



THE SIGMA GUIDELINES- TOOLKIT

SUSTAINABILITY ACCOUNTING GUIDE



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The COOPERATIVE BANK



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SUSTAINABILITY ACCOUNTING GUIDE

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1. Executive summary

Sustainability accounting is a useful tool that can be employed to assist organisations in becoming more sustainable. It recognises the important role of financial information in this transformation and shows how traditional financial accounting can be extended to take account of sustainability impacts at the organisational level. The focus is on extending the range of monetised information (covering environmental, social and economic impacts) on which decisions are made.

There are many examples of organisations experimenting with different ways of using monetised information for management decision-making and for communicating with stakeholders. This guide highlights approaches that are particularly relevant to managing for sustainability. For each approach, the background and its benefits will be explained, together with case studies and a reflection on any limitations. It is hoped these case studies and pro formas (as illustrated in the appendices) will offer an opportunity for other organisations to experiment with sustainability accounting approaches.

The approaches have been divided into those which deal with resource flows in a period (like a Profit and Loss Account) and those which consider stocksⁱ at a particular point in time (like a Balance Sheet).

This guide brings together many different approaches to using monetised information for sustainability. At present there is no one comprehensive methodology and in practice organisations are focussing on different individual elements. Sustainability accounting is an area of fertile experimentation for many organisations.

2. How to use this guide

The key intended audiences for this guide are:

1. The finance function in an organisation
2. Sustainability practitioners in an organisation

It can help employees with finance roles to understand sustainability considerations and options for developing finance mechanisms to reflect and report on these. Equally, information is provided to help sustainability practitioners to understand the options for working with their finance function to improve accounting practices.

The Guide starts from the basics, so some users may want to skip sections depending on their level of expertise and initial knowledge. The main text of the guide outlines the different approaches, which are illustrated with case studies and pro formas in the appendices.

Sustainability accounting is at an embryonic stage of development. This guide is intended to support people wanting to make progress in this area by providing:

- Information on the range of approaches that are known to be available
- Alternative frameworks to improve understanding of how these approaches may fit together
- Information on each approach and how organisations can start to use them
- Suggestions of areas that require further development

Due to its limitations sustainability accounting should be used in conjunction with other methods to inform decision-making.

This document is supplemented by the [SIGMA Environmental Accounting Guide](#). The guide is based on experience of some of the organisations involved in the development of the SIGMA guidelines. It provides an introduction to internal and external environmental accounting and tools. It also summarises how an organisation can produce one type of external environmental accounts.

2.1 Terminology

Throughout this guide we have used examples drawn from a diverse range of organisations and academic sources. Whilst this gives a good flavour of the range of activity, it can lead to confusion over terminology. *We have decided to use the same terms as the authors* so that the reader can further investigate each example, even where the term may have a different meaning than that of the Sigma Guidelines.

3. Introduction

3.1 Defining sustainability accounting

For the purposes of this discussion paper the working definition of sustainability accounting is:

the generation, analysis and use of monetarised environmental and socially related information in order to improve corporate environmental, social and economic performance.

A more complete and technical name could be ‘Sustainability Financial Accounting’, to differentiate this approach (focused on monetised data) from wider forms of sustainability reporting.

3.2 Financial accounting framework

Sustainability accounting is based on extending the existing financial accounting framework. In the UK, this is based on a combination of company law, accounting standards from regulatory bodies and the customs used by accounting professionals. These are drawn together in UK Generally Accepted Accounting Practice (or UK GAAP). Different countries have different GAAPs, based on their own legal and regulatory frameworks but they influence each other and share many core principles.

There is, however, a strong move towards global convergence of financial reporting standards. From 2005, all EU listed companies will be required to comply with International Financial Reporting Standards as issued by the International Accounting Standards Board.

Although there are many users of company accounts – such as tax authorities, regulators, employees, customers and suppliers – financial accounting is primarily designed for the investor, to inform them of the company’s financial performance and allow them to make investment decisions. Therefore, accounting practice draws a narrow boundary around the company for financial reporting.

The boundary uses the concept of *control*: does the organisation have the ability to:

1. deploy economic resources *and*
2. benefit (or suffer) from their deployment?

If so, then the economic resources, and the benefits or costs which are associated with them, are included in the financial accounts. If not, the resources and the associated benefits or costs are not included.

3.3 Full cost accounting

Present financial accounting and conventional economic measurement do not capture all the consequences of economic actions. *Externalities – costs and benefits that do not accrue directly to the organisation – are not included in the financial accounts.*

In a market-based system people are influenced by the pricing signals that are available. If prices do not include all the costs and benefits, then how can the market give the signals which allow for the most appropriate economic, social and environmental decisions? *Full Cost Accounting* is the general name for attempts to 'get the prices right', and so allow improved market-based decision-making. As such Full Cost Accounting refers to the external dimension of accounting for an organisation's impacts. The sustainability accounting in this guide also includes examples of the internal dimension. (For further introduction and discussion of Full Cost Accounting see Bebbington et al, 2001 published by the ACCA.)

For example, petrol emissions from transport contribute to acid rain, climate change, as well as adverse health effects arising from a reduction in air quality. These environmental and social impacts generate real costs to society now and in the future. However, they are not reflected in the price of fuel. These externalities are not wholly borne by the person purchasing the petrol and driving the car. Externalities may also be positive: the car may be performing any number of tasks that lead to benefits to wider society (an ambulance, a truck transporting recycling material, a family visiting relatives).

There are means of bringing external environmental impacts within the control boundary of an organisation. Mechanisms such as taxes, levies or compliance costs internalise the cost of the environmental impacts so they are being recognised by the conventional financial accounting system, and earnings are reduced as a result. It remains true, however, that the extent of such internalised costs is rarely reflected in terms of financial statement disclosures. Residual, non-internalised costs, both environmental and social, remain unrecognised and continue to represent a hindrance to fully effective resource allocation.

Many sustainability accounting approaches generate information on *potential* costs, benefits and price changes. The information generated is the financial impact that *would have been incurred* if the organisation had been sustainable. This is known as the *shadow price* or *shadow cost approach*. Sustainability accounting aims to produce a set of shadow accounts which allow the sustainability position of the organisation to be represented. They show the costs and benefits of investing in sustainability and the potential social, environmental and economic risks relating to external impacts. The more complete information that is provided in the shadow accounts enable more informed economic, social and environmental decisions to be made.

Where an organisation is committed to work to sustainability principles such as described in the [SIGMA Guiding Principles](#), sustainability accounting enables them to understand the financial implications of their progress towards meeting their commitments.

3.4 Drivers for change

The drivers for change are given in [Appendix 1](#) and are broadly:

- *Financial accounting and the service economy*
Financial accounting was codified in an era where manufacturing organisations dominated. It has not kept pace with the change to a service economy, so that crucial elements of an organisation's success – such as reputation and creativity – are not represented.
- *Financial accounting and sustainability*
Since financial accounting was codified there is a growing understanding of the global environmental, social and economic consequences of large-scale industrialisation. Making decisions for sustainable development requires a broader perspective and longer timeframes than provided by financial accounting.
- *Changing requirements of corporate governance*
Organisations are under more and more pressure from regulators and wider society to report on their environmental and social performance in the form of sustainability reporting.
- *Management benefits of sustainability accounting*
Sustainability accounting can be part of operationalising sustainability in an organisation.

As a result of these changes in the broader business environment, it is possible to observe changes in the ways companies are now communicating. There is an upsurge in non-financial and forward-looking reporting initiatives, as well as growing take-up of sustainability reporting. It remains true, however, that financial accounting is still struggling with issues such as the valuation of intangibles and the internalisation of environmental and social costs. Narrative and sustainability reporting are attempts to circumvent such measurement problems.

4. Overview of Sustainability Accounting

4.1 Introducing multi-dimensional accounting

Financial accounting traditionally records the financially-related flows and stocks of an organisation in the form of the Profit and Loss Account and the Balance Sheet, respectively.

Sustainability accounting tries to provide information in three different dimensions:

1. Timing: does it provide a snapshot in time of the state of the stock or does it show the *flow* of goods and services arising from the stock over a period?
2. Location of impact: is it within the company's financial reporting boundaries – *internal* – or outside the boundaries – *external*?
3. Type of impact: is the impact *environmental*, *social* or *economic*?

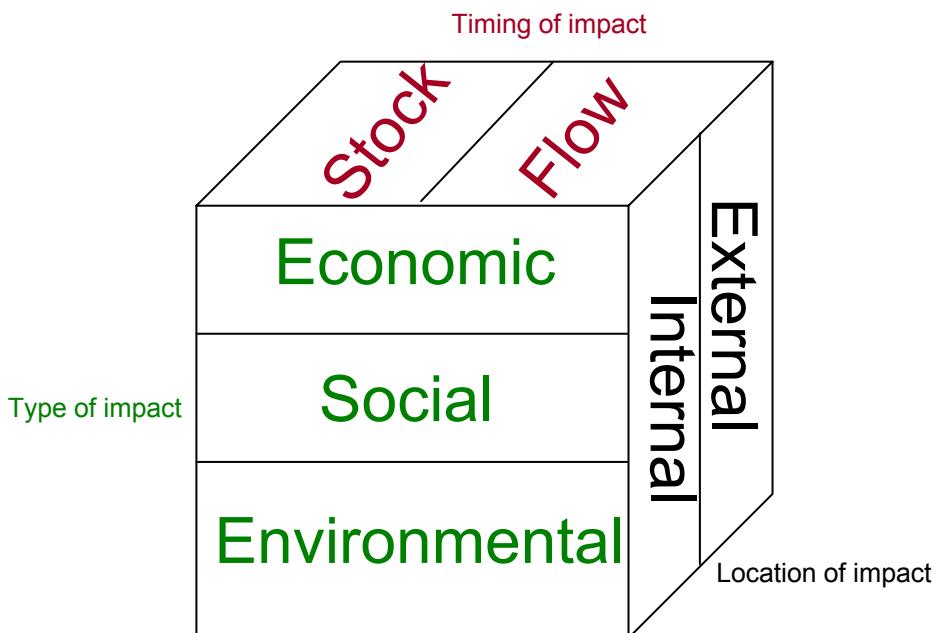
The environmental, social and economic elements, are often thought of as the components of the 'triple bottom line' of sustainability reporting which can be disaggregated into the Five Capitals Model in the following way:

Five Capitals	Triple Bottom Line
Manufacturing	} ⇔ Economic
Financial	
Human	} ⇔ Social
Social	
Natural	⇨ Environmental

The 5 Capitals Models is discussed in depth in the [Sigma Guiding Principles](#).

These three distinct dimensions of the sustainability accounting framework are illustrated in Figure 1 as a three by two by two cube.

Figure 1: Sustainability Accounting in three dimensions



Almost inevitably, sustainability accounting currently deals with economic, environmental and social issues in relative isolation from each other. Attempts are being made to explore the inter-relationships between these three central pillars of sustainability (for example see the material in [6.2 on the Sustainability Assessment Model](#)) but, with the possibility of some experimentation with integrated performance indicators (socio/economic or eco-financial), corporate progress towards sustainability is mainly measured in discrete chunks rather than as an integrated whole (Bebbington & Gray).

