

CHAPTER 17

17

ENVIRONMENTAL AND SOCIAL MANAGEMENT ACCOUNTING

AFTER COMPLETING THIS CHAPTER, YOU SHOULD BE ABLE TO:

- 1** explain the meaning of *corporate social responsibility* and why it is considered important by many organisations;
- 2** describe how triple bottom line reporting provides a broader perspective than conventional approaches to reporting performance;
- 3** explain the meaning of *environmental management accounting (EMA)*;
- 4** describe the range of techniques that are used in environmental management accounting;
- 5** outline the benefits of recognising and measuring environmental and social impacts;
- 6** explain the difficulties in recognising and measuring environmental and social impacts;
- 7** define environmental costs and describe the five tiers of environmental costs;
- 8** analyse environmental costs as prevention, appraisal and internal and external failure costs;
- 9** integrate environmental costs in information for decision making;
- 10** assess the effects of environmental and social factors when managing suppliers and customers;
- 11** describe the types of measures that can be used to assess environmental and social performance;
- 12** define the term *social audit* and outline the benefits of social audits; and
- 13** include environmental and social factors in capital investment analyses.

LEARNING OBJECTIVES

In Chapter 1 we explained that management accounting focuses on supporting managers within the organisation in their quest to enhance both shareholder and customer value. However, organisations are increasingly recognising the broader information needs of a wider range of stakeholders. For example, many Australian businesses now use triple bottom line reporting to communicate the economic, environmental and social dimensions of their activities to stakeholders, and many organisations require a range of information to practise environmental management.

In this chapter, we briefly examine the triple bottom line approach to reporting to external stakeholders, and then move on to explore how management accounting can help an organisation to manage its environmental and social performance, which can benefit both the organisation and society. An important aspect of contemporary management accounting is the inclusion of both financial and non-financial information, and this can extend to include social and environmental information. Management accountants have the skills to monitor performance along a variety of social and environmental dimensions, and to gather and analyse the financial and non-financial data provided in reports. Accounting for environmental and social factors can benefit the organisation and enhance shareholder value, as well as contribute to a more sustainable environment and society.

corporate social responsibility

involves organisations taking into account the social and environmental impact of corporate activity when making decisions

LEARNING OBJECTIVE 1

triple bottom line

(TBL) report a report that focuses on three aspects of performance: financial (or economic), social and environmental

LEARNING OBJECTIVE 2

social performance

the impact of an organisation's behaviour on society, including the broader community, employees, customers and suppliers

CORPORATE SOCIAL RESPONSIBILITY AND EXTERNAL REPORTING

Corporate social responsibility involves organisations taking into account the social and environmental impact of corporate activity when making decisions (Adams and Zutshi, 2004). This approach is regarded by many senior managers as leading to increased profitability, and as a determinant of long-term survival (Simms, 2002).

It is becoming more common for organisations to communicate their performance on environmental and social issues within external reports to stakeholders. This information may be reported as part of the annual report, or as separate stand alone reports. These separate reports have a variety of titles, including *triple bottom line reports*, *environmental reports*, *stakeholder impact reports*, *social impact reports* and *social audits*.

Triple bottom line reports

Triple bottom line (TBL) reports focus on three aspects of performance: financial (or economic), social and environmental. Traditionally, financial information has been the focus of the reports presented to shareholders, with information about social and environmental issues being provided on an *ad hoc* basis. Triple bottom line reporting is a more comprehensive reporting process aimed at a broader range of stakeholders, including various environmental and social interest groups. **Social performance** refers to the impact of an organisation's behaviour on society including the broader community, employees,

customers, and suppliers. **Environmental performance** refers to the impact of an organisation's performance on the environment, including the natural systems such as land, air and water as well as on people and living organisms. Social and environmental performance are both concerned with people. Environmental performance includes the impact on people outside of the organisation that results from an organisation's good or poor environmental performance. Occupational health and safety problems usually appear in the social performance report, but they may be the result of poor environmental practices within the organisation and be included in environmental performance.¹

Triple bottom line reporting is used by many different types of organisations. Mining companies, such as Rio Tinto, and energy producers, such as BP Australia, produce triple bottom line reports because of the obvious community concern about their environmental performance. Manufacturing organisations may cause a range of environmental and social impacts and produce social and environmental reports to account for these activities. Service organisations can improve their environmental performance by reducing the energy they consume as well as recycling consumables such as paper and toner cartridges. In addition, service industries can encourage their suppliers to act in an ethical and environmentally and socially responsible way. Government entities and not-for-profit organisations like Maroochy Shire Council and the Wesley Mission produce triple bottom line reports to focus attention on their environmental and social activities and performance as well as their financial performance.

Exhibit 17.1 (overleaf) shows a summary performance page from the triple bottom line performance report for the Australian Government's Department of Family and Community Services (FaCS). Like many TBL reports, the FaCS report is very detailed, running to 68 pages. For each of the major areas of performance—social, environmental and economic—there are detailed descriptions of projects and initiatives, performance targets and performance outcomes against plan. Quantitative performance indicators for each major project and area of activity, as well as qualitative performance evaluations, are provided, and there are details of future commitments.

One of the drivers for organisations adopting TBL is the Global Reporting Initiative (GRI), an international collaboration to develop guidelines for triple bottom line reporting. The GRI was launched in 1997 by the Coalition for Environmentally Responsible Economies and the United Nations Environment Program. Its work is continuing, as it develops global reporting guidelines for TBL reporting.

Some people believe that triple bottom line reporting is used by some organisations to produce 'a good public face', without there being any genuine intention of improving environmental and social performance. However, it can be argued that if social and environmental performance is reported publicly, this may encourage the organisation to actively manage these issues. Organisations that produce these reports may be more likely to 'walk the talk' and adopt responsible social and environmental practices.

However, triple bottom line reporting will not by itself improve environmental and social performance. We can expect performance to improve when managers and individuals in organisations integrate social and environmental goals and information into their daily practice. Management accounting is an important information source, which can help improve both environmental and social performance. The 'Real life' overleaf outlines how Westpac integrates corporate social responsibility into their management approach and practices, and provides details of its TBL reporting.

ENVIRONMENTAL MANAGEMENT ACCOUNTING

Environmental management accounting (EMA) consists of environmentally-related management accounting systems and practices. These systems and practices can include life cycle costing, environmental cost accounting, environmental performance measures, assessment of environmental benefits and strategic planning for environmental management (IFAC, 1998). EMA focuses on material and energy flow information, environmental costs, and other related cost and physical information.

environmental performance the impact of an organisation's performance on the environment, including the natural systems (such as land, air and water) as well as on people and living organisms

environmental management accounting (EMA) environmentally related management accounting systems and practices

LEARNING OBJECTIVE 3

¹ Further information on TBL in the Australian context can be found at CPA (2004) and Group of 100 (2003).

EXHIBIT 17.1

Family and
Community Services,
*Triple Bottom Line
Report 2003–04*

FaCS TBL performance at a glance

Social

- FaCS staff have opportunities to adopt flexible working arrangements and a healthy work–life balance. This includes access to maternity leave, part-time work arrangements, flexible hours, adoption leave, and a work–life balance information and referral service.
- The department has an Indigenous recruitment and retention strategy to increase the number of FaCS Indigenous staff.
- The Child Support Agency won the Prime Minister’s Silver Award for Excellence in Public Sector Management for the second year in a row.

