2 chart the information presented in Tables 4.1 and 4.2.

Figure 4.2 Economic Benefits of NISP (2005/06 to 2009/10)



The results presented in Tables 4.1 and 4.2 and Figure 4.2 demonstrate that NISP adds significantly to the economy. Depending on the methodology used to account for persistence, the net total economic value added ranges from £882.1m to £1,470.2m for the 5 year period of 2005/06 to 2009/10. The gross figure (which does not use the 60% attribution figure) presents a range of £1,470.2m to £2,450.4m for TEVA for the same period.

The results show that the impact of NISP on the exchequer, measured as a combination of income tax, corporation tax and VAT, is also significant, with net impacts ranging from £88.8m to £148.0m (depending on the persistence effect methodology used). The gross fiscal impact of NISP for the period 2005/6 to 2009/10 is within the range of £148.0m to £246.6m.

Table 4.2 demonstrates that NISP delivers value for money for the public, with investment multipliers ranging from 3.2 to 5.4 (net) and 5.4 to 8.9 (gross) for fiscal impacts; and a massive 31.9 to 53.2 (net) and 53.2 to 88.6 (gross) for total economic value added (TEVA).

## 5 SUMMARY

The economic impact analysis summarises the way in which the outputs from NISP activity feeds through the economy and generates additional value for business, consumers and the community – demonstrating that resource efficiency or *dematerialisation* can drive economic growth. The NISP programme has achieved impressive results over the first five years of its operations, and logic suggests that as membership and visibility of the programme continues to increase, the environmental, financial and social benefits of NISP will continue to increase accordingly. It is clear that the methods used to report and present data, specifically the levels of attribution and persistence used, has significant impacts on the magnitude of the results, and it is therefore important that results are calculated and presented in a manner consistent to other, comparable programmes to ensure any like for like comparisons are meaningful.



## APPENDIX A – SUMMARY OF ECONOMIC ASSUMPTIONS

**Table A1 Summary of Economic Assumptions Used**

Impact	Measure	Economic Multiplier					Assumption	
		2009 Assumptions (Current)	2005/06	2006/07	2007/08	2008/09		2009/10
Sales GVA	Additional Sales	30.6%					National avg as proxy/Tax issue	
Cost savings	Cost savings	50%					Half value & consumer surplus 50% pass thru assumed	
Total GVA	-	-					-	
Land fill diverted	Tonnes of landfill Diverted	Landfill Tax profile - see cells F8 to J8	18	21	24	32	40	Landfill tax escalator (values have been halved to ensure not double counting with 'cost savings' category) - should be noted that the landfill tax figure used is for active landfill, not inert landfill
CO2	Tonnes of CO2 saved	Profiled - see cells F9 to J9	23.3	24.3	25.5	26.7	27.8	Stem Value / Defra Guidance
Indirect & induced employment	Jobs created + Jobs Safeguarded	0.6						National multiplier indirect + induced of 1.6
Vat on sales	Additional Sales	17.5%						VAT
Corporate profits	GVA	15%						Share of taxable profits in GVA = 15%
		26%						Avg 26% corporate tax used
Employment income tax	Total Job Output	22%						assume marginal tax of 22%
		18,000						Avg taxable salary 15k

## APPENDIX B – TABULATED ANNUAL RESULTS

**Scenario 'Net 1' - Persistence Effect with 20% Decay per Annum (incl. Residual PE post 2010), 60% of Benefit Attributed to NISP**

Tables - Persistence Effect  
PE Decay

	20%									
Synergies formed in Yr1	100%	80.0%	60.0%	40.0%	20.0%					
Synergies formed in Yr2		100%	80.0%	60.0%	40.0%	20.0%				
Synergies formed in Yr3			100%	80.0%	60.0%	40.0%	20.0%			
Synergies formed in Yr4				100%	80.0%	60.0%	40.0%	20.0%		
Synergies formed in Yr5					100%	80.0%	60.0%	40.0%	20.0%	