Also, much sustainability accounting practice currently treats the stocks and flows in relative isolation. A more complete approach is to recognise that changes in stocks are the results of in- and out- flows. There are almost no examples of reporting at this level of sophistication.

Traditional financial accounting only includes the internal stocks and flows of economic (and some social and environmental impacts) on the Balance Sheet and Profit and Loss account respectively – part of the front half of the cube. Sustainability accounting seeks to explore all three dimensions by:

1. disaggregating the internal accounts to show costs and benefits relating to economic, social and environmental performance; and
2. extending the accounting boundary to consider the monetary value of external economic, social and environmental impacts.

Moving from financial accounting to sustainability accounting requires adjustment and extension to the primary statements in the following ways:

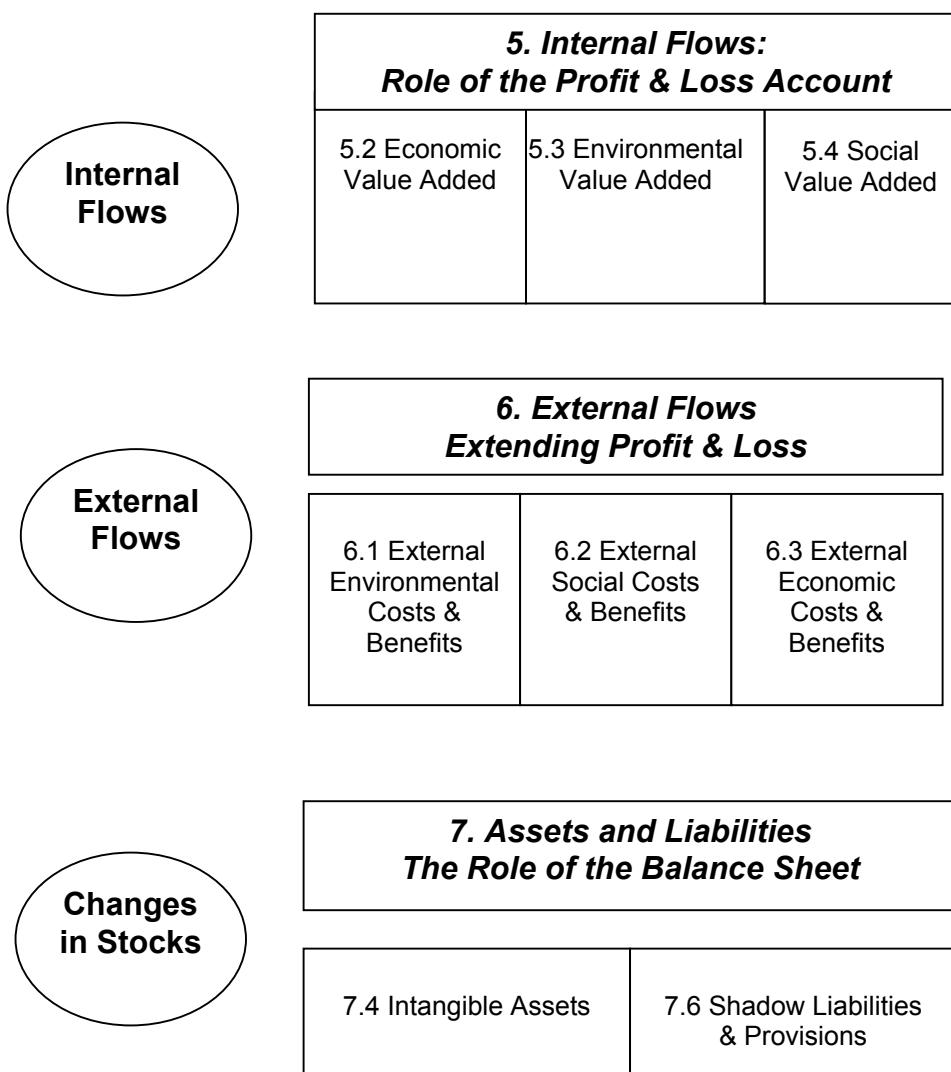
- **Restatement of the Profit and Loss Account** to show how sustainability related costs and benefits can directly impact on the bottom line.

- **Extension of the Profit and Loss Account** to encompass the external costs and benefits to the environment, society and the economy which are not traditionally taken into account.
- **Extension of the Balance Sheet** to take a fuller account of the range of assets (including intangible assets such as brands, human capital or reputation as they relate to sustainability); and ‘shadow’ liabilities (including liabilities relating to sustainability risks) of the organisation.

Taken together these adjustments form the sustainability accounting framework which is illustrated in Figure 2. They provide a route map for the remaining chapters of this guide.

Figure 2: Overview of Sustainability Accounting

The numbers against each part of the overview give the section in this guide where that approach is discussed.



5. Internal Flows: Role of the Profit & Loss Account

5.1 Current financial accounting practice

Reporting an organisation's financial performance over a period is encapsulated in the Profit and Loss account (P&L). Conventionally the P&L presents this information in a format of most interest and value to its shareholders. Table 1 provides a simple example of the presentation of a conventional P&L Account.

Table 1: A Conventional Profit and Loss Account

	£	£
Sales		450
<u>Less Materials Used</u>	155	
Wages Paid	100	
Services Bought	40	
Interest Paid	<u>15</u>	
Profit Before Tax		<u>(310)</u>
		140
Corporation Tax (25%)		<u>(35)</u>
Profit After Tax		105
Dividend Payable		<u>85</u>
Retained Profit		20

For many users of the financial accounts, the financial bottom line would be the Profit Before Tax.

Sustainability accounting recognises that the capacity of an organisation to generate wealth and value added is dependent not just on manufactured and financial capital, but also on human, social and natural capital. This means that payments to employees; environmental protection expenditures and community programmes can be re-investments in the organisation's assets and as such can contribute to positive wealth generation.

Re-statement of the financial information contained in the P&L Account can show the positive contribution that sustainability related programmes can make to wealth generation and value added. There are many different ways to re-state the financial information contained in the P&L Account. This guide illustrates three different ways:

- Economic value added
- Environmental value added
- Social value added

5.2 Economic Value Added

An Economic Value Added statement restates the financial flows in the P&L to show which different stakeholder groups benefited from those flows. It shows the economic value added to different stakeholders by the organisation's activities.

Value Added Statements are an integral part of sustainability accounting as they enable organisations to focus on returns to wider stakeholders as well as shareholders. They can be used to allow sustainability targets to be defined in terms of how the wealth generated is to be shared amongst the various groups. They allow sustainability performance to be benchmarked over time and across different organisations and sectors.

The Economic Performance Indicators in the Global Reporting Initiative are derived from a simple Economic Value Added Statementⁱⁱ. A number of organisations are now regularly preparing and reporting using this format. See for example BT, Novo Nordisk and South African Breweries (as illustrated in Table 2). Value added statements are normally produced on the basis of sales less cost of sales. Using cash receipts minus cash payments is a variant which can be susceptible to timing differences in cash flows. The SAB approach is cash flow based.

A more detailed pro forma of the economic value added statement is presented in [Appendix 2](#).

Table 2: Economic Impacts: Value Added Statement for South African Breweries for the year ended 31 March 2002

	2002 US\$m	Percentage change
Net cash generated		
Customers, consumers and investment income		
Cash received by SAB for the supply of its products and services	3,691	1.8%
Cash returns on investments	50	(7.4%)
Suppliers		
Cash payments outside the Group for materials, facilities and services purchased	(1,622)	(2.2%)
Group value added	2,119	5.0%
Distribution of value added		
Remunerate employees for their services	408	(3.1%)
Pay direct and excise taxes to state treasuries	858	0.4%
Provide lenders with a return on borrowings	112	47.4%
Provide shareholders with cash dividends	270	8.9%
Corporate social investment	7	(22.2%)
Cash retained in the business to fund future growth	464	13.2%
	2,119	5.0%

Source: *South African Breweries plc Corporate Accountability Report 2002:12*

An Economic Value Added statement, such as Table 2, by itself does not give the users of the accounts a full basis for understanding an organisation's economic impact. Best practice with sustainability reporting would be to provide a relevant and objective interpretation of the disclosed figures.

5.3 Environmental Value Added

The P&L Account can also be re-stated to draw out environmentally related costs and benefits which would otherwise remain hidden in the financial accounts. The presentation of company wide environmental costs and benefits is sometimes referred to as an Environmental Financial Statement (EFS).

The EFS is basically an aggregated cost-benefit statement that attempts to collate and report, in a single statement, total environmental expenditure and any associated financial savings achieved as a result of that expenditure over the particular accounting period under review. The statement aims to capture all relevant items of environmentally related expenditure, irrespective of which department or cost centre incurred them, and to match the expenditure with associated financial benefits or savings. Environmental costs may be investments in fixed assets (manufactured capital) or operational expenses. Environmental benefits may arise from cost savings; environmental grants; taxes avoided or revenues generated. Environmental taxes (e.g. landfill tax, climate change levy etc) to discourage poor environmental performance and tax breaks (e.g. enhanced capital allowance for energy efficiency investments) to reward good environmental practices are likely to become more common. In other cases, some materials will become more costly or even banned for environmental reasonsⁱⁱⁱ.

The re-statement of environmentally related costs and benefits can be presented in a variety of different formats and levels (organisation-wide, by department, project or product). A detailed pro forma of an environmental financial statement is presented in [Appendix 3](#).

An example of an EFS in practice is provided by Baxter Healthcare Corporation. They have produced and reported a company wide statement of environmental costs and benefits since 1995. The Company reports that their experience makes a powerful bottom line argument for environmentally responsible corporate behaviour that should appeal to companies that have yet to make environmental issues a priority. Table 3 presents the company wide statement of environmental costs and benefits for the years 2000 and 2001.

The Baxter approach requires an organisational commitment to a revised and expanded management accounting system which can identify not just environment related costs but also related benefits and the life-span of those benefits. Companies wishing to adopt the Environmental Value Added approach are advised to pilot the methodology at the facility or production unit level so that the practicality of the approach, and its benefits, can then be demonstrated (and sold) elsewhere in the organisation.