Environmental

- Power-saving measures introduced at Juliana House, one of FaCS’ main buildings in Canberra, provided a 27 per cent reduction in power use at that site. These measures are now being introduced in other FaCS sites.
- We finalised our Cooperative Agreement with the Australian Greenhouse Challenge, becoming a full Greenhouse Challenge member.
- Environmental management systems are being implemented at two sites—Juliana House and the Newcastle Child Support Agency office.
- A hybrid electric/petrol car joined the car fleet.
- Cartridges 4 Planet Ark boxes are in place at 20 FaCS sites for recycling used toner and ink cartridges.

Economic

- There were 4949 staff employed across Australia in state and territory capital city offices and in rural and regional areas.
- \$293.4 million was paid in salary and wages in 2003–04.
- \$191.3 million worth of goods and services was purchased in 2003–04.
- FaCS’ use of smaller airlines was 23 per cent of departmental airline usage on the Canberra–Sydney route, against the government target of 10 per cent and the Australian Public Service average of 12 to 14 per cent.

Employee profile

During 2003–04, the typical FaCS employee:

- was aged between 30 and 34 years
- was female
- came from an English-speaking background
- worked as an administrative officer
- worked full-time
- was paid around \$53 600 a year
- used 9709 sheets of paper annually
- was responsible for the production of 2.4 tonnes of greenhouse gas emissions at work during the year.

Source: FaCS (2004)

real life

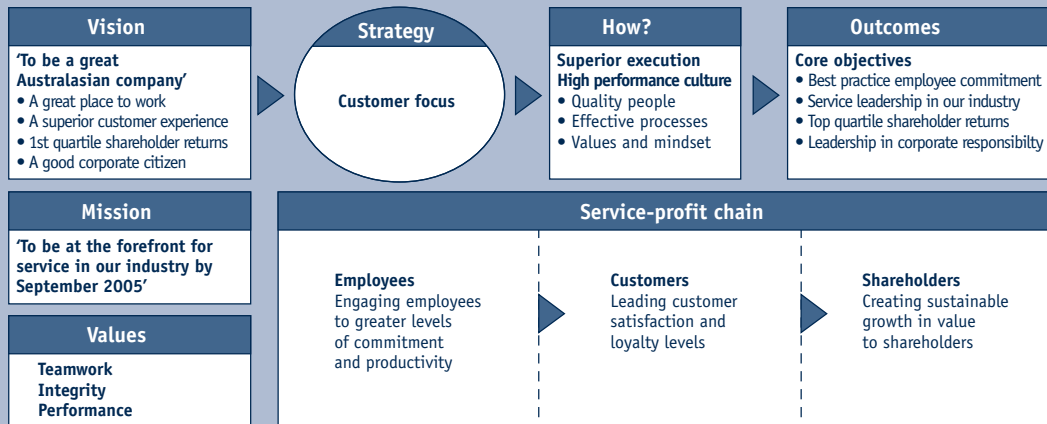
Westpac Australia: corporate social responsibility for shareholder value

Over recent years, Westpac has earned a host of sustainability ratings and awards. These include being ranked number 1 in the global banking sector by the Dow Jones Sustainability index three years in a row, ranked number 1 against Australia’s top 100 companies for two years in a row on the Reputex Social Responsibility Ratings, and ranked number 1 in the inaugural Australia Corporate Responsibility Index.

Westpac was one of the founding signatories to the United Nations Environment Program Statement on Financial Institutions and the Environment, and in 1996, it was the first bank to join the Australian Government Greenhouse Challenge. Westpac has shown its commitment to corporate social responsibility by fully integrating corporate responsibility principles into the way that it does business.

Westpac is a member of the Global Reporting Initiative and since 2002 has produced a yearly Social Impact Report, which describes its social and environmental performance. In 2004, for the first time, it published a Stakeholder Impact Report (SIR), which brought together annual financial reporting with social and environmental reporting into a triple bottom line report.

In the foreword to the SIR, the chairman, Leon Davis, and the CEO, David Morgan, explained that corporate responsibility practices are central to Westpac's long-term resilience and earnings sustainability, and that they form a core part of the bank's strategy to deliver sustainable long-term shareholder value. Not only does this approach benefit shareholders, however; it also delivers value to all stakeholders—employees, customers, shareholders and the wider community. The approach that Westpac takes to corporate responsibility is outlined in the diagram below, drawn from the Stakeholder Impact Report.



There are seven sections in Westpac's SIR, that cover the areas described below, as well as a section that provides an overview of quantitative and qualitative KPIs for each area of performance:

- 1 Employees.** Westpac focuses on employee commitment and reducing staff turnover. It also includes initiatives to improve the proportion of older workers, women in management, and participation by disabled people.
- 2 Customers.** As well as the targets in areas such as customer service and reducing customer complaints, Westpac is trying to help particular customer groups. For example, the bank has a commitment to rural areas to keep branches open and set up 'in-store' branches, rather than reducing branches to increase efficiency. Other projects include assisting small businesses and those customers in financial hardship.
- 3 Environment.** Westpac monitors its own CO₂ emissions and water usage. In the banking industry, the production of harmful emissions is small. Westpac contributes to the environment by investing in clean fuels and encouraging environmental causes.
- 4 Social.** The bank is involved in various community projects such as the Cape York Indigenous Partnership and the Indigenous Capital Assistance Scheme. Like many other organisations, it contributes to many community funds.
- 5 Suppliers.** Westpac believes that it has a responsibility to its 10 000 suppliers in relation to its social, environmental and ethical practices, and has developed a sustainable supply chain management approach.
- 6 New Zealand and Pacific banking.** This section of the SIR outlines activities and performance across all areas in these two regions.
- 7 Finance and Governance.** Financial performance is outlined, as are mechanisms and structures for corporate governance. Details are provided of systems for controlling and managing risk, whistleblower policies, and managers' code of ethics.

The SIR report provides information about the bank's social, environmental and economic performance, sets goals and identifies projects for the future. The financial, social and environmental sections have each been verified by independent assurance experts, which gives confidence in the integrity of the reporting. This public commitment reinforces the bank's accountability for its future social, environmental and economic performance.



2004 Stakeholder Impact Report

Westpac

'We understand that the community expects, and in fact demands, truth and accountability in reporting on performance.'

Courtesy of Westpac Banking Corporation

These data are identified, collected, estimated, analysed and reported for use by internal decision makers within an organisation (Savage, 2003). EMA *does not usually include* external costs to society or the environment for which an organisation is not legally accountable. In our description of triple bottom line reporting earlier in this chapter we defined *environmental performance* as the impact of an organisation's performance on the environment, including the natural systems such as land, air and water as well as on people and living organisms. This definition may include external costs, in contrast to the EMA approach to assessing environmental performance.

The interest in EMA is growing globally. In the early 1990s, the US Environmental Protection Agency set up a formal program to promote the adoption of EMA, and in 2004 the International Federation of Accountants (IFAC) issued an exposure draft *International Guidelines on Environmental Management Accounting (EMA)* (IFAC, 2004).²

EMA techniques

EMA consists of a range of environmental management accounting techniques, some of which produce *financial information* and some that produce *physical information*. In this chapter we will consider primarily techniques that produce financial information.³

Financially-oriented EMA

Financially-oriented EMA focuses on supplying financial information to management about the environmental impact of the organisation's activities. Techniques are similar to many of those described in other chapters of this book, although they will have a broader scope to include the environmental costs and benefits resulting from the organisation's activities. In many management accounting systems this information may be hidden in more aggregated classifications, such as overhead cost and sales revenue. Under EMA, these financial impacts become more visible.