KPI	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
Landfill diverted (t)	515,086	968,897	1,715,354	2,409,480	2,862,793	2,020,107	1,280,439	652,135	216,000	12,640,291
Carbon Dioxide (t)	197,378	1,171,131	2,373,969	2,330,125	2,181,558	1,456,991	771,900	289,454	96,000	10,868,506
Virgin materials (t)	-	2,437,400	3,106,714	3,566,508	3,661,942	2,497,377	1,332,812	655,726	210,000	17,468,480
Hazardous Materials (t)	-	177,883	169,736	137,937	98,621	54,986	11,351	3,293	720	654,527
Water (t)	158,686	1,471,577	5,196,835	4,243,596	3,167,227	2,018,859	902,227	54,522	12,000	17,225,528
Sales (£)	9,906,201	56,785,214	60,296,058	62,118,102	58,986,352	37,854,602	18,704,092	9,325,632	3,000,000	316,976,254
Cost savings (£)	21,869,824	38,048,058	49,416,199	53,336,072	52,606,201	33,876,330	19,520,424	9,274,957	3,000,000	280,948,064

KPI	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
Landfill diverted (£/t)	0.97	0.88	0.69	0.30	0.24	-	-	-	-	0.31
Carbon Dioxide (£/t)	2.53	0.73	0.50	0.31	0.32	-	-	-	-	0.36
Virgin materials (£/t)	-	0.35	0.38	0.20	0.19	-	-	-	-	0.23
Hazardous Materials (£/t)	-	4.82	6.94	5.20	7.07	-	-	-	-	6.04
Water (£/t)	3.15	0.58	0.23	0.17	0.22	-	-	-	-	0.23
Sales (£/£)	0.050	0.015	0.020	0.012	0.012	-	-	-	-	0.012
Cost savings (£/£)	0.023	0.023	0.024	0.013	0.013	-	-	-	-	0.014

Economic Evaluation	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
EGVA	13,966,210	36,400,305	43,158,693	45,676,175	44,352,924	28,521,673	15,483,664	7,491,122	2,418,000	237,468,766
TEVA	27,836,678	83,811,507	140,439,467	169,178,264	192,749,855	133,940,045	80,697,570	39,763,529	13,730,233	882,147,149
Job Outputs	775	1,457	2,580	3,624	4,306	3,038	1,926	981	325	19,013
Fiscal Impacts	3,623,526	9,254,037	13,398,681	17,028,591	19,052,030	13,133,853	7,940,381	4,017,953	1,323,603	88,772,654

NISP Value chain	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
Sales multiplier (CV)	9.1	15.8	13.3	23.0	22.9	-	-	-	-	21.6
GVA multiplier (GEVA)	4.0	6.1	5.2	9.1	9.1	-	-	-	-	8.6
Total multiplier (TEVA)	8.0	14.0	17.0	33.7	39.5	-	-	-	-	31.9
Tax multiplier	1.0	1.5	1.6	3.4	3.9	-	-	-	-	3.2

**Scenario 'Net 2' - Persistence Effect with 0% Decay per Annum (incl. Residual PE post 2010), 60% of Benefit Attributed to NISP**

Tables - Persistence Effect  
PE Decay

	0%										
Synergies formed in Yr1	100%	100.0%	100.0%	100.0%	100.0%	100.0%					
Synergies formed in Yr2		100%	100.0%	100.0%	100.0%	100.0%	100.0%				
Synergies formed in Yr3			100%	100.0%	100.0%	100.0%	100.0%	100.0%			
Synergies formed in Yr4				100%	100.0%	100.0%	100.0%	100.0%	100.0%		
Synergies formed in Yr5					100%	100.0%	100.0%	100.0%	100.0%	100.0%	

KPI	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
Landfill diverted (t)	515,086	1,071,914	2,032,754	3,133,430	4,213,430	3,698,344	3,141,516	2,180,677	1,080,000	21,067,152
Carbon Dioxide (t)	197,378	1,210,606	2,655,566	3,142,835	3,622,835	3,425,457	2,412,229	967,269	480,000	18,114,177
Virgin materials (t)	-	2,437,400	3,594,194	4,772,827	5,822,827	5,822,827	3,385,427	2,228,632	1,050,000	29,114,133
Hazardous Materials (t)	-	177,883	205,313	214,576	218,176	218,176	40,293	12,863	3,600	1,090,878
Water (t)	158,686	1,503,314	5,529,235	5,681,843	5,741,843	5,583,157	4,238,529	212,608	60,000	28,709,214
Sales (£)	9,906,201	58,766,455	74,030,589	90,658,751	105,658,751	95,752,550	46,892,297	31,628,162	15,000,000	528,293,757
Cost savings (£)	21,869,824	42,422,023	62,274,569	78,649,355	93,649,355	71,779,531	51,227,332	31,374,786	15,000,000	468,246,774