**Table 3: Baxter Health Care: Environmental Financial Statement
Showing Estimated Environmental Costs and Savings Worldwide (\$m)
(Amended)**

	2001 \$ m	2000 \$ m
ENVIRONMENTAL COSTS		
Costs of Basic Program		
Corporate Environmental: General and Shared Multidivisional Costs	1.6	1.6
Auditors and Attorneys' Fees	0.6	0.5
Corporate Environmental – Engineering	0.4	0.4
Environmental Professionals and Programs	5.6	6.0
Packaging Professionals and Programs for Packaging Reductions	1.1	0.4
Pollution Controls: Operations and maintenance	2.6	3.9
Pollution controls: Depreciation	0.9	1.0
Total Costs of Basic Program	13.0	14.0
Remediation, Waste and Other Response Costs		
Attorneys' Fees for Cleanup Claims	0.1	0.1
Settlement of Government Claims	0.0	0.0
Waste Disposal	10.2	8.4
Environmental Taxes for Packaging	1.0	1.1
Remediation/Cleanup – On-site	0.5	1.1
Redemiation/Cleanup – Off-site	0.0	0.1
Total Remediation, Waste and Other Response Costs	12	11
TOTAL ENVIRONMENTAL COSTS	25	25
ENVIRONMENTAL SAVINGS		
Ozone Depleting Substances Cost Reductions	0.0	0.1
Hazardous Waste Disposal Cost Reductions	(0.3)	0.9
Hazardous Waste Material Cost Reductions	0.0	1.1
Nonhazardous Waste Disposal Cost Reductions	(0.5)	0.0
Nonhazardous Waste Material Cost Reductions	(9.8)	2.1
Recycling Income	8.2	7.0
Energy Conservation Cost Savings	3.2	2.8
Packaging Cost Reductions	2.5	1.3
Water Conservation Cost Savings	0.1	0.1
TOTAL ENVIRONMENTAL SAVINGS	3	15
As % of the costs of basic program	23%	107%
TOTAL COSTS IN REPORT YEAR	25	25
SUMMARY OF SAVINGS		
Total Report-Year Environmental Savings	3	15
Cost Avoidance in Report-Year from efforts initiated in the 6 years prior to Report Year.	53	60
TOTAL INCOME, SAVINGS AND COST AVOIDANCE IN REPORT YEAR	56	75

Source: <http://www.baxter.com/investors/citizenship/environmental/financials.html> (Amended through addition of 'Total costs in report year' line)

Forum for the Future has been working with a number of organisations in the private and public sectors to encourage them to account for the environmental costs and benefits of their environmental programmes. For example, the construction services company Carillion, prepared an Environmental Financial Statement for the Dartford and Gravesham hospital in Kent which was published in [2000 Environmental and Community Report](#) (pages 26 and 27). More recently, a statement of the costs and savings of selected environmental features of the Great Western Hospital in Swindon was prepared and published by CIRIA (2002).

For practical guidance on preparing an Environmental Financial Statement, see CIMA and Forum for the Future (2002). Also refer to Envirowise (a government programme offering practical advice to business) Using Environmental Management Accounting to Increase Profits: A Good Practice Guide, 2002.

5.4 Social Value Added

The P&L Account can also be re-stated to draw out the costs and benefits of social policies and activities, including the values which drive the core business, that would otherwise remain hidden in the financial accounts. This is not the disbursement of internal flows to stakeholders (which is given in the Economic Value Added statement in [section 5.2](#) above). Instead the Social Value Added statement is the economic value to the organisation of its social stance, through ethical policies and practices. The presentation of organisation wide socially related costs and benefits can also be referred to as a Social Financial Statement (SFS).

The first step in the preparation of a social value added statement is defining the scope and definition of benefits and costs related to an organisation's social stance. One way forward is to ring-fence particular types of costs and benefits as 'socially related'. Benefits would include additional sales from social/ethical price premium and additional business generated due to social/ethical reputation as well as costs avoided through reduced staff turnover, a beyond-compliance health policy and ethical supply chain management, for instance. The costs would include the extra expenditure related to social policies, in staff costs, supply chain management or through donations to the local community.

For this guide, we suggest that the boundaries be defined by ring-fencing particular types of costs and benefits as socially related. Over time it is important to build a common understanding on what should and what should not be included.

For example, should social expenditure include total expenditures on health and safety or only those expenditures beyond legislative compliance? Should it include total expenditure on wages and salaries or just expenditures above sectoral averages? These issues are raised to identify the type of further work that is needed in this area.

Forum for the Future has pioneered the Social Financial Statement and has trialled it with some of its partners. A suggested pro forma for the Social Financial Statement is provided in [Appendix 4](#). At present, there are no examples of organisations who have completed a full SFS but some organisations are beginning to collect information on certain aspects.

BT plc have made some first steps along the road of considering the benefits of Corporate Social Responsibility policies through their Customer Satisfaction Model. The Model uses consumer research, such as face-to-face interviews, to identify the factors that strongly correlate with changes in overall customer

satisfaction: Products & Services; Contact & Experience; Price & Value, and Image/Reputation. Within the Image/Reputation driver the interview data allows BT to estimate that about 25% of its reputation is built on its CSR policies.

As the company says “Taking our model to the bounds of reasonable extrapolation, if BT were to cease all its CSR activities (i.e. cease treating employees with respect, ignore environmental issues, no longer emphasise the need to act with integrity, ceasing all non-profitable services and cancelling all community activities) then our customer satisfaction rating would drop by 10%” (European Business Forum magazine issue 11, autumn 2002 p65).

The BT Customer Satisfaction Model provides a case for the “underlying and long-term strategic importance of strong social responsibility reputation” for similar organisations. Although BT routinely considers customer satisfaction, they have not as yet decided to use the full model (from each component of each driver, through the drivers to the overall customer satisfaction) as a continuous management tool. Nor have they tried to make a further causal jump from movements in customer satisfaction driven by social policies to financial impacts such as turnover or profit. More detail on the BT model can be found on their Better World website under [Investors](#).

The Co-operative Bank has considered the financial benefits to the bank of its ethical policies through focusing on its customers’ behaviour. Using the Co-operative Bank Model they estimated the additional profit generated from attracting ethically minded customers. The methodology estimates the net contribution that its ethical and ecological stance has made to net profits and reported the results in its Partnership Reports for 2000, 2001 and 2002^{iv}. The findings show that in 2002 around 24% (est. £30 million) of profit can be assigned to customers who cite ethics as an important factor, and 13% (est. £16 million) to customers who cite ethics as the most important factor.

The results were based on a survey for all major products, which asked customers to specify the degree to which ethical and ecological factors influence decision making. The research strongly suggests that whilst ‘ethics’ is a major determining factor for customers of The Co-operative Bank (28% cite ethics as being influential in opening an account) it is only rarely specified by customers of other banks.

The Co-operative Bank Model is worked through as a practical example in [Appendix 5](#).

London Benchmarking Group (LBG) Model has focused on community. The LBG Model provides a methodology to measure the costs of corporate community involvement and the associated output effects. The model assigns monetary value on the ‘input’ costs of a company’s community involvement programmes, whether the contributions are made in cash, time or in-kind. Combining this with the programme management costs, covering salaries,

benefits and overheads of staff involved in community relations, enables a total cost of community involvement to be evaluated.

The 'outputs' or benefits of community involvement may be expressed in financial and/or non-financial terms. For example:

- Leverage of cash and resources from other sources drawn in by the programme
- The community benefit, such as the number of people in society who benefit
- The business benefit which accrues.

The categories of input costs and output benefits of corporate community programmes are summarised in the LBG matrix (Table 4).

Table 4: Investing in the community: input costs and output benefits

	Inputs (Costs)	Outputs (Benefits)		
	Cash Value	Leverage	Community Benefits	Business Benefits
Charitable Gifts				
Community Investment				
Commercial Initiatives				

6. External Flows: Extending the P&L Account

Sustainability accounting extends the traditional accounting boundaries to take into account environment, social and economic costs (and benefits) that accrue to the full range of stakeholders. A distinction is therefore made between private costs and benefits which accrue directly to the organisation and societal or external costs and benefits that accrue to other stakeholders.

Stress has impacts both inside an organisation e.g. through lost productivity, outside an organisation e.g. the quality of life of the employee and family. The impact to the organisation is internalised as lost productivity and could be drawn out in a Social Financial Statement. The wider impacts on the individual and society are not internalised and so would appear in an account of external social costs.

To prepare external accounts an organisation must collect new information on the external environmental, social and economic impacts relating to the organisations' activities. These impacts are evaluated in financial terms where possible.

There are essentially 4 steps in the preparation of external cost accounts:

1. Scoping impacts:

Ideally a stakeholder approach should be used to identify all significant environmental, social and economic impacts associated with the organisations' activities. A full life-cycle approach will scope upstream impacts (associated with the supply of products and services); downstream impacts (associated with the use, disposal or remanufacture of products) and at the operational level (associated with the manufacture and distribution of the product).

The [SIGMA Stakeholder Engagement Tool](#) provides guidance on how to identify and engage with stakeholders. This approach should be used to scope out environmental, social and economic impacts and to prioritise stakeholder concerns. This can be supplemented with internal documentation (such as the ISO 14001 Significant Aspects Register of Environmental Impacts); reports and interviews. This guide classifies environmental impacts according to the categories in the Global Reporting Initiative – which itself was prepared using a multi-stakeholder approach.

2. Determining boundaries:

This involves prioritising what impacts to account for and what impacts to consciously exclude. This is an important decision having a significant impact on the estimation of sustainable profits. As already noted, financial accounting boundaries are governed by statute and focus on economic resources under the company's control. This narrow definition of organisational responsibility is being changed by recent legislation and voluntary guidelines affecting reporting of significant social and environmental risks. As sustainability accounting is currently a voluntary exercise, the choice between narrow or broad system boundaries will

ultimately rest with the individual organisation. Decisions on boundaries and other issues should be disclosed in the accounts to give users a better understanding.

Full cost accounting requires that broad system boundaries be drawn that internalise the full impacts that an organisation has on social, environmental and economic systems. Box 1 shows the different types of costs that would be taken into account in a full cost approach.

Conventional accounting only includes Tier 0 (Usual Costs) and Tier 1 (Hidden Costs).

3. *Monetary valuation of impacts*

Methods to assign monetary values to environmental impacts have been developed over the past decade and are increasingly accepted both within government and corporate circles. There are a wide variety of different types of environmental valuation methods that can be used – some more controversial than others. They can be split into those that are based on the costs to the organisation of reducing its environmental footprint and those that are based on valuing the damage cost to society. [Appendix 7](#) provides a summary of the different environmental valuation approaches, selected examples of valuations and links to a range of public sources.

The valuation of external social impacts is a less well-developed and controversial field. In principle, the same approach to valuation could be applied to social impacts. For example, measures to prevent or reduce social impacts could be regarded as a form of avoidance cost. Likewise, compensation to affected parties could be regarded as a form of restoration cost. A practical example might be the costs of installing new safety devices to reduce accidents at work or the costs of incorporating measures to reduce the health or safety risks associated with the use or disposal of the final product.

4. *The Triple Bottom Line: Calculating Sustainable Profit*

Whilst companies ‘add value’ through their activities they also extract value for which they do not pay. Financial profit is a measure of value added for the organisation – but traditional profit and loss accounts do not take account of external environmental, social and economic costs that impact on the wider society. Deducting total external costs from financial profit gives an estimate of the sustainable profit level.

Box 1: Full Cost Accounting

Tier 0: Usual Costs

Includes direct and indirect costs usually associated with the project of both a capital and revenue nature.

Tier 1: Hidden Costs

These are additional costs that are usually found in overheads/general accounts. They would include regulatory and health, safety and environmental management systems – both capital and revenue in nature.

Tier 2: Liability Costs

There are ‘contingent liability costs’ that are not presently incurred in a conventional accounting sense. They may emerge depending on circumstances (for example, if the law changes) and their likelihood can be estimated. Such costs include fines, future clean up costs and regulatory costs associated with a project.