Environmental costs are the costs that an organisation incurs to prevent, monitor and report environmental impacts. Examples include the costs of waste management systems (acquisition costs and ongoing running costs), environmental training, legal activities and fines, record keeping and reporting, as well as costs of preventing, mitigating and remediating environmental impacts. Environmental costs are described in more detail in a later section of this chapter

Environmental product costing involves tracing direct and indirect environmental costs to products, and covers the costs of waste management, permits and fees, and recycling. Under EMA there is an emphasis on tracking environmental costs and benefits directly to the specific processes and products that cause those costs or benefits, rather than spreading them across all products. Costing techniques covered in Chapters 4, 5, 7 and 8 are relevant.

Environmental performance indicators can also be used to set targets and to monitor environmental performance, using both financial and physical measures. In Chapter 14 we studied a range of approaches to developing and using financial and non-financial performance measures, including the balanced scorecard. As we will see later in this chapter, some companies have adapted the balanced scorecard to include both environmental and social performance indicators.

Environmentally-induced capital expenditure describes capital investment that is driven by the desire to improve the organisation's environmental impacts or by the need to comply with environmental regulations. Techniques for evaluating capital investment decisions are covered in Chapters 21 and 22.

Environmentally-induced revenues (or **benefits**) are revenues that arise from positive environmental actions of an organisation. These may include increased revenue resulting from the sale of

financially-oriented

EMA financial information supplied to management about the environmental impact of the organisation's activities

LEARNING OBJECTIVE 4

environmental costs

the costs that an organisation incurs to prevent, monitor and report environmental impacts

environmental product costing

tracing direct and indirect environmental costs to products, including the costs of waste management, permits and fees, and recycling

environmentally-induced capital expenditure

capital investment that is driven by the desire to improve the organisation's environmental impacts or by the need to comply with environmental regulations

environmentally-induced revenues (or benefits)

revenues (benefits) that arise from positive environmental actions of an organisation

² There are also web sites devoted to EMA, including the environmental accounting site of the US EPA (www.epa.gov/oppt/acctg/), the Centre for Social and Environmental Accounting Research (CSEAR) (www.gla.ac.uk/departments/accounting/csear/index.html) and the Environmental Management Research and Information Centre (www.emawebsite.org).

³ These descriptions are based on material in Schaltegger and Burritt (2000) Chapter 6, and Burritt, Hahn and Schaltegger (2002).

recyclable materials and higher profit contributions from producing greener products, or charging higher prices for enhanced environmentally-friendly products. More intangible benefits from adopting environmentally-responsible practices may also be considered, including increased customer satisfaction, improved employee morale and increased future profits. These future benefits are difficult to quantify, but may be relevant in decision making.

Life cycle costing is an approach to managing costs over the life of a product, as described in Chapter 15. In identifying a product's life cycle costs, organisations that practice EMA will identify and often assign a cost to the environmental consequences of the product, including the costs of recycling waste and the disposal of products and equipment.

Under EMA, information produced for tactical management decisions, such as decisions to make or buy a product, or to produce a special order, or to delete or add a new product, will include environmental costs and benefits that are relevant to the decision. These techniques are described in Chapter 19.

Physically-oriented EMA

Physically-oriented EMA includes techniques that focus on supplying information to management that accounts for the organisation's impact on the natural environment, measured in physical terms. Physical measures include kilograms, tonnes, kilowatt hours and decibels. Thus, information provided to management for tactical decisions and capital investment decisions will include information about the physical environmental impacts of a decision alternative, such as the quantities of noxious emissions, energy used or solid waste produced.

physically-oriented EMA techniques that focus on supplying information to management that accounts for the organisation's impact on the natural environment, measured in physical terms

Environmental management systems and EMA

The growth of interest in EMA is closely linked to increased interest in environmental management systems. **Environmental management systems (EMS)** are the systems that organisations put in place to manage their environmental performance. An EMS may include recycling systems and systems to monitor and control levels of liquid, material and atmospheric discharge and waste. In 1996, ISO 14001 was released, which is an international standard for environmental management systems and their audit. By 2001 over 10 000 companies around the world were certified ISO 14001 compliant (Gray and Bebbington, 2001).

environmental management systems (EMS) systems that organisations put in place to manage their environmental performance

The growth of EMS and the adoption of ISO 14001 by many organisations is of interest to management accounting, as it requires that environmental performance be measured against policies, objectives and targets. Many conventional and contemporary management accounting techniques can be adapted to meet these needs. Further environmental standards have been released, including ISO 14010 Environmental Audits and ISO 14031 Environmental Performance Indicators, which are discussed later in this chapter.

THE BENEFITS OF RECOGNISING ENVIRONMENTAL AND SOCIAL IMPACTS

Management accountants have often been too busy identifying financial impacts of decisions to take on the additional difficult task of measuring environmental and social performance and preparing decision-making information that addresses environmental and social issues. In addition, many accountants may believe that their role is to create value for major stakeholders, and not for the broader community. However, many organisations and their accountants are increasingly now acknowledging the broad consequences of their behaviour, including their impacts on the wider community. And many managers now accept that social and environmental responsibility is important to the long-term sustainability of their organisation. The 'Real life' on James Hardie (overleaf) provides a sobering tale of the consequences of not acknowledging the social dimensions of performance.

There are great benefits in recognising, managing and reporting environmental and social impacts. These include attracting and retaining highly skilled employees who wish to work for a responsible employer; enhancement of the organisation's reputation as a responsible and caring organisation; identification of potential cost savings; and reduction in the risk of current and future activities (Group of 100, 2003).

Environmental management accounting will allow an organisation to assess a broader range of the costs and benefits of its operations, and help managers manage their resources more effectively. For example, by identifying the cost of disposing of waste material from production, management can consider ways to reduce these costs by reprocessing waste or by changing production processes.

Environmental and social accounting can also lead to improvements in competitiveness. Some customers may prefer to buy from companies that follow good environmental practices, or which produce products and services responsibly. The reputation of the organisation can therefore be greatly enhanced.

Remember that in Chapter 1 we explained that it is important to consider both financial and non-financial information within the management accounting system. This helps to ensure that all aspects of relevant activities and performance information are available to assist managers to enhance shareholder and customer value. Environmental and social impacts can have both financial and non-financial perspectives.

real life

James Hardie and blue asbestos

James Hardie is one of Australia's largest building material groups. In the 1920s, the company started to mine and process asbestos. However, in 1968 the company started to phase out the mining of blue asbestos, the most lethal form of asbestos, and by 1986 it claimed that all of its products were asbestos-free. Blue asbestos is a fibrous mineral that has been linked to lung cancer and mesothelioma, a rare form of cancer affecting the chest or abdomen.

At the time that James Hardie started to process asbestos, there was relatively limited knowledge of the serious health effects that this activity could have on its workforce and the public into the future. Nor was there any realisation of the high value that society in the future would place on a company's obligation to manage a safe workplace.