KPI	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
Landfill diverted (£/t)	0.97	0.80	0.58	0.23	0.17	-	-	-	-	0.19
Carbon Dioxide (£/t)	2.53	0.71	0.44	0.23	0.19	-	-	-	-	0.22
Virgin materials (£/t)	-	0.35	0.33	0.15	0.12	-	-	-	-	0.14
Hazardous Materials (£/t)	-	4.82	5.74	3.35	3.19	-	-	-	-	3.62
Water (£/t)	3.15	0.57	0.21	0.13	0.12	-	-	-	-	0.14
Sales (£/£)	0.050	0.015	0.016	0.008	0.007	-	-	-	-	0.007
Cost savings (£/£)	0.023	0.020	0.019	0.009	0.007	-	-	-	-	0.008

Economic Evaluation	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
EGVA	13,966,210	39,193,547	53,790,645	67,066,255	79,156,255	65,190,046	39,962,709	25,365,611	12,090,000	395,781,277
TEVA	27,836,678	89,378,843	163,882,571	225,397,882	294,049,050	266,212,372	204,670,207	130,166,478	68,651,167	1,470,245,248
Job Outputs	775	1,612	3,058	4,713	6,338	5,563	4,725	3,280	1,624	31,688
Fiscal Impacts	3,623,526	9,978,742	16,119,135	22,972,871	29,590,885	25,967,359	19,612,143	13,471,750	6,618,013	147,954,423

NISP Value chain	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
Sales multiplier (CV)	9.1	16.9	16.5	33.7	40.9	-	-	-	-	36.0
GVA multiplier (GEVA)	4.0	6.5	6.5	13.3	16.2	-	-	-	-	14.3
Total multiplier (TEVA)	8.0	14.9	19.9	44.9	60.3	-	-	-	-	53.2
Tax multiplier	1.0	1.7	2.0	4.6	6.1	-	-	-	-	5.4

**Scenario 'Gross 1' - Persistence Effect with 20% Decay per Annum (incl. Residual PE post 2010)**

Tables - Persistence Effect  
PE Decay

	20%									
Synergies formed in Yr1	100%	80.0%	60.0%	40.0%	20.0%					
Synergies formed in Yr2		100%	80.0%	60.0%	40.0%	20.0%				
Synergies formed in Yr3			100%	80.0%	60.0%	40.0%	20.0%			
Synergies formed in Yr4				100%	80.0%	60.0%	40.0%	20.0%		
Synergies formed in Yr5					100%	80.0%	60.0%	40.0%	20.0%	

KPI	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
Landfill diverted (t)	858,477	1,614,829	2,858,923	4,015,799	4,771,322	3,366,846	2,134,064	1,086,892	360,000	21,067,152
Carbon Dioxide (t)	328,964	1,951,884	3,956,616	3,883,542	3,635,930	2,428,318	1,286,499	482,423	160,000	18,114,177
Virgin materials (t)	-	4,062,333	5,177,857	5,944,180	6,103,237	4,162,295	2,221,353	1,092,877	350,000	29,114,133
Hazardous Materials (t)	-	296,471	282,894	229,894	164,369	91,644	18,919	5,488	1,200	1,090,878
Water (t)	264,476	2,452,628	8,661,391	7,072,660	5,278,712	3,364,765	1,503,712	90,869	20,000	28,709,214
Sales (£)	16,510,335	94,642,024	100,493,430	103,530,171	98,310,587	63,091,003	31,173,486	15,542,721	5,000,000	528,293,757
Cost savings (£)	36,449,707	63,413,431	82,360,332	88,893,453	87,677,001	56,460,549	32,534,039	15,458,262	5,000,000	468,246,774

KPI	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
Landfill diverted (£/t)	0.58	0.53	0.41	0.18	0.15					0.19
Carbon Dioxide (£/t)	1.52	0.44	0.30	0.18	0.19					0.22
Virgin materials (£/t)	-	0.21	0.23	0.12	0.11					0.14
Hazardous Materials (£/t)	-	2.89	4.17	3.12	4.24					3.62
Water (£/t)	1.89	0.35	0.14	0.10	0.13					0.14
Sales (£/£)	0.030	0.009	0.012	0.007	0.007					0.007
Cost savings (£/£)	0.014	0.014	0.014	0.008	0.008					0.008