Tier 3: Less Tangible Costs

Costs and benefits that may be assessable in financial terms are likely to arise from improved sustainability management. These costs and benefits could include the loss/gain of goodwill arising from a project; changing attitudes of suppliers, customers, and employees; and advertising/image issues from sustainability performance.

Tier 4: Sustainability Focused Costs

Costs that would be incurred if a sustainability focused approach was taken to a project or organisational performance. Costs to ensure zero environmental (and social) effect could be estimated. It is unlikely that such costs would become real costs in the absence of a radical change in the regulatory and operating environment.

Adapted from Bebbington and Thomson; p53

6.1 External Environmental Impacts

The professional accounting bodies^v, the UK Government and the European Commission^{vi} are all encouraging organisations to measure, manage and report the impact of environmental risks and liabilities on their organisations' financial positions. Negative environmental impacts relating to an organisations operations and products represent potential liabilities which need to be accounted for in financial terms as far as possible. Examples of external environmental cost accounting are drawn from Forum for the Future and Trucost.

Forum for the Future has pioneered the development of external environmental cost accounting which is now being applied by a number of

leading UK companies including Marks and Spencer, AWG (formerly Anglian Water), Bulmers (the Herefordshire-based cider manufacturer); Interface Europe, Uniqema, UPM Kymmene, and Wessex Water.

The external environmental footprint of an organisation is assessed according to the GRI categories of environmental impact. For each type of impact a sustainability target is estimated using latest available evidence.

Using avoidance and restoration values is the least controversial method^{vii} as it is based on the actual costs^{viii} that would be incurred by the organisation in order to prevent or avoid its external footprint. For example, the additional cost of switching to renewable energy represents the costs of avoiding energy-related emissions. Restoration values are the costs of rehabilitating or restoring the environmental damage caused by the organisation's operations and products. For the energy example, investing in carbon sequestration is one restoration option.

Table 5 illustrates the application of external environmental cost accounting to Wessex Water which published the account in the main annual review and accounts for 2002/2003. The basic pro forma for the External Environmental Cost Account is presented in [Appendix 6](#). For more detailed information about environmental values that are available from public sources see [Appendix 7](#).

Table 5 has been developed as follows: Consumption (in Table 5 shown as 'A') is converted into emissions ('B' in Table 5); The difference between present emissions and the sustainability target ('C' in Table 5) gives a 'sustainability gap' expressed as the avoidance amount ('D' in Table 5,); For each impact, a unit cost is determined based on what the organisation would have to pay to avoid the impact in the first place or, if avoidance was not possible, what it would cost to restore any resulting damage ('D, £ per tonne' in Table 5); The total external environmental cost for that impact is converted to a monetary estimate by applying the unit restoration or avoidance cost to the 'sustainability gap' ('E' in Table 5).

Details on how to estimate an organisation's external environmental cost using a similar method can be found in the [Sigma Environmental Accounting Guide](#).

Table 5: Wessex Water Services External Environmental Cost Accounts for the year to 31 March 2003

Component	(A) Consumption	(B) Emission (tonnes)	(C) Target level (1997 -60%)	(D) Avoidance amount / abatement cost (£ per tonne)	(E) 2001/ 2002 £'000
Emissions to air					
Grid electricity	181,215 m kWh	CO2 - 77,922 NOx - 217 So2 - 453	CO2 - 36,074 NOx- 132 So2 - 400	CO2 - 41,848 tonnes at £5.50 NOx - 85 tonnes at £14,000 SO2 - 53 tonnes at £2,400	230 1,190 127
Natural Gas	19,011 kWh	CO2 - 3,612	CO2 - 1,577	CO2 - 2,035 tonnes at £5.50	11
Diesel oil	8,986 kWh	CO2 - 2,247	CO2 - 616	CO2 - 1,631 tonnes at £5.50	9
Vehicles	2,639m litres	CO2 - 6,999 Other - 58	CO2 - 2,176 Other - 144	CO2 - 4,823 tonnes at £5.50 N/A	27
Methane (as CO2 equivalent)	n/a	CO2 - 58,401	CO2 - 28,753	CO2 35,210 tonnes at £5.50	194
Other principal impacts					
Abstraction Priority 2 Sites			Meet Defra guidance on low flows		1,850
Contaminated land			See notes		120
Environmental sustainability cost Profit etc ESP					3,758 63,300 59,542

A second example is Trucost, a London-based environmental rating company that aims to provide a means for companies and other organisations to measure, manage and communicate their overall environmental performance.

In particular, the Trucost model allows organisations to measure their external environmental impact in monetary terms. Trucost calculates a rating that compares economic activity as shown in the published accounts (internal costs) with economic activity when adjusted for externalities. The rating is expressed as a single percentage figure and is a measure of the extent to which organisations have internalised their external environmental costs.

6.2 External Social Impacts

This aspect of the sustainability accounting framework is still very much in its infancy. Consequently there are very few examples of organisations

accounting for external social impacts in financial terms and there is scope for innovation.

Perhaps the most comprehensive (but somewhat dated) example of corporate accounting for the social costs and benefits associated with its activities is the preparation of a Social Income Statement by the Cement Corporation of India (see Gray, Owen and Adams 1996: 105-106).

More recently, BP in collaboration with the University of Aberdeen have developed the Sustainability Assessment Model (SAM) which is an accounting tool that tracks significant external impacts (including social) on a project basis. Other examples can be drawn from liability settlements for social damages or valuation of specific aspects relating to the health and safety of products.

The SAM seeks to track significant economic, resource, environmental and social impacts of a project over its full life cycle and then to translate these impacts into a common measurement basis – that of money. The approach was applied to a discrete BP project, an oil and gas field development. The full accounting tool is available from Baxter et al (2002).

The SAM examined social impacts of oil and gas field development and identified three elements of social impact:

- *Social costs and benefits relating to employment*
Direct value generated and the quantification of the health and safety impacts of these jobs. This is expressed as an estimate of how much economic activity is generated based on the multiplier effect of using the wages paid in the economy.
- *Social benefits of corporate tax*
This was based on external social benefits that arise out of the tax paid over the project life. The taxes paid were split on a pro rata basis reflecting the UK Government spending patterns (e.g. health, education). A series of tax multiplier factors were estimated based on the average social benefit arising from tax spend in each category.
- *Social benefits of the product*
Three products are generated from a typical oil and gas field: mobility, heating and oil based products (including pharmaceuticals, plastics and other chemicals). Taking the example of mobility, both positive and negative externalities were identified. The positive impact is measured by the difference between the crude price of oil and the current value that consumers place on mobility (in other words an estimate of the consumer surplus). The negative factor is the social costs of mobility relating to cost of congestion and road accidents (using data drawn from Samson et al 2001).

Forum for the Future has been involved in a study to estimate the social costs of alcohol misuse. Box 2 uses information from public sources to show how

the social costs of alcohol misuse can be attributed to a specific product, brand or producer.

Box 2: Alcohol: Estimating External Social Costs

Drawing on the work of Alcohol Concern, the quantifiable damage costs of adverse social impact of alcohol abuse arises from a number of causes, including:

- costs to industry (including absence, unemployment and premature deaths)
- cost of society's response
- costs of material damage from accidents
- costs of criminal activities.

A range of international studies indicate that alcohol misuse costs between 2% to 5% of a country's annual gross national product (GNP). Taking the lowest estimate of 2% and a GNP for England of £542,700 million, Alcohol Concern calculated that alcohol misuse costs England between £10.8 billion and £27 billion per year (Alcohol Concern 2001).

The external social costs attributed to any alcohol product, brand or producer can therefore be calculated as the share of the product in the alcoholic drinks market (by alcohol volume) multiplied by the total external social costs to society.

For example, if an alcohol product has 1% of the alcohol market by alcohol volume, the external social costs attributed to this product is estimated to be:

$$1\% \times £10.8 \text{ billion (lower value)} = £108 \text{ million per annum}$$

Box 2 shows how it is possible to estimate the social costs of a particular product but it does not tell us whether this downstream impact is the responsibility of the producer or the consumer or some other stakeholder in the demand chain (such as distributors, advertisers, retailers, government).

Therefore the next step is to estimate how social costs relating to a specific product are shared across affected stakeholders in the demand and supply chain. Pearce and Newcombe (1998) have developed a model to describe a complex notion of responsibility based on sharing of the 'blame' between producers and consumers across a product chain. Forum for the Future has developed a methodology to establish a social contract between affected stakeholders based on a stakeholder consultation process^{ix}.

6.3 External Economic Impacts

Traditional corporate financial reports do not detail the wider economic impacts of a company's activities. These external economic impacts may affect a range of stakeholders in both beneficial and adverse ways. For example, positive impacts on local suppliers and service providers via the economic multiplier and negative economic impacts on the local community

from a redundancy programme. The GRI Sustainability Reporting Guidelines also recommend that companies report on their indirect or external economic footprint.

The development, measurement and valuation of the external economic footprint is, perhaps surprisingly, the least developed aspect of sustainability accounting.

Novo Nordisk is one of the few companies that has gone beyond reporting its direct financial impacts to reporting on its wider economic footprint. In 1999 Novo Nordisk began to systematically explore the wider socio-economic aspects of its business, producing case studies of local impacts. In 2000 a case study was undertaken analysing the general economic impact of the Novo Nordisk Insulin plant in Clayton, North Carolina, USA.

The Clayton analysis demonstrates that the local plant has numerous impacts on the local community, employees and suppliers, and is a stimulus to local trade and industry. Furthermore, employee salaries and income to suppliers multiplies as it is spent in the local economy. Novo Nordisk has estimated the financial value of both direct and external economic impacts relating to the Clayton Plant (see Table 6 below).

Table 6: Economic Impact of the Novo Nordisk Insulin plant in Clayton, North Carolina, USA. 2000

Direct (internal) impacts		Indirect (external) impacts \$000	
Government: Tax	346		
Suppliers: purchased goods & services	20, 000	Supplier multiplier via wholesale and retail trade	22, 000
Employees: wages; salaries training & development	10, 000 151		
Community: charitable donations	60		

7. Assets & Liabilities: The Role of the Balance Sheet

7.1 Sustainability and capitals

As noted before, sustainability can be defined in terms of flows and stocks. A sustainable society can be thought of as living off the income generated by capitals (flows) rather than degrading the capitals themselves (stocks).

A sustainability accounting Balance Sheet could theoretically report a snapshot of the stock of each of the Five Capitals which form the resources available for the value creation process. A sustainability P&L would recognise the in- and out- flows of these stocks over time. This has not yet been attempted anywhere in a systematic fashion.

This next section considers some experiments which bring different ‘capitals’ onto the financial balance sheet. Consequently the techniques described below are company specific and are mainly used for internal management purposes. At present few organisations frame their approaches in terms of the Five Capitals used by SIGMA. The approaches we have given below are framed in terms of the individual organisation’s competitive advantage. Present practice on the Balance Sheet appears to be considering the *internal* generation of capitals. They are internal measurements of a company’s success in generating assets for its own use.