In 2001 James Hardie started a fund, with a payment of A\$293 million, to pay damages to people exposed to the asbestos used in its products. It then shifted its head office from Australia to the Netherlands. The New South Wales government set up an inquiry chaired by David Jackson, a former Federal Court judge. Jackson found that the fund needed at least A\$1.5 billion to meet all claims. However, the liability may exist for decades, as new cases emerge every week around Australia. In December 2004, after extensive media coverage of the dispute and very public negotiations, James Hardie, the ACTU (representing the trade unions) and various asbestos victim groups arrived at an agreement to ensure that the company continues to fund current and future asbestos victims and their families. There is no limit on how much can be paid to victims, and the commitment will extend for at least 40 years. However, there is a maximum amount that James Hardie can pay in any year, which is set at 35 per cent of the company's free cash flow.

If environmental information had been understood and included in James Hardie's decision making, the company would have been aware of the social impact of its manufacturing operations. (In fact, it might have decided not to mine and process asbestos products at all!) This lack of recognition has had serious financial consequences for James Hardie and for its reputation as a responsible company.

DIFFICULTIES IN RECOGNISING AND MEASURING ENVIRONMENTAL AND SOCIAL IMPACTS

Conventional management accounting excludes the measurement of many environmental and social impacts. In some companies, the costs of these impacts remain hidden, even though they may be substantial. Exhibit 17.2 provides some examples.

Some organisations now measure some of these ‘forgotten’ costs. For example, a drop in the value of brands and in corporate image as a result of adverse environmental or social impacts of an organisation’s activities may be recognised, and the impact sometimes estimated in dollars.

However, environmental and social impacts can be difficult to recognise and report because:

- future ecological and social issues are not yet known;
- many costs and benefits are external—that is, they occur outside of the organisation; and
- many costs and benefits are difficult to measure in financial terms (Gluch and Baumann, 2004).

Future ecological and social issues are not yet known

It may be difficult to determine the future environmental and social impact of current decisions and operations, particularly as we do not know what aspects of the environment and of society may be valued by future generations. Even now, there are probably many work practices and operations that will have future environmental and social impacts that we are not able to currently assess. One example is the growing interest in developing and growing genetically modified (GM) crops. This provides great business opportunities for many organisations. However, while many scientists believe that these crops will have no future adverse impact on the environment or on the population who consume these products, we do not really know what the long-term consequences will be.

Measuring impacts external to the organisation

Traditionally, management accountants have recorded only the costs and benefits that occur inside the organisation. In Chapter 16, we explained that value chain approaches encourage us to think about and measure the impacts of decisions on suppliers and customers. While it can be difficult to determine the impact of our actions on suppliers and customers, it can be even more difficult to assess the environmental and social impacts outside the organisation.

The ‘Real life’ on CFCs overleaf demonstrates the problem that occurred when GE developed a chemical that increased efficiency and eliminated work hazards in refrigeration manufacturing plants, but provided later generations with global environmental problems. Limiting the assessment of environmental and social effects within our organisation may cause us to overlook many long-term problems that our firm may create!

LEARNING OBJECTIVE 6

| Costs we measure | Costs we forget |
|--|--|
| The cost of collecting and disposing of waste | The long-term cost to society of dumping waste. |
| Cost of control systems to minimise emissions into rivers or air | Damage to water sources and air as a result of legal emissions. |
| Packaging costs | Impact on the health of neighbours. |
| Compensation paid to the estate of an employee killed at the plant | Costs to customers and society of disposing of unwanted packaging. |
| Cost of a new waste water treatment plant | Devastating loss to employee’s family and friends. |
| | Damage to morale of employees. |
| | Poor corporate image because we dump waste water. |

EXHIBIT 17.2

Environmental and social costs: measured or forgotten

real life

General Electric and chlorofluorocarbons (CFCs)

In the United States, General Electric (GE) developed chlorofluorocarbons (CFCs) in the 1930s. These were used by GE in their domestic refrigeration products. CFCs were believed to be a major advance over the ammonia and sulphur methods of refrigeration, as they were non-flammable and non-toxic, and they increased production efficiency. Over time, CFCs came to be used in a variety of products, including air-conditioning and as the propellant in aerosols.

It was not until the 1970s that scientists began to realise that this commonly used gas was dangerous to the environment, and was one of the pollutants causing a hole in the ozone layer. Australia's use of CFCs peaked at 20 000 tonnes per annum. Today CFCs are rarely used. Under the Montreal Protocol the production and consumption of CFCs was banned in developed countries from 1 January 1996, except for essential uses that must meet a very limited range of essential use criteria. Developing countries have until 2010 to phase out CFCs completely.

In the 1970s, no company would have predicted that the products it manufactured could cause significant environmental damage. Scientists believe that it will take until 2050 for the atmosphere to recover from the environmental damage caused by CFCs. In the future, scientists and companies will be much more careful before widespread adoption of a new chemical.

Sources: www.abc.net.au/rn/talks/natint/stories/s682544.htm; EPA (2000)

The difficulty of measuring costs

While some environmental and social impacts can be measured in physical terms, it is sometimes difficult to measure these in financial terms. In this chapter, we look at new techniques that will help in this process, and focus on physical units as well as financial terms. In the CFC case, it would have been almost impossible for engineers in the 1930s to measure the financial costs of the potential damage of the new chemical, even if they had recognised the possible future environmental problems.

Defining environmental costs

LEARNING OBJECTIVE 7

As explained in an earlier section, environmental costs are the costs that an organisation incurs to prevent, monitor and report environmental impacts. They can also include the costs an organisation incurs when it does not comply with environmental regulations, some of which may extend well into the future. Some organisations may define environmental costs very narrowly, including only costs that have a direct effect on profits. Other organisations may include costs that result from the organisation's activities and operations but are external to the organisation. As part of a management accounting system, an organisation may report any or all of these types of environmental costs, depending on how managers intend to use the information.

The United States Environment Protection Authority has defined five tiers of environmental costs, from Tier 1 to 5, as shown in Exhibit 17.3 (EPA, 1995):

- Tier 1 costs, conventional costs, can be found in the accounting systems of most organisations. However, they may not be reported in a form that can be readily used by managers to assess environmental expenditure. These include the costs of purchasing equipment and plant that will prevent environmental impacts.

EXHIBIT 17.3

Five tiers of environmental costs

1 Conventional costs

Direct costs associated with capital expenditures, raw materials, and other operating and maintenance costs.

2 Hidden costs

Hidden regulatory costs from activities such as monitoring and reporting of environmental activities and emissions, cost of searching for environmentally-responsible suppliers, and the ongoing cost of cleaning up contaminated land.

3 Contingent costs

Contingent liabilities arising from failure to clean up contaminated sites, and fines and penalties for non-compliance with regulations.

4 Relationship and image costs

Less tangible costs and benefits that relate to consumer perceptions, and employee and community relations.

5 Societal costs

These are the costs that organisations impose on others—the environment and society—for which they may not be held legally responsible and which cannot be compensated for in the legal system.