Economic Evaluation	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
EGVA	23,277,016	60,667,175	71,931,156	76,126,959	73,921,540	47,536,122	25,806,106	12,485,204	4,030,000	395,781,277
TEVA	46,394,463	139,685,845	234,065,779	281,963,773	321,249,758	223,233,408	134,495,951	66,272,549	22,883,722	1,470,245,248
Job Outputs	1,291	2,429	4,300	6,040	7,177	5,064	3,210	1,635	541	31,688
Fiscal Impacts	6,039,210	15,423,395	22,331,135	28,380,985	31,753,383	21,889,755	13,233,969	6,696,588	2,206,004	147,954,423

NISP Value chain	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
Sales multiplier (CV)	15.1	26.3	22.2	38.3	38.1					36.0
GVA multiplier (GEVA)	6.7	10.1	8.7	15.1	15.2					14.3
Total multiplier (TEVA)	13.3	23.3	28.4	56.1	65.8					53.2
Tax multiplier	1.7	2.6	2.7	5.6	6.5					5.4

**Scenario 'Gross 2' - Persistence Effect with 0% Decay per Annum (incl. Residual PE post 2010)**

Tables - Persistence Effect  
PE Decay

	0%									
Synergies formed in Yr1	100%	100.0%	100.0%	100.0%	100.0%					
Synergies formed in Yr2		100%	100.0%	100.0%	100.0%	100.0%				
Synergies formed in Yr3			100%	100.0%	100.0%	100.0%	100.0%			
Synergies formed in Yr4				100%	100.0%	100.0%	100.0%	100.0%		
Synergies formed in Yr5					100%	100.0%	100.0%	100.0%	100.0%	100.0%

KPI	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
Landfill diverted (t)	858,477	1,786,524	3,387,923	5,222,384	7,022,384	6,163,907	5,235,860	3,634,461	1,800,000	35,111,920
Carbon Dioxide (t)	328,964	2,017,677	4,425,944	5,238,059	6,038,059	5,709,095	4,020,382	1,612,115	800,000	30,190,295
Virgin materials (t)	-	4,062,333	5,990,324	7,954,711	9,704,711	9,704,711	5,642,378	3,714,387	1,750,000	48,523,555
Hazardous Materials (t)	-	296,471	342,188	357,626	363,626	363,626	67,155	21,438	6,000	1,818,130
Water (t)	264,476	2,505,523	9,215,391	9,469,738	9,569,738	9,305,262	7,064,215	354,347	100,000	47,848,690
Sales (£)	16,510,335	97,944,091	123,384,315	151,097,919	176,097,919	159,587,584	78,153,828	52,713,604	25,000,000	880,489,595
Cost savings (£)	36,449,707	70,703,372	103,790,948	131,082,258	156,082,258	119,632,551	85,378,886	52,291,310	25,000,000	780,411,290

KPI	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
Landfill diverted (£/t)	0.58	0.48	0.35	0.14	0.10					0.11
Carbon Dioxide (£/t)	1.52	0.42	0.27	0.14	0.12					0.13
Virgin materials (£/t)	-	0.21	0.20	0.09	0.07					0.08
Hazardous Materials (£/t)	-	2.89	3.44	2.01	1.92					2.17
Water (£/t)	1.89	0.34	0.13	0.08	0.07					0.08
Sales (£/£)	0.030	0.009	0.010	0.005	0.004					0.004
Cost savings (£/£)	0.014	0.012	0.011	0.005	0.004					0.005

Economic Evaluation	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
EGVA	23,277,016	65,322,578	89,651,074	111,777,092	131,927,092	108,650,076	66,604,514	42,276,018	20,150,000	659,635,461
TEVA	46,394,463	148,964,738	273,137,619	375,663,137	490,081,749	443,687,286	341,117,012	216,944,130	114,418,612	2,450,408,747
Job Outputs	1,291	2,687	5,096	7,855	10,563	9,271	7,875	5,467	2,707	52,813
Fiscal Impacts	6,039,210	16,631,237	26,865,224	38,288,119	49,318,141	43,278,931	32,686,904	22,452,917	11,030,022	246,590,705

NISP Value chain	Year 1	Year 2	Year 3	Year 4	Year 5	Residual PE	Residual PE	Residual PE	Residual PE	5 Yr Total
Sales multiplier (CV)	15.1	28.1	27.5	56.2	68.1					60.1
GVA multiplier (GEVA)	6.7	10.9	10.9	22.2	27.0					23.9
Total multiplier (TEVA)	13.3	24.8	33.1	74.8	100.4					88.6
Tax multiplier	1.7	2.8	3.3	7.6	10.1					8.9