However, an organisation has an impact on the *external* capitals, outside its own boundaries. These may include the human capital of its employees at home or after they leave the organisation, the social capital of the communities in which the organisation operates and the natural capital on which it relies. Do the organisation’s activities increase the stock of human happiness? Do they contribute to increasing stocks of natural capital? We have not come across any examples of organisations creating measures of their contribution to external capitals.

7.2 Current financial accounting practice

Financial accounting recognises on the Balance Sheet factors of production where the organisation has sole right to get the benefits of their deployment.

Those economic resources are composed of:

- Fixed Assets – assets which are held for the long term.
- Working Capital – the inventories, debtors, cash and creditors which are used in day-to-day operations.
- Long-term liabilities – liabilities which will fall due in the longer term, including debt which finances the business.

In UK GAAP, assets are rights or other access to future economic benefits controlled by an entity as a result of past transactions or events. Liabilities are obligations of an entity to transfer economic benefits as a result of past transactions or events. An asset or liability should be recognised when:

1. there is sufficient evidence of the transaction or event and
2. it can be measured with sufficient reliability

7.3 Intangible Assets

Equity market value refers to the value of the company as determined by the demand and supply of their equity on the finance markets. Book values refer to the value of the company according to the value of assets and liabilities on the balance sheet.

Even with recent downturns in equity prices, for listed companies there remains a large gap between equity market values and book values. This gap is the market's valuation of intangible assets not represented on the balance sheet – the capabilities and competencies which make up the organisation's competitive advantage. The shift from a production to a service economy means that competitive advantage owes more to intangible assets than to plant and machinery. For a fuller discussion see the sections on Financial Accounting and the Service Economy in [Appendix 1](#).

The issue of measuring intangibles is widely discussed in the accounting profession. From a sustainable development point of view, the general reason for trying to measure intangibles is to establish whether *the organisation* is degrading the five forms of capital or living off the revenues they generate?.

In terms of the [Sigma Five Capitals Model](#), these intangible assets represent the human and social capital on which the organisation relies to generate value. Therefore, the approaches to measuring these intangible assets are considering the internal stock of the organisation.

7.4 Measuring intangible assets

As an area which is full of experimentation and innovation many practitioners create their own terms. As with other areas of sustainability accounting, this proliferation of jargon can be confusing. Many authors will use the same words with different meanings, some of which may be contradictory to the meaning in the context used in the SIGMA guidelines. We have decided to use the same terms as the authors so that the reader can further investigate each example.

However, before exploring these examples a note of caution on using monetised measurement as the only way to represent intangible assets. Professor Edvinsson, the former Director of Intellectual Capital at Skandia and one of the pioneering practitioners, likens describing intangible capitals to describing the weather: *to be precise and comparative you need numbers but you also need a narrative, to give context and a frame*.

Following Sveiby (2001), measuring intangible assets can be organised into 4 methods.

- *Scorecard methods*

These identify components of intangible assets and assign particular indicators to them. The indicators can be brought into an index or

presented as a scorecard.

Examples of indices include, at a community level, the work of [Robert Putnam](#) and at an organisational level the [New Economics Foundation](#), particularly their 2001 publication for the ACCA called 'Investing in Intangibles'.

Some businesses have also experimented with measuring Intellectual Capital (usually meaning an organisation's intangibles). The [Skandia Navigator](#) tries to give the manager (or investor) a systematic description of the company's ability and potential to transform intellectual capital into financial capital. It does this with a combination of financial and non-financial metrics which are presented in a form of Balanced Scorecard.

The Intangible Asset Monitor was created by [Karl-Erik Sveiby](#). The monitor has financial and non-financial metrics which cover the growth, efficiency and stability of different components of an organisation's intellectual capital.

The scorecard methods do not monetise data and can be hard to interpret. As with a general Balanced Scorecard, the benefit is derived through designing and implementing a system for intangibles and increasing an organisation's understanding of how intangibles can be managed.

- *Direct methods*

With Direct Methods a monetised value is assigned to component parts of the intangibles based on either the historic cost to create, the replacement value or the value of the future economic benefits.

One area of focus is brands. [Interbrand](#), the consultancy, produce an annual ranking of brand values. They calculate a brand's value as its differentiated earnings – the amount it earns above a generic competitor – multiplied by a judgmental score of the brand's relative strength.

Direct methods do produce monetised information, though with many generalising assumptions.

- *Market Capitalisation methods*

These methods use the difference between the market capitalisation and the organisation's net asset value to give the value of its intangibles.

In the long-term market valuations give an asset's intrinsic value but in the short-term they are subject to asset bubbles and over-corrections. As such, market capitalisation methods are a poor guide for managing intangibles.

- *Return on Assets methods*

This method assumes that all returns are the result of either tangible or intangible assets. Therefore, an organisation's return on tangible assets (ROA) is compared to the industry average. The difference represents the return on the assets not included in the tangible assets, that is the intangible assets. Dividing the return from intangible assets by the

company's cost of capital derives an estimate of the intangible asset value.

This method has been proposed by [Baruch Lev](#) as the most appropriate way to bring forward an organisation's intangibles. Again, the nature of the generalised assumptions – for instance, how to select an organisation's peer group – can make it a poor guide for decision-making.

7.5 Liabilities

As noted above, as the focus on economic processes moves from growth to sustainable development many impacts which had previously been external to the organisation will be internalised. This was discussed under External Flows, where the externalities are internalised as *shadow costs*. In the previous section it is noted that there have been few attempts to quantify on a balance sheet the implications of flows from (and occasionally to) external stocks. Two mechanisms which may bridge this gap are *shadow liabilities* and *shadow provisions*.

7.5.1 Shadow liability

The section on External Flows above discussed external environmental and social costs. These are the costs of avoiding the environmental and social impacts that occurred in the year, or of restoring them. As the shadow costs are debited to the P&L, the Balance Sheet would need to be credited with a *shadow liability*. This would build up a value that represented what would have had to have been spent to avoid the historic impact of the organisation's activities. The shadow liability is an indication of how much the organisation has drawn on human, social and natural capitals to be able to perform its value creation.

7.5.2 Shadow provision

At present, where a company knows that it will incur a cost and can reliably measure that cost then it must recognise a provision. For instance, the owners of an oil rig know that it has a finite life, that there are regulations in place dealing with its de-commissioning, and what the cost would be to meet those standards. Therefore, it creates a provision, based on the net present value of cash flows associated with the de-commissioning. Each year the calculation is updated for the new life expectancy, disposal technologies, regulations and other assumptions.

By analogy it would be possible for a company to calculate its *shadow environmental provision* as the net present value of the expected external environmental costs as calculated for the environmental accounts. A similar shadow social provision could be calculated in a similar way.

For the oil rig, as it nears its end of life the provision increases (as the discount unwinds). In order to stay solvent the company must have assets to match the provision. In this way the provision ensures that the company can pay for the de-commissioning costs when they fall due. The provision

represents the cost of meeting regulatory standards for the site once the rig has ceased to function.

Similarly the shadow provisions would represent the cost of the restoration and avoidance costs of continuing with present activities. The shadow provision is an indication of how much the company knows that it will draw on external human, social and natural capitals to be able to perform its value creation in the future. An organisation that recognises a shadow provision is acknowledging that it generates value in a way that has negative external impacts.

Clearly, forecasting future performance is uncertain. Choosing an appropriate discount rate would be a challenge. A shadow provision would also raise questions about how the company is obliged into its mode of value-generation. In other words, is the generation of external impacts a feature of our economic system or are companies able to act independently with free choice over the course of action they pursue. Which may of course include externalising costs onto third parties.

One implication of a shadow provision is that a company will need to raise additional financial capital to remain solvent even before the external costs are incurred by society. The need for extra financing could provide a powerful incentive to minimise the environmental and social footprint of operations.

As such, a shadow provision is likely to be provocative.

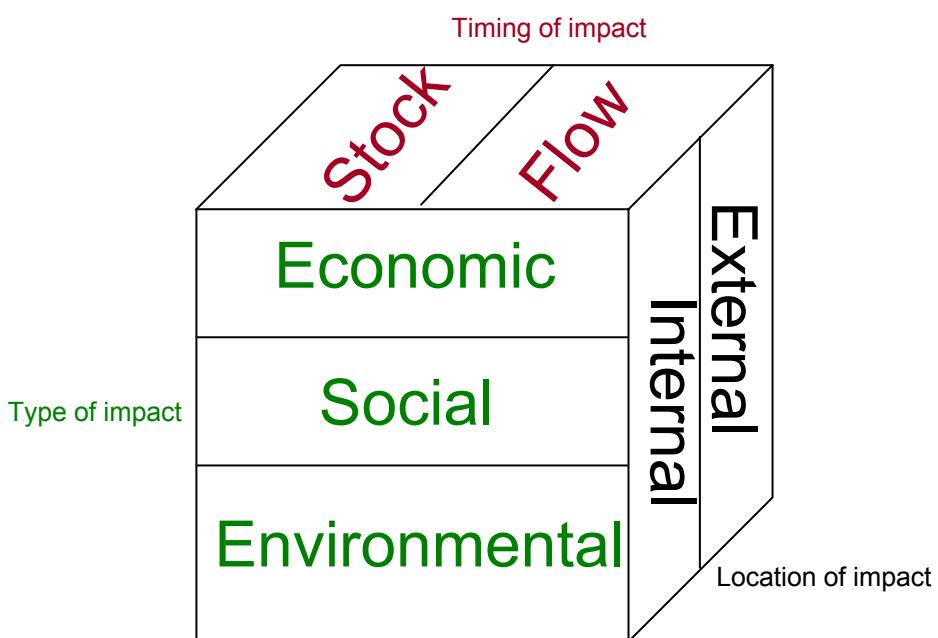
8. Conclusion

8.1 Locating the approaches

This guide has outlined many examples of using monetised information for sustainable decision making. The guide has located these examples as part of sustainability accounting in three dimensions by asking:

- is the approach measuring the impact on a *stock* or a *flow*?
- is the impact *internal* or *external* to the organisation's accounting boundaries?
- is the impact *environmental*, *social* or *economic*?

Figure 3: Sustainability Accounting in three dimensions



Financial accounting concerns itself with *internal economic, social and environmental* activity that impacts *stocks and flows* by presenting monetised data in the Balance Sheet and Profit and Loss account respectively.

Because of the way the Balance Sheet and P&L are framed for the investor, the social and environmental costs and benefits both internal and external are hidden. The different types of *internal flows* can be brought out by restating the P&L as Environmental or Social Value Added Statements.

The *external flows* can be captured by extending the boundaries of the organisation and asking: how much would it have cost to avoid or restore the impacts over the period? This information can be presented in external accounts. The impacts which need to be avoided or restored are beginning to

be understood for the environment. For the social side, the many different perspectives on a social ‘good’ or ‘bad’ impact can be approached using a stakeholder dialogue model.

The *internal stocks* of social capital, indicating the competencies and capabilities of the organisation, are being valued by capital markets as the difference between book values and the market value of the company. There have been several approaches to allow managers to understand their intangible assets – including the Intangible Asset Monitor, brand valuation and a Return on Assets approach.