Source: adapted from EPA (1995)

- Tier 2 costs, hidden costs, include the costs of monitoring and reporting activities to comply with regulations. These costs also can be found in the accounting system, but may not be easy to find and report, as they are often hidden in various overhead accounts and in the cost of wages and salaries.
- Tier 3 costs, contingent costs, include costs that may be incurred in the future, depending on future events. These costs may be recognised within internal company reports. They are also disclosed in the notes to the accounts of external financial reports, but only if there is a high probability that the company will be obliged to pay these costs in the future and if they are material in value. In external reports, these contingent liabilities are often limited to costs that may arise from existing legal actions.
- Tier 4 costs, relationship and image costs, reflect perceptions of various stakeholders, which are rarely measured in standard information systems and are difficult to measure objectively.
- Recognition of Tier 5 costs, societal costs, would be very difficult to achieve because of the cost of estimating the impacts, and the specialised environmental knowledge that might be needed to do so. In some cases, it may be easier to use physical measures to understand external impacts.

The first four tiers can be described as **private costs**, as these are environmental costs that directly affect the profit of the organisation or are costs for which the organisation can be held legally accountable.

A survey of 125 of the top 500 Australian companies suggests that very few companies in Australia are measuring environmental costs in either quantitative or qualitative terms (Gadenne and Zaman, 2002). Forty seven per cent of companies measured few or no social responsibility costs. Few companies measured internal environmental costs and even fewer measured environmental costs external to the organisation. The ‘Real life’ overleaf reports a survey that considers where environmental costs are reported within the organisation.

private costs

environmental costs that directly affect the profit of the organisation or are costs for which the organisation can be held legally accountable

Analysing environmental costs

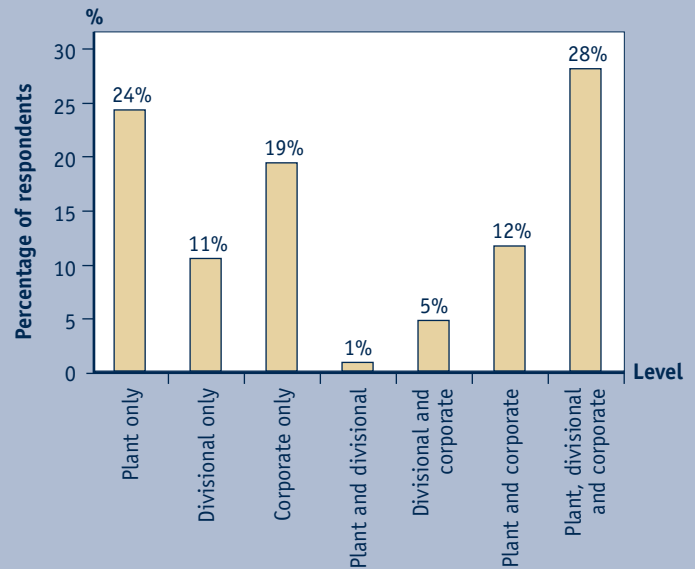
Many of the management accounting techniques described in other chapters of this book can help to measure and analyse environmental costs. These include activity-based costing, conventional overhead analysis and life cycle costing. The framework for analysing quality costs, described in Chapter 16, is particularly useful.

real life

Who receives the cost information?

Within an organisation, not all environmental cost information is prepared to suit the needs of all employees and managers. While evidence from Australia is limited, the graph opposite shows the results of a survey of manufacturing companies in the United States that prepare environmental cost information. Only 65 per cent of these companies provided environmental cost information at the plant level, and only 28 per cent of the companies tracked their environmental costs to plant, division and corporate levels.

Information about environmental costs is most likely to be useful when it is available at the plant level, where managers and employees would be able to use it in their operations so that genuine change can take place. It is the plant operators who need the information to be able to identify what environmental costs exist and how they can be reduced.



Source: Tellus Institute (1995, p. 19)

You may remember that quality costs can be categorised as prevention costs, appraisal costs, internal failure costs and external failure costs. When applying this framework to environmental costs, the goal is to control and reduce environmental costs overall. As with quality management, an initial focus on prevention and appraisal activities may, in time, significantly lower failure costs. However, the definition of each cost category differs from those used under quality management (Hughes and Willis, 1995).

- *Prevention activities* are designed to solve environmental problems before they occur, or even to turn problems into opportunities. Cost incurred under this category can be viewed as investments, as they can reduce later outlays and provide long-term benefits. For example, efforts to reduce and eliminate pollutants can provide a long-term cost advantage over competitors, as well as possible marketing and reputation advantages. The cost of prevention activities includes the cost of employee training and the cost of installing environmentally-responsible equipment, processes and activities.
- *Appraisal activities* monitor the level of environmental impacts and include measuring damage, inspecting processes and products, and auditing supplier performance. Appraisal costs include depreciation of testing equipment, costs of supplies used in testing and monitoring, and costs of obtaining external certifications and tests.
- *Internal failure activities* correct environmental breakdowns that have been discovered in appraisal activities.⁴ For example, internal failure costs may include the costs of cleaning up the plant following a chemical explosion or leakage, and costs of occupational health and safety claims.

⁴ Under cost of quality approaches, internal failure costs are linked to the company's inability to meet customer specifications, resulting in product-specific rework and scrap. Under the environmental approach, internal failure is linked to production processes (Hughes and Willis, 1995).

- *External failure activities* occur when the resolution or remediation efforts fall outside of the company's management. These costs may include the cost of cleaning up polluted sites, fines for environmental damage, and losses associated with a loss of reputation (and future sales) due to public awareness of the organisation's failure to engage in environmentally-responsible actions. As with the analysis of quality costs, it is often difficult to recognise and measure the cost of external failure.

Let's look at an example of a company that reports and analyses environmental costs. Lithgow Cleaners manufactures chemicals for the cleaning industry and is very aware that some of its processes and practices may impact on the external environment. The warehousing manager has undertaken an assessment of the cost for its materials handling operations of all activities performed to reduce the company's impact on the environment. These costs are listed in Exhibit 17.4.

How could the managers at Lithgow Chemicals use this information? Some activities are related to prevention, such as training, auditing, and recycling of packaging materials (which helps to prevent environmental damage). (Managers could also reduce the recycling cost by asking their suppliers to reduce their level of packaging.) The monitoring of air pollution levels is an appraisal cost. This is an important activity to safeguard employees and to prevent unnecessary pollutants from entering the environment.

The internal failure costs relate to a chemical spillage and make up about 23 per cent of the total environmental costs. Management may decide to investigate the underlying causes of this spillage to prevent any future accidents from occurring. The investigation may lead to increased prevention and appraisal activities. The external failure cost relates to a fine for environmental damage, and this is the highest component of all of the environmental costs. The managers may undertake an assessment to consider how this could have been prevented. Managers at Lithgow may look at ways of undertaking more prevention activities (increase prevention costs) to prevent these types of problems from occurring in the future. In the short run, increasing the costs of prevention and appraisal may reduce the risk of failure costs. Introducing more sophisticated monitoring equipment and engaging in more employee environmental awareness training may help to minimise future internal and external failures.

EXHIBIT 17.4

Analysis of environmental costs

| Environmental costs | | Percentage of total environmental cost | |
|---|------------------|--|-----------------------|
| Prevention costs: | | | |
| Auditing environmental risks | \$2 250 | | |
| Training for staff on how to reduce waste | 1 480 | | |
| Recycling of packaging from suppliers' materials | 5 650 | | |
| Depreciation—air cleaning system attached to exhaust | <u>8 355</u> | | |
| | | \$17 735 | 9.36% |
| Appraisal costs: | | | |
| Monitoring the level of air pollution | <u>\$2 650</u> | | |
| | | 2 650 | 1.40% |
| Internal failure: | | | |
| Cost of cleaning plant following chemical spillage | \$28 200 | | |
| Employee medical costs arising from spillage of toxic chemicals | <u>15 290</u> | | |
| | | 43 490 | 22.94% |
| External failure: | | | |
| Fines for environmental damage | <u>\$125 675</u> | | |
| | | <u>125 675</u> | <u>66.30%</u> |
| Total environmental costs | | <u>\$189 550</u> | <u>100.00%</u> |

IMPROVED DECISION MAKING AT CORMACK MANUFACTURING

LEARNING OBJECTIVE 9

So how can managers use environmental costs in their decision making? In this section we will draw on Cormack Manufacturing (see ICAA, 2003b).

EXHIBIT 17.5

Environmental costing information, Cormack Manufacturing

| Relevant costs | Current accounting treatment | Revised treatment: stage 1 |
|---|---|--|
| Tier 1 | | |
| Materials Packaging | Packaging and materials costs are hidden within cost of goods sold in the company accounts. | New account codes for Materials and Packaging to be created within cost of goods sold in the company accounts. |
| Light and power | One account for each product cost centre is maintained in the manufacturing business unit for all energy costs (lighting, machinery, office equipment etc.). The allocation of costs between the product cost centres is fairly arbitrary, based on assumed management estimations of energy usage. | To be separated out into new account codes, 'Lighting' and 'Moulding Energy', for each product cost centre within the manufacturing business unit. This will improve understanding of how the costs are generated. The remainder will remain in the Energy Overhead account. The allocation basis between product cost centres will be updated and based on actual readings taken during the trial, replacing the previous management estimation basis. |
| Stock variance | All stock losses are accumulated in the manufacturing business unit at a consolidated level. These include obsolete stock, spills, wastage on the production lines and misappropriation. There is no allocation between the product cost centres and no identification of particular comments of the cost—for example, how much relates to waste. | Obsolete stock costs to be separated into a new manufacturing business unit account code, with costs allocated across the product cost centres. The remainder will stay within the Stock Variance account for the time being. |
| Tier 2 | | |
| Direct labour Depreciation External repairs and maintenance | There are already separate account codes in the manufacturing business unit. Costs are allocated directly to the product cost centres to which they relate. | No change requested. Current accounts and the bases of allocation appear reasonable. |
| Waste | No cost data recorded. The materials cost of waste is hidden within the Stock Variance account in the manufacturing business unit, as noted above. Energy and labour costs of waste are hidden in the Energy and Salaries accounts, respectively, in the manufacturing business unit. | The weight of plastic waste produced (by product category) by the moulding and assembly operations is to be set up as a KPI in summary management accounts. Although not separating the costs of waste at this stage, this KPI at least provides management with a measure for monitoring and controlling waste, and identifying where and why it is generated. Waste costs (including raw materials, labour, energy etc.) will be separated out in the future. |
| Compliance | Minimal environmental compliance costs. | No change requested. |
| Tiers 3, 4 and 5 | | |
| | Not being captured by the accounting system. | Quantitative and qualitative data to be included in the summary management accounts and brought into decision making. |

Source: ICAA (2003b, pp. 44–5)

Cormack is a plastic injection moulding business employing 90 people in the western suburbs of Sydney. There are two production processes. Plastic granules are injection moulded to form container caps and tops for the food, cosmetics and pharmaceutical industries. The components of the food packaging are then assembled. Most waste is recycled; there are no toxic chemicals used in the process, and no hazardous waste outputs; and there are limited requirements for environmental compliance.

The need for environmental management accounting does not look strong. However, the company did implement an environmental management accounting project, which provided improved costing and environmental outcomes. The company analysed its costs using a modified tier structure similar to that outlined in Exhibit 17.3. This is detailed in Exhibit 17.5. As discussed earlier, it is unlikely that we will find management accounting systems that report environmental costs at the higher tiers.

Part of the motivation for the project undertaken at Cormack was to develop environmental information that could direct employee behaviour towards more environmentally-responsible actions. The existing costing system provided very little financial information relating to key areas of environmental performance. In the new system, a decision was made to collect financial data to direct attention to various critical areas where environmental performance could be improved, such as the cost of material waste, energy use by various machines, packaging and lighting.

The new systems at Cormack included many changes. We will discuss two of the major initiatives to show how improved management accounting can encourage managers and employees to adopt more environmentally-supportive behaviours.

Integrating production and environmental costs

At Cormack, plastic products are manufactured using either a cold runner process or a hot runner process to inject molten plastic into moulds. The cold runner process generates waste that needs to be hand sorted for recycling, whereas the hot runner process generates waste that cannot be recycled and is sent to landfill. The two processes generate different amounts of waste and use different amounts of energy and labour. Exhibit 17.6 compares the total annual production cost and the environmental cost of waste for the same product, using the hot runner or the cold runner processes.

Overall, management was surprised at the cost of environmental waste. For the hot runner process, the cost of environmental waste was 13.6 per cent of production costs, and for the cold runner process was 15.3 per cent of production costs. The cold runner process resulted in higher waste costs. The material cost of this waste was cheaper than for the hot runner process, as it could

| | Hot runner | | Cold runner | |
|---------------------------------------|------------------|----------------------------------|------------------|----------------------------------|
| | Estimated cost | Environmental waste cost element | Estimated cost | Environmental waste cost element |
| Materials (FG)* | \$95 868 | – | \$95 968 | – |
| Energy (FG)* | 2 899 | – | 3 049 | – |
| Materials (waste)† | 13 221 | \$13 221 | 11 508 | \$11 508 |
| Labour (waste)† | 2 216 | 2 216 | 6 216 | 6 216 |
| Energy (waste)† | 150 | 150 | 132 | 132 |
| Total | \$114 354 | \$15 587 | \$116 773 | \$17 856 |
| Cost of waste as % of production cost | | 13.6% | | 15.3% |

EXHIBIT 17.6

Comparison of the cost of hot runner and cold runner processes, Cormack Manufacturing

* FG indicates the monetary value of the material that is included in the finished goods.

† Waste indicates the monetary value of material that is diverted into a waste stream.

Source: ICAA (2003b, p. 47)

be recycled, but the labour cost was higher because of the hand sorting. However, this is not the whole story. Although it was cheaper to produce the product using the hot runner process and there were lower internal environmental waste costs, the hot runner process produced 1844 kg of waste that needed to be disposed of in landfill, compared to 1605 kg for the cold runner process. In addition, the hot runner process produced environmentally damaging CO₂ emissions of 47 tonnes compared to 49 tonnes for the cold runner.

Management can use either the hot runner or cold runner processes, and may use the cost and environmental information to help make this decision. How will they integrate the cost information with the environmental information? How will they weigh up the relative damage to the environment from the production of CO₂ gas compared to waste in landfill? On balance, they may argue that the CO₂ emissions are similar and given the lower measured environmental waste cost then the hot runner process may look superior. But perhaps not!

The cost of recycling waste

In the plastic injection industry, much of the waste produced can be re-used in future production. This appears sensible on environmental grounds—plastics use up scarce hydrocarbons and their waste causes environmental damage. Cormack used its new costing system to assess whether recycling the waste and re-using it in production was better for the company than the current system of selling waste plastic to an external recycler. The major saving associated with recycling and re-using the plastic waste relates to raw material savings, with some minor increases in costs for energy and labour to run the waste regrinding machine. In this case, what is clearly a good decision for the environment is also a good decision for the company from a financial viewpoint, as is shown in Exhibit 17.7. A detailed financial analysis like this may help Cormack to think about ways to make the recycling process even more efficient.