To our knowledge, no organisation has tried to measure its impacts on *external stocks*.

8.2 Trends in sustainability accounting

From our work on sustainability accounting we believe there are several key trends which are of interest to all organisations wishing to move towards sustainability:

Increasing internalisation of externalities

There is an increasing recognition that, in order for a market society to move toward sustainability, the pricing signals that influence behaviour must include the consequences of that behaviour. The mechanisms for internalising externalities – such as taxes and compliance costs – are becoming more popular as legitimate policy instruments for governments to set the context within which organisations innovate. The most prominent example of this are the mechanisms from the Kyoto protocol, including the proposed EU-wide carbon emissions trading schemes.

In these circumstances, organisations which understand and can measure their externalities will have a competitive advantage. Sustainability accounting is one way to achieve this.

The need and difficulty of integrating measures across sustainable development

As implied by Figure 3, sustainability requires that attention is paid to all the different economic, social and environmental systems (or all the Five Capitals) now and into the future. Sustainable development is likely to be a dynamic activity where different dimensions are working in synergy. At present most measures or indicators only address one part of the puzzle.

The importance of the need to integrate is matched by the difficulty in doing so. There have been some attempts, such as the Sustainability Assessment Model given in [section 6.2](#). Integration requires the unbundling of hard issues such as:

- *boundaries and responsibilities* – where does an organisation’s responsibilities end and another’s begin? How can we consider an organisation’s individual responsibility when it is participating in a

socio-economic system which only rewards certain sorts of behaviour?

- *valuation methods* – can the same judgements be applied to environmental and social valuation methods?

The avoidance and restoration cost method (used in [6.1 External Environmental Impacts](#)) gives the cost to the organisation of its impact on other parts of society. The cost to that third party may be much smaller, or much larger.

- *adding up and across* - The conversion of social and environmental impacts into monetary values makes it possible to add up the impacts and trade them off against each other. This opens up the possibility of comparing £1 worth of climate change damage with £1 of reduced impact from waste or £1 of contribution to the local economy.

These trade-offs may not make sense from the sustainability perspective of living off the revenue rather than degrading the capitals. This point about comparing £1 of environmental or social impact also applies to comparing between £1 of impact between different years and between different companies.

- *accounting for what you can count* – an organisation may not be aware of its impacts, or not able to count them. The strength of using a stakeholder engagement methodology is that the stakeholders can provide an organisation with information on an impact which otherwise might have been omitted.

The challenges around integration form the starting point for considering areas for future improvements, such as more work on:

- external economic impacts, such as the local multiplier effect on local economies and how this contributes to the organisation's own financial capital
- including positive external impacts, for instance, the work on the social impacts of alcohol (in [Section 6.2](#)) considers social costs like health spending and lost productivity but no estimates of the social benefits of alcohol were made
- linking the values of internal and external flows to movement in internal and external stocks.
- creating more standardised and sector specific methods, to facilitate comparisons.

Impacts on conventional accounting systems

We see sustainability accounting as an extension of the conventional accounting system to allow it to face the challenge of sustainable development. As we argued in the section on intangible assets, it is possible to reframe many current-day accounting problems in terms of sustainability.

In particular, the move to service economies and the call for improved governance has drawn out many of the limitations of conventional accounting. There are many developments in non-financial reporting – such as Balanced Scorecards – that are designed partly to finesse intractable measurement issues. We expect these developments to continue, and to increasingly build in sustainability measures such as sustainability accounting.

8.3 Sustainability accounting as an enabler to wider sustainable development

Engaging an organisation in the transition to sustainability is difficult. It requires that people engage in a process which builds their understanding of the *need* to change their behaviour and gives them options on *how* to change.

Our experience is that sustainability accounting can be a vehicle for that process. People often report that sustainability accounting allowed them to do what they had always wanted to do, but previously they had not been able to argue the case. Focusing on these benefits will help with ‘selling’ sustainability accounting within an organisation.

Sustainability accounting allows for a justification of sustainable decisions. It uses financial language which decision makers are familiar with and provides opportunities for more sustainable behaviour. As such, it can act as a bridge between the ‘old’ and the ‘new’.

We believe it is better to be imprecisely right than precisely wrong when considering sustainability indicators. As such, sustainability accounting is definitely *not* about getting the ‘precisely wrong’ number but one which is ‘imprecisely right’ enough. Its purpose is to be one carrier in a large change process.

8.4 How to start

It is our experience that sustainability accounting works best when it builds from inside an organisation outwards. Reporting performance for internal purposes can then feed into external disclosure.

Also, in order to prepare a ‘complete’ set of sustainability accounts an organisation needs to have the crucial data, such as CO₂ emissions and so forth. Starting a sustainability accounting project can drive improving non-monetary environmental and social reporting as well.

When starting sustainability accounting ask yourself:

- What decisions need to be made for the organisation to be more sustainable? How will the information generated be used?
- Who will make those decisions? Who is this information for?
- What are the organisation's blind spots? What do people not realise that they need?
- Who will have to be convinced for this to happen?

The answers to these questions will differ from place to place. For some organisations it will be most appropriate to start with an isolated part – say one location, one country, one product line, one project. For others it will make more sense to be global.

There will be problems: how can we value *that* impact? Where should we draw our boundaries? We believe sustainability accounting is only about getting a number that is *good enough* to enable the larger change process towards sustainability.

The complexities and difficulties of sustainability accounting should not prevent organisations making a start. They should recognise that their approach will evolve and improve over time.

9. References and Sources

- ACCA (2001) Advances in Environmental Accounting (London: ACCA).
- Alcohol Concern (2001) The State of the Nation (Britain's True Alcohol Bill).
- Bebbington J. and Thomson I. (1996) 'Business Conceptions of Sustainability and the Implications for Accountancy. ACCA, London.
- Bebbington et al (2001) Full Cost Accounting. (London: ACCA)
- Baxter, Tom; Bebbington, Jan and Cuttridge, David (2002), "The Sustainability Assessment Model (SAM)", *Proceedings of the SPE International Conference on Health, Safety and Environment in Oil and Gas Exploration and Production* (March 20-22nd 2002, Malaysia).
- Bourmans, R., Costanza R., Farley, J., Wilson, M., Portela, R., Rotmans, J., Villa, F. and Grasso, M (2002). Modelling the Dynamics of the Integrated Earth System and the Value of Global Ecosystem Services Using the Global Unified Metamodel of the Biosphere (GUMBO). *Ecological Economics*, 41 (3).
- BSO Origin (1990, 1991, 1992, 1995) Annual Report
- CIMA and Forum for the Future (2002) Environmental Cost Accounting: An Introduction and Practical Guide.
- CIRIA (2002) Sustainability Accounting in the Construction Industry. Report prepared by Stanger, Forum for the Future and Carillion plc.
- CWRT (1999), Total Cost Assessment Methodology: Internal managerial Decision Making Tool. Centre for Waste Reduction Technologies, New York.
- Dixon J.A., Scura L.F., Carpenter R.A., and Sherman P.B. (1996), Economic Analysis of Environmental Impacts. Earthscan, London.
- EC (2001), Commission Recommendation of 30 May 2001 on the Recognition, Measurement and Disclosure of Environmental Issues in the Annual Accounts and Annual Reports of Companies. Official Journal of the European Communities 13th June 2001.
- Gray R.H., D.L. Owen & C. Adams (1996) Accounting and accountability: Changes and challenges in corporate social and environmental reporting (London: Prentice Hall)
- Henriques A. and Richardson J. (forthcoming 2003), The Triple Bottom Line: Does It All Add Up? Earthscan, London.

OECD (1995) The Economic Appraisal of Environmental Projects and Policies: A Practical Guide. Organisation of Economic Cooperation and Development, Paris.

ORNL (1995) Oak Ridge National Laboratory study Estimating Fuel Cycle Externalities. US Department of Energy.

Pearce D.W. and Newcombe J. (1998), Corporate Sustainability: Concepts and Measures'. CSERGE, mimeo.

Pretty J.N. et al (2000) An Assessment of the Total External Costs of UK Agriculture. Agriculture Systems 65(2000) 113-136.

RCG/Hagler Bailly (1995) New York Environmental Externalities Cost Study.

Richardson J. and Nurick R. (1999) Environmental Valuation: Theory, Techniques and Applications. Wye College, University of London.

Appendix 1: Drivers for change

This section outlines the current financial framework and identifies drivers for change towards an integrated sustainability accounting framework. Some of the drivers are ‘pulls’ from regulators, investors and stakeholders while others are internal ‘pushes’ for better managerial information.

Financial accounting and the service economy

Much of the present financial accounting framework was codified in the early 20th century. Consequently, financial accounting is well suited to the dominating businesses of that era: manufacturing industries where companies owned large amounts of plant and machinery and employed large numbers of manual workers.

In the last 20 years, the structure of the largest economies has moved from manufacturing to service industries. Companies now rely on the qualities of the services they provide, their innovation and how customers, investors and wider stakeholders perceive them. For example, a company like Nike controls its brand, product designs and the quality of production but the actual manufacturing is sub-contracted.

Even with the bear market of the early part of the new century, corporate market valuations exceed their accounting net asset value. The differences between market and book values are indications of aspects of company performance that fall outside traditional accounting methods. The difference is often assigned to intangible assets that represents the faith investors have in the ability of the company to deliver net economic benefit over the long term.

This faith is not based on the historic cost of the assets and liabilities but on the reputation of the company to deliver consistent competitive advantage. The competitive advantage can be assigned to intangible assets such as brands, employee capabilities, management reputation and so on. For example, when valuing a film production company, the market does not first consider the fixed asset value of the cameras or editing equipment. They consider the track record the companies have in producing films which earn money, and whether that feat can be repeated.

Traditional accounting is still struggling with how to provide an objective financial valuation methodology for these intangible assets. Increasingly analysts and investors are using data that is outside traditional accounting when valuing a company. Many of these are non-financial - like customer churn (retention and recruitment) rates. This guide provides examples of companies trying to communicate their own monetised measures.

Financial accounting and sustainability

When the financial accounting principles were being codified, the global environmental impacts of industrialised society were not a pressing issue. At that time industry was considered socially responsible if it provided a return on investment and a platform for national economic growth.

Now, however, there is a growing understanding of the global environmental, social and economic consequences of large-scale industrialisation. The demands made on companies to demonstrate that they are socially responsible are changing. The focus of economic progress is moving from development – economic growth – to sustainable development – economic, social and environmental improvements on a global scale. Traditional accounting was not designed for this purpose but is presently undergoing a transformation process whereby historical financial accounting data is increasingly supplemented by non-financial data relating to the broader sustainability debate. The sustainability accounting examples in this guide are part of that transformation.

Making decisions for sustainability requires a broader perspective that draws on economic, social and environmental dimensions. It must also recognise longer timeframes that enable appropriate consideration of the way current decisions impact on future generations.

Sustainability accounting is one approach to the challenge of making decisions for sustainability.