The 'Real life' opposite, on improving the costing systems at G H Michell & Sons, provides a further demonstration of how environmental costs can be taken into account.

EXHIBIT 17.7

The costs and benefits of recycling waste at Cormack Manufacturing

| Costs/benefits | |
|--|-----------------|
| Depreciation of the waste regrinding machine | \$1 950 |
| Energy needed to run the regrinding machine | 131 |
| Labour cost of running the regrinding machine | 3 087 |
| Recycling sales revenue foregone | <u>3 175</u> |
| Total costs | \$8 343 |
| Less Raw material saved | <u>47 628</u> |
| Net benefits from recycling waste for re-use in production | <u>\$39 285</u> |

Source: adapted from ICAA (2003b, p. 49)

IMPROVING SUPPLY CHAIN MANAGEMENT THROUGH ENVIRONMENTAL AND SOCIAL ACCOUNTING

LEARNING OBJECTIVE 10

Environmental and social management accounting may provide useful information to assist managers to achieve competitive advantage. This approach may result in cost savings and product and process improvements at each stage in the supply chain. Although some advantages may go to both suppliers and customers, there may be financial advantages for an organisation and advantages for the environment and society. (You may remember that supply chain management was explained in Chapter 16.)

Environmental costing at G H Michell & Sons

G H Michell & Sons, based in Adelaide, is Australia's largest wool and leather processor, processing between 30 and 35 million kilograms of wool every year. Michell's traders purchase several grades of wool for the company at wool auctions. They are provided with the estimated processing cost for each grade of wool, which influences the prices that they are willing to pay.

Michell redesigned its costing system to reflect more closely the resources used to process the various grades of wool. These changes also helped the company to reduce the environmental impacts of its wool processing.

G H Michell uses a carbonising process to process low grade or 'dirty' wool. The process is more complex than that used for the top grade wools, as there are large amounts of dirt, vegetable matter and salts that must be removed from the wool. The dirty wool goes through the following stages:

- 1 *Opening*. This separates the fibres that have been firmly packed by a wool press at the shearing shed. Pressing reduces transportation costs but creates costs for the processor.
- 2 *Scouring*. Four scourers work in a row, using detergent to clean the wool.
- 3 *Acidification*. The burrs and vegetable matter are acidified and turned to ash that can be removed from the wool.
- 4 *Centrifuge*. Water is removed from the wool.
- 5 *Dry baking*. The wool undergoes dry baking.
- 6 *Crushing/dusting*. The crushing/dusting process removes vegetable matter, carbon and dust from the wool fibre.
- 7 *Neutralising*. Water, sodium carbonate and hydrogen peroxide are used to neutralise any acid.
- 8 *Blending*. The wool fibres are blended ready for manufacture.
- 9 *Packing*. The wool is packed ready for transport.

At each stage in the process there are inputs, some of which deplete resources, and outputs, some of which are potentially harmful to the environment.

Under the existing costing system the costs of processing were allocated evenly across all wool products on a per bale basis. As we learned in Chapter 8, averaging costs in this way does not cause any distortions in product costs if all products use a similar amount of resources. However, at Michell this was not the case. Dirty wool used more energy, water, detergent, acid and transportation costs per unit of output than top grade wools. It was more difficult to process dirty wool; it had a much lower yield than top grade wool and the production processes caused more environmental costs. In addition, the dirty wool was more expensive to transport from the suppliers because a significant part of the weight of each bale was lost during the carbonising process due to the removal of contaminants. If only 50 per cent of the bale is usable wool, then half of the transport cost has been wasted.

The redesigned costing system took account of the expected yields of various wool grades—for dirty wool the yield was as low as 50 per cent. The changes in product costs resulting from the new system were lower than 10 per cent across all products, but this was significant as profit margins were very low. Also, the new product costs sent a signal to the traders to pay less for dirty wool, which costs the company and the environment in terms of usage of energy and chemicals.

The new costing system reduces the number and cost of preventive activities—the wool now no longer needs the heavy processing it once did. And Michell has other procedures that support sound environmental management. Wool grease, which is obtained more efficiently from better wools, can be sold for \$2 a kilogram. The sludge from the carbonising process is reprocessed for compost for vineyards, although this costs Michell \$15 per tonne.

Suppliers

An organisation may be willing to pay more for supplies that are known to have reduced adverse impacts on society and the environment. However, there may be other incentives for an organisation to work with suppliers to adopt responsible environmental and social practices, as sometimes these changes can lead to reductions in cost.

For example, in the 'Real life' at G H Michell, bales of wool transported to the processing plant included a high percentage of waste material, which needed to be disposed of prior to and during processing. Thus, part of the cost of transport related to transporting waste material. Additional greenhouse emissions were also created by these wasteful transport and processing activities. If the supplier could remove the waste material from the wool bales prior to transport, this might result in lower transport costs for the supplier and lower processing costs for G H Michell, as well as resulting in reduced environmental impacts. Thus, both costs and environment impacts would be reduced by this change. Sometimes an organisation may be committed to following environmentally-responsible practices, only to find that its supplier is using non-biodegradable and hazardous materials or avoiding using recycled materials. This may not be detected easily in a management accounting system, although an environmentally-responsible supplier cost analysis (see Chapter 16) could include measuring the level of non-environmentally-friendly materials used or produced by a supplier.

Exhibit 17.8 shows how an organisation might evaluate its suppliers by taking into account a range of environmental and social factors. This idea was developed at Commonwealth Edison, a United States electricity supply organisation (EPA, 2000). For each supplier, a rating from 1 to 7 can be given for each criteria, and a total score can then be calculated for the supplier. The difficulty for any organisation in calculating this score is how to weigh up the importance of each criteria in its evaluation and comparison of suppliers.

Customers

Manufacturers and service organisations can work with customers to reduce adverse social and environmental impacts. These impacts include harm to customers, other people and the environment when the service is being delivered or the product is being used, as well as damage to the environment when the product is disposed of. This approach may lead manufacturers to help their

EXHIBIT 17.8

Financial and environmental criteria for evaluating suppliers

| | | worst → best | | | | | | |
|----------------------------------|----------------------------------|---|---|---|---|---|---|---|
| Evaluation area | Criteria | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Purchasing and supply management | Cost | | | | | | | |
| | Vendor performance | | | | | | | |
| | Shelf life | | | | | | | |
| | Packaging safety | | | | | | | |
| | Storage requirements | | | | | | | |
| Environment | Material regulated by EPA | | | | | | | |
| | Disposal required off-site | | | | | | | |
| Safety and hygiene | Adequate labelling on containers | | | | | | | |
| | Inhalation risk | | | | | | | |
| | Hazardous decomposition | | | | | | | |
| | Carcinogenic potential | | | | | | | |
| Analytical | Specification analysis | | | | | | | |
| | Frequency of testing | | | | | | | |