Changing requirements of good corporate governance

Accounting for the financial aspects of an organisation's performance is a statutory requirement. Accounting for sustainability is currently a voluntary activity. However, the changing corporate governance environment, as evidenced by the Turnbull Report^x, the UK Company Law Review^{xi}, and the recent Association of British Insurers Report (2001)^{xii}, means that companies are increasingly reporting aspects of their social and environmental performance.

Reporting sustainability accounts can increase transparency with stakeholders and deliver benefits. For example, this provision of information can help a company negotiate more favourable terms with the investment community through disclosure demonstrating how its management are identifying; evaluating and managing social and environmental risks. Where appropriate, sustainability accounting can also be part of how an organisation communicates with its regulators.

Management benefits of sustainability accounting

Sustainability accounting can be part of operationalising sustainability in an organisation. Sustainability management accounts provide a useful internal reporting tool to track progress towards sustainability goals. In particular, they can be used to:

- Identify resource efficiency and cost-saving opportunities by routinely collecting information on environmental and socially related expenditures and show how effective these expenditures are by linking them to financial benefits and environmental and social performance.
- Compare performance and identify best practice

- Link improvements in sustainability performance with specific and identified financial opportunities
- Highlight the social and environmental risks associated with current financial performance – using external costs as an indicator of risk.
- Identify which stakeholder relationships present the greatest social and environmental risks.
- Show how environmental and social external costs decline over time with commitment to sustainability.
- Raise awareness and promote internal change and innovation

Sustainability accounting provides an opportunity to contribute to the development of an individual business case for sustainability.

Appendix 2: Economic Value Added

	STAKEHOLDER	VALUE ADDED	£ (000)
1	Customers	Cash received by company for supply of products	
2	Suppliers	Cash payments outside the company for materials and services purchased	
3	Company Value Added	= (1) - (2)	
4	Employees	Total remuneration to employees (including wages and benefits)	
5	Community	Corporate social investment	
6	Public Sector	Regulatory charges and taxes paid; subsidies and incentives	
7	Investors	Interest payments on borrowings + dividend payments	
8	Balance	Monies retained in the organisation $= (1-2) - (4+5+6+7)$	
9.	Total	= (4+5+6+7+8)	

Appendix 3: Pro forma Environmental Financial Statement

Item		£ (000)
	Environmental Costs	
1	Operating expenditure Staff costs (apportionment of personnel costs allocated to environmental management)	
2	Suppliers: environmentally related operational costs	
3	Regulatory: includes EA and local authority charges; waste management licences; landfill tax; climate change levy	
4	Other: includes contributions to environmental groups	
5	Capital Expenditure – Depreciation End of pipe Integrated capital expenditure	
	Total Environmental Costs	
	Environmental Benefits	
6	Revenue Generated e.g. Revenue from recycled waste Additional revenue from environmental price premium Additional business generated due to environmental reputation	
7	Cost Savings e.g. Reduced waste disposal costs Energy conservation savings Packaging cost reductions	
8	Regulatory Costs Avoided e.g. landfill tax savings climate change levy savings trade effluent savings penalties/fines avoided	
9	Grants/subsidies received e.g. enhanced capital allowance for energy efficient appliances	
	Total Environmental Benefits	
	Net environmental costs/benefits	

Appendix 4: Pro forma Social Financial Statement

Item		£ (000)
	Social Costs	
1	Operating expenditure Staff costs (apportionment of personnel costs allocated to socially related activities; staff training & development; other staff welfare benefits)	
2	Suppliers: socially related operational costs (e.g. additional cost of social/ethical specification on products or suppliers)	
3	Regulatory: includes socially related taxes and penalties and fines for non-compliance (e.g. national insurance contributions; health and safety fines).	
4	Community: contributions to community activities (grants; in-kind contributions)	
5	Capital Expenditure – Depreciation Socially related investments (e.g. health and safety; staff welfare and recreation facilities)	
	Total social Costs	
	Social Benefits	
6	Revenue Generated e.g. Additional revenue from social/ethical price premium Additional business generated due to social/ethical reputation	
7	Cost Savings e.g. Savings from low staff turnover Savings from reduced insurance due to improved health and safety record Increased staff productivity & morale	
8	Regulatory Costs Avoided e.g. Penalties/fines avoided	
9	Grants/subsidies received e.g. Investors in people awards (if money received) Grants for disability access	
	Total Social Benefits	
	Net Social Costs/Benefits	

Appendix 5: The Co-operative Bank Model

(This appendix was written by Paul Monaghan of Co-operative Financial Services.)

For all major products, the bank has asked its customers to specify the degree to which ethical and ecological factors influence decision making, as exemplified in Figure 1.

Figure 1: Personal Current Account Customer Example:

'Which of these factors are important in your decision to open and maintain a Co-operative Bank account?'

Any number of influencing factors can be specified

- Branch near home/work
- Parents banked there
- Recommended to me
- Dissatisfied with previous bank
- Image/reputation
- Ethical/ecological reasons
- Lower charges/competitive rates
- Other

'Which one of these factors is most important in your decision to open and maintain a Co-operative Bank account?'

Only one influencing factor can be specified

- Branch near home/work
- Parents banked there
- Recommended to me
- Dissatisfied with previous bank
- Image/reputation
- Ethical/ecological reasons
- Lower charges/competitive rates
- Other

This produces a response range. For example, 53% of personal current account customers state that 'ethics' is one of a number of important factors, whilst 31% cite 'ethics' as the most important factor. Data is derived via comprehensive telephone polling. Computers randomly sort options presented to pollsters to ensure that no bias arises from the order of presentation. For reasons of commercial confidentiality, the bank will not publish the ethical motivation factors of each product as this might allow competitors an unfair advantage when designing and marketing products. However, all data has been viewed by the bank's social auditor, who can provide assurance that factors have been formulated in a balanced and robust fashion. The bank does indicate the net profitability contribution of Personal Banking and Corporate and Business Banking.

It is interesting to note that, where comparative information is available for UK retail banks in relation to the importance customers place on ethical and environmental factors, the data indicates that Co-operative Bank customers

are uniquely placed to express a preference. For example, MORI Financial Services conducts research on a biannual basis into the influence of various factors on the opening of personal current accounts. This research strongly indicates that whilst 'ethics' is a major determining factor for customers of The Co-operative Bank (28% cite ethics as being influential in opening an account, and this is by far the most frequently specified reason), it is only rarely specified by customers of other banks (just one percent cite ethics as being influential in opening an account). This is considered to be a consequence of the fact that only customers of The Co-operative Bank are routinely presented with products and services in which 'ethics' are constituted as a core component.

Findings

The bank's ethical and ecological positioning makes a sizable contribution to the bank's profitability. 24% of profits can be attributed to customers who cite ethics as an important factor (2001: 26%), and 13% to customers who cite ethics as The principal factor behind the reduction in 'ethical' profitability contribution between 2001 and 2002 was the improved contribution of Treasury and Asset and Liability Management to the bank's profitability in relation to retail banking.

As a proportion of retail banking profits, ethical customers are in fact making a larger contribution in 2002. There was an almost two-fold increase in the percentage of Visa credit card customers stating that ethics and ecology are important factors in opening and maintaining an account. In addition, now Business Direct and Direct Banking customers both state that ethics and ecology is the number one reason for opening and maintaining an account.

Of the profitability attributed to customers who cite ethics as the most important factor, 72% is attributable to Personal Banking customers (2001: 69%) and 28% to Corporate and Business Banking customers (2001: 31%). Of the profitability attributed to customers who cite ethics as an important factor, 68% is attributable to Personal Banking customers (2001: 61%) and 32% to Corporate and Business Banking Customers (39%).

Appendix 6: Pro forma External Environmental Cost Account

Component	Consumption	Emission (tonnes)	Target level	Avoidance amount / abatement cost (£ per tonne)	FY e.g. 02/03 £'000
Emissions to air					
Grid electricity	X kWh	CO2 - X NOx - X So2 - X	CO2 - X NOx - X So2 - X	CO2 - X tonnes @ £X NOx - X tonnes @ £X SO2 - X tonnes @ £X	X X X
Natural Gas	X kWh	CO2 - X	CO2 - X	CO2 - X tonnes at £X	X
Diesel oil	X kWh	CO2 - X	CO2 - X	CO2 - X tonnes at £X	X
Vehicles	X m litres	CO2 - X Other - X	CO2 - X Other - X	CO2 - X tonnes at £X N/A	X
Methane (as CO2 equivalent)	X	CO2 - X	CO2 - X	CO2 - X tonnes at £X	X
Other principal impacts					
X			X		X
X			X		X
Environmental sustainability cost (A) Profit etc (B) Environmentally Sustainable Profit (=B-A)					X X X

Appendix 7: Resources for Environmental Values

Environmental Valuation Methods

Most environmental valuation methods seek to measure the money value of environmental benefits or losses directly from the preferences of the stakeholders affected. This information may be obtained directly from actual or surrogate market information or indirectly through surveys or experiments. The environmental value is based on willingness to pay (WTP) to obtain environmental benefits (e.g. improvement in local air quality) or willingness to accept (WTA) compensation to suffer an environmental loss (e.g. degradation in local air quality). Environmental valuation methods based on WTP or WTA are demand-side methods – they are based on estimating the demand for environmental resources based on stakeholder preferences. They are distinguished from supply side methods which are based on the costs of supplying environmental resources or services.

Examples of demand side methods:

Hedonic Pricing: This method uses information from a surrogate market to estimate the implicit value of an environmental good or service. For example, differential housing prices can be used to estimate how much extra people are willing to pay for residential property in areas free from traffic or industrial air pollution.

Travel Cost Method: This method uses a combination of surveys and surrogate markets to estimate the demand curve for an environmental resource. As its name implies, the travel cost method infers willingness to pay for environmental goods and services from the time and expense involved in travelling to them. Conventionally, the method is used to derive values for recreational sites.

Contingent Valuation Method: CVM elicits information on environmental preferences directly from the individual using surveys, questionnaires or experimental techniques. CVM is based on hypothetical behaviour inferred from surveys or experiments rather than on actual observed behaviour. It has wide application but is the most unreliable of the methods as it is subject to a number of inherent biases.

Examples of supply side methods

Supply side methods are based on the costs of preventing environmental damage or the costs of restoration or replacement once damage has been incurred. Supply side methods also include the impacts on productivity due to changes in environmental quality. These methods capture the costs to the organisation of improving environmental quality – they do not capture the benefits to society of such improvement.

Productivity Approach: In this technique, environmental quality is viewed as a factor of production. Changes in environmental quality lead to changes in productivity and production costs, which in turn lead to changes in prices and output, which can be measured and observed. For example, improvements in soil conservation will feed through into changes in agricultural yields and prices. Hence, the costs of soil erosion can be evaluated using information obtained from agricultural markets.

Preventive Expenditure Method: This approach has much intuitive appeal in that it is based on actual expenditure incurred to prevent, eradicate or reduce adverse environmental effects.

Replacement Cost Method: This is an ex-post environmental valuation approach. In other words, it estimates replacement or restoration costs once environmental damage has taken place. Expenditures to neutralise soil and water acidity from agricultural run-off are examples of the costs incurred to restore damaged environmental assets to their original state.

Source: Richardson and Nurick (1999) Environmental Valuation: Theory, Techniques and Applications. Wye College, University of London.

Resources for Selected Environmental Values

This section provides some examples of per unit monetary values for different types of environmental impacts. Environmental values are not static but change in response to changing market prices (eg. market price of abatement technology) and environmental preferences. They will also vary according to the different environmental valuation method used (ranging from abatement costs; damage costs and restoration values). For this reason, this section provides a resource of publications and web-sites which can be used to find and update environmental values.

General sources for information on environmental values are provided together with illustrative values for a range of specific environmental impacts.

General Sources:

Association of Chartered Certified Accountants (ACCA), (2001) Full Cost Accounting: An Agenda for Action. *Provides sources for a range of environmental values used in different environmental accounting frameworks.* www.acca.co.uk

CWRT Centre for Waste Reduction Technologies

Concerted Action on Transport Pricing Research Integration: Valuation of Transport Externalities.
www.europa.eu.int/comm/transport/extra/final_reports/strategic/capriannexes.pdf.

Costanza et al(1999) The Value of the World's Ecosystem Services and Natural Capital. Nature 387, 253-260.

Chartered Institute of Management Accountants (CIMA), (2002) Environmental Cost Accounting: An Introduction and Practical Guide. Guide prepared for CIMA by Forum for the Future. Provides a range of environmental values based on costs of avoidance or restoration.

Envalue: The New South Wales Environment Protection Authority's Envalue database (<http://www.epa.nsw.gov.au/envalue/>) is a searchable environmental valuation database.

EVRI: The best known database of Environmental Valuations is Canada's EVRI (Environmental Valuation Resource Inventory) web-based database for environmental valuation studies – see <http://www.evri.ec.gc.ca/EVRI/>. Each study includes details of the estimated monetary values, the specific units of measure, and technical information on the methods that were used to arrive at the results.

A list of European Valuation studies is available at:
www.europa.eu.int/comm/environment/enveco/others/evripart2.pdf
References to about 450 studies are included in the listing.

ExternE Project (<http://externe.jrc.es/phasesIII.html>). ExternE is an EU project with multiple objectives including research into the internalisation of externalities and the possible application of the accounting framework in policy making. External cost data is compiled in a readily accessible database. The ExternE studies for transport and power plants are the most quoted damage estimates.

Navrud S(ed) (1992) Pricing the European Environment. Scandinavian University Press/Oxford University Press. This is the most complete review of European valuation studies done up until 1992.

Specific Sources:

Carbon dioxide

Unit Value	Valuation method	Source
£6.50 - £21/tonne (depending on location, baseline, sustainability benefits etc)	Restoration cost based on market price of carbon sequestration	Market prices of carbon sequestration (such as Future Forest; Climate Care) www.climatecare.org www.futureforests.com www.co2.com
\$3 - \$5/tonne	Emissions Trading Market Price	Current market prices reported in Environmental Finance www.environmental-finance.com www.cleanerandgreener.org publishes

		examples of emission trading transactions from around the world.
£30/MW (approx £0.03 per kWh)	Cost of Renewables Obligation Certificates	www.dti.gov.uk

Nitrogen Oxide

Unit Value	Valuation method	Sources
\$6 400/ton	Market spot price: NOx emissions trading price (2003)	www.environmental-finance.com
\$4 500 - \$4 800/ton	Market future price (2005)	www.cleanerandgreener.org
Dutch Gilders 10/kg	Marginal abatement costs	www.natsource.com is a site for a US brokerage service which trades NOx BSO/Origin 1990-1994
\$19-\$1 025/ton (UK)	Damage cost approach based on willingness to pay to avoid adverse human health effects, agricultural effects and material damage.	Centre for Waste Reduction Technologies (CWRT) (1999, p 3-64)
\$12 610/ton	Damage Cost	
\$90-2003/ton	Damage Cost	ExternE Project ORNL/DOE (1995)

Sulphur Dioxide

Unit Value	Valuation method	Sources
£2 400/tonne	Environmental tax	Based on EU and Scandinavian environmental tax rates (linked to external damage costs)
\$2000/ton	US SO ₂ trading scheme penalty for non-compliance	OECD (2001) Encouraging Environmentally Sustainable Growth: Experience in OECD countries.
\$105-\$225/ton	Market spot price (2001)	www.environmental finance.com www.natsource.com

\$69-\$212/ton	US EPA Acid Rain SO2 Trading Program	www.cleanerandgreener.org
NGL 14/kg	Marginal Abatement Cost	BSO/Origin (1990-1994)
\$444/ton	UK Damage Cost approach (health, agriculture and material damage)	CWRT (1999, p3-64)
\$4140-6050	Damage Cost	ExternE Project
\$10-1002	Damage Cost (selected aspects)	ORNL (1995)

Particulate matter (pm)

Unit Value	Valuation method	Sources
£2 800/tonne	Marginal Abatement Cost	BSO/Origin figure from 1995 Accounts
\$850-\$34004/ton	Damage Cost	ORNL (1995)
\$3200-\$43800/ton	Damage Cost	RCG/Hagler Bailly Study (1995)
\$16 060/ton	Damage Cost	ExternE Project

Volatile organic compounds (voc's)

Unit Value	Valuation method	Sources
£7 200/tonne	Abatement cost: cost of installing end of pipe technology to reduce emissions to lowest practical level.	

Waste

Type	Unit Value	Valuation method	Sources
Botton Ash	NGL 100/tonne of dry matter	Marginal Abatement Cost	BSO/Origin (1990-1994)
Fly Ash	NGL 200/tonne of	Marginal Abatement	BSO Origin

Sewage Sludge	dry matter NGL 500/tonne of dry matter	Cost Marginal Abatement Cost	(1990-1994) BSO Origin (1990-1994)
Waste to Landfill	£23/tonne	Based on difference between UK and Austrian rate (based on damage costs)	UK Landfill Tax £12/tonne Austrian Landfill Tax ~£35/tonne

Water effluent

Unit Value	Valuation method	Sources
NGL 12/inhabitant equivalents	Treatment costs	BSO Origin (1990-1994)

Transport

ExternE Transport Project

Unit Value MECU/ vehicle km	Average Diesal Car	Average 3- way-cat car	Valuation method	Source
PM	134.80	10.85	Damage cost	ExternE Project (transport) (www.externe.jrc.es/trans.pdf)
NOx	7.31	4.75	Damage cost	As above
CO ₂	2.62	3.16	Damage cost	As above

Capri Project: Total external costs from transport (damage costs): ECU/1000 vehicle kms, 1995

Mode	Accidents	Air pollution	Noise	Climate change	Total
Cars – urban	56 – 204	7.3-83.8	3.3-13.5	2.3-5.4	65.6-293.2
Cars – interurban	8 – 25	7.8-109.0		2.0-10.1	29.1-157.6
Trucks - urban		23.9- 912.6		6.0-24.2	29.9-936.8
Trucks –		20.0-	71.2-277.7	22.1-68.4	163.3-

Interurban	50 – 60	343.5			749.6
Bus – diesel	814 – 870	152-1575	210	7.9-8.7	1183.9-2663.7
Tram	8	19.2		33.1	60.3
Rail – passenger	13 – 36	36.8-500.6	50.6-455.6	14.6-460.5	115-1452.7
Rail – goods	13 – 36	91.0-723.1	848-3152	48-1744	1000-5655.1
Air passenger	7 -35	804.0	250	710	1771-1799

Air Transport: Capri Project

Per Unit Value	Valuation Method	Source
40-200 ECU/tonne CO ₂	Avoidance Cost	Capri Project

Agriculture and forestry

Type of impact	Per Unit Value	Valuation Method	Source
Agriculture	£208/ha (1996)	Damage costs including water contamination; damage to wildlife habitat; emission gases; soil erosion & food poisoning	Pretty et al (2000)
Forestry	\$3 225/tree	Replacement Cost	New York Neighbourhood Tree Survey. New York Times, 12 May 2003

Endnotes

- ⁱ Throughout the guide we will be using the term 'stock' in the standard economic and accounting meaning, to refer to an amount of wealth or capital at any one moment in time. For instance, the Balance Sheet is a measure of the 'stocks' of an organisation by valuing the amount of assets and liabilities at a particular date. We are not using it in the sense of 'equity', such as 'Stock Market' or 'stockbroker'.
- ⁱⁱ For more information refer to the Economic Performance Indicators in the Sustainability Reporting Guidelines issued by the Global Reporting Initiative (www.globalreporting.org).
- ⁱⁱⁱ For example, the proposed EC Directive on the Restriction of Certain Hazardous Substances in Electrical and Electronic Equipment will require the use of lead, cadmium, mercury, chromium VI and brominated flame retardants to be phased out of the manufacture of certain types of electrical and electronic equipment by January 2007.
- ^{iv} See <http://www.co-operativebank.co.uk/ethics/partnership2001> for more detail on the ethical value analysis.
- ^v See for example, CIMA and Forum for the Future (2002), and ACCA (2002)
- ^{vi} See EC (2001)
- ^{vii} The use of avoidance or restoration costs is in line with United Nations recommendations for environmental adjustments to the national accounts.
- ^{viii} Costs are based on 'real' or market based prices. Although it is important to note that actual market prices are unlikely to reflect those price signals that would prevail in a more sustainable society .
- ^{ix} For further information on the stakeholder contract model contact David Bent at Forum for the Future (d.bent@forumforthefuture.org.uk)
- ^x The Institute of Chartered Accountants in England and Wales (1999): Internal Control: Guidance for Directors on the Combined Code (The Turnbull Report)
http://www.icaew.co.uk/cbp/index.cfm?aub=tb2I_6242
- ^{xi} Department of Trade and Industry (2002): Modern Company Law: Final Report (Company Law Review) www.dti.gov.uk/could/review.htm
- ^{xii} Association of British Insurers (2001): Investing in Social Responsibility, Risks and Opportunities (www.abi.org.uk)



About the SIGMA Project

The SIGMA Project - **Sustainability Integrated Guidelines for Management** was launched in 1999 with the support of the UK Department of Trade and Industry (DTI) and is led by:

- British Standards Institution - the leading standards organisation
- Forum for the Future - a leading sustainability charity and think-tank
- AccountAbility - the international professional body for accountability.

The SIGMA project has developed the SIGMA Guidelines and a series of tools to provide clear, practical advice to organisations to enable them to make a meaningful contribution to sustainable development.

The SIGMA Guidelines consist of:

- a set of **Guiding Principles** that help organisations to understand sustainability and their contribution to it.
- a **Management Framework** that integrates sustainability issues into core processes and mainstream decision-making. It is structured into phases and sub-phases.

The SIGMA **Toolkit**, consists of targeted tools and approaches to help with specific management challenges, and case studies explaining how organisations have used the SIGMA Guidelines and Toolkit to tackle real issues.

More information including the full SIGMA Guidelines and the accompanying SIGMA Toolkit are available at: www.projectsigma.com.