Source: adapted from EPA (2000), p. 14

EXHIBIT 17.9

Cost and benefits to Cormack Manufacturing of introducing recyclable containers⁵

| Costs and benefits | |
|--|------------------------|
| One-off setup costs for using returnable cartons: | |
| ■ purchase of new cutting equipment | |
| ■ design and print costs | |
| ■ additional cost of purchasing returnable cartons (compared to non-returnable cartons) | |
| Initial net outlay | <u>\$(7 500)</u> |
| Cost reductions to the business from using returnable cartons as compared to using disposable cartons (based on existing order quantities and lead times): | |
| ■ fewer cartons required (reduced purchase costs) | |
| ■ increased cartage (higher collection charges) | |
| ■ increased liner cost (more liners required for smaller cartons) | |
| ■ labour differences are negligible | |
| Net benefit per annum | <u>\$4 790</u> |
| Net benefit over expected life (4 years) of returnable cartons | <u><u>\$11 660</u></u> |
| Intangible benefits: | |
| ■ industry reputation | |
| ■ customer relationship | |
| ■ meeting obligations under the Packaging Covenant and avoiding future regulation | |
| ■ reduced packaging waste in the supply chain | |
| Net intangible benefit | Unquantifiable |

Source: ICAA (2003b, p. 50)

customers recycle a used product. It may also encourage the customer to use the product or service in a way that will cause the least damage to the environment.

There are many examples of organisations that encourage their customers to recycle using methods that include 'take back' and 'disposal' programs. The European auto industry is required by law to design cars in a way that they can be recycled once the customer has finished with the car. The directive of the European Union, to be implemented by the end of 2006, is that the car must be designed so that 85 per cent of the weight of its materials can be recycled. This provides a significant challenge to car designers, especially in reducing the use of plastics and in using recyclable plastics. The goal is that by 2015, 95 per cent of a car will be recyclable (www.azom.com; www.planetark.com).

Management accounting can help an organisation identify the cost savings from recycling or better environmental use of a product in the hands of a customer. For Cormack there was an advantage in working with its customer. The company's new costing system showed that packaging costs accounted for 48 per cent of manufacturing profit, and therefore were a prime area for improvement. As a result of this information, a trial was conducted using containers that could be recycled four times. Even though it was expensive to redesign processes and purchase the new containers, the analysis in Exhibit 17.9 shows that over the four-year life of the containers there were net cost savings for Cormack. Of course, this particular initiative relied on the customer being willing to accept an alternative packaging form. This example shows the advantages in working with the customer, and the cost savings could have been used to negotiate a lower selling price for the customer.

Management accounting information can help managers to make decisions that not only result in lower costs but also lead to favourable environmental impacts. In some cases, the analysis may show that it is more expensive to provide a more environmentally-friendly product or service, and the organisation may still decide to adopt these practices but to charge more to customers.

⁵ The net benefit of \$11 660 consists of the initial outlay of \$7500, less yearly cost savings of \$4790 over four years. If the savings over the four years were discounted to recognise the time value of money, then the net benefit would be lower. Net present value and discounting techniques are described in Chapter 21.

Some customers may be happy to pay more for a product that they believe to be more environmentally responsible. However, this depends on the nature of the product or service being offered, and the characteristics and preferences of the customers. Clearly, marketing and strategic considerations come into these pricing decisions, and information such as that used in the Cormack case above is essential for making these decisions.

MEASURING ENVIRONMENTAL AND SOCIAL PERFORMANCE

LEARNING OBJECTIVE 11

We saw in Chapter 14 that performance measurement systems that combine financial and non-financial measures may provide a balanced perspective of the overall performance of an organisation. Performance measurement systems provide important information to assist managers in monitoring and controlling activities, and to motivate and reward managers. They are also used to direct attention to aspects that are considered important by the organisation. As with many important aspects of business activity, it is difficult to quantify environmental and social impacts. It is even more difficult to express these in dollar terms. However, a well-designed environmental management system should include measures of performance.

ISO 14031 environmental performance indicators

ISO 14031 is an international standard that assists organisations to develop environmental performance measures. This standard suggests that three types of indicators (or measures) should be used: operational performance indicators, management performance indicators and environmental condition indicators.

operational performance indicators indicators that provide information such as waste levels and energy consumption, relative to volume of production, sales or some other activity

management performance indicators indicators that measure the efforts of management to improve the environmental performance of their organisation

environmental condition indicators measure the actual condition of the environment at a local, national or global level

- 1 Operational performance indicators** provide information, such as waste levels and energy consumption, relative to volume of production, sales or some other activity. Thus, an organisation may measure the number of kilograms of waste material disposed of in landfill, or waste material as a percentage of material used or as a percentage of production output. In this case, we could measure the quantity in kilograms as well as in dollars. Another example is the kilowatts of electricity and the cost of electricity used per production output or production hour. Again, both a physical and a financial measure can be provided.
- 2 Management performance indicators** measure the efforts of management to improve the environmental performance of their organisation. These include the cost of supplier audits, the number of cases of non-compliance with regulations and any cost of correcting non-compliance, and the cost and time devoted to staff environmental training. These are not outcome measures as they do not capture the impact of an organisation's activities. They can be described as input measures, and compliance may or may not lead to improved environmental outcomes.
- 3 Environmental condition indicators** measure the actual condition of the environment at a local, national or global level. This is a difficult area to quantify, as many organisations and other factors may contribute to the condition of the local environment. Thus, it may be difficult to single out the impact of a single organisation. Nevertheless, there are examples where distinct changes in environmental conditions can be closely linked to the activities of a specific organisation. For example, the level of noise pollution experienced close to an airport may be linked to the activities of that airport, and so the airport owner could monitor the noise level. Alternatively, a sewage processing plant that is allowed to pump recycled output into the ocean could monitor the quality of the water. In both of these cases, it is possible to measure the impact in quantitative terms—average and maximum decibels of noise and percentage of bacteria per litre of discharge.

As with all performance measures, these indicators may be presented as *absolute measures* relative to another activity (for example, to sales), or as a percentage *relative to a baseline*. Some

organisations might benchmark them against other organisations. To be useful to managers, these indicators need to be reported and monitored over time using a consistent measurement approach.

When indicators are initially developed, there may not be an appropriate benchmark against which to measure the relative performance. For example, for the disposal of wastewater, either the total discharge or the total discharge per dollar of production may be reported. However, over time, a measure such as wastewater discharge per kilogram of production may provide more useful information. In addition, the financial cost of a social or environmental problem may galvanise management attention more than a physical or relative measure.

Eco-intensity measures are measures of the *input* (such as kilohertz of power) *to output* (such as kilograms of aluminium). You may recognise this as a form of productivity measure (see Chapter 14). In this case, it indicates the level of environmental inputs used to produce a level of output. This approach could be used to indicate which organisations use the scarce water from the Murray Darling basin in the most responsible way.

eco-intensity measures measures that compare input to output

An **eco-efficiency measure** relates *output to input*. For example it could relate the product value measured in dollars against the resources used. For the Murray Darling water, a farm producing cotton could assess the production or financial value of cotton produced relative to how much water was used. The farm might see that its long-term viability was in doubt if another form of agriculture, such as vineyards, produced greater income for each kilolitre of water used.

eco-efficiency measures measures that compare output to input

The release of environmental reports to external stakeholders is becoming more common. These reports often contain a range of performance indicators. The 'Real life' overleaf explains how The Body Shop reports environmental performance to external parties, while also ensuring that good environmental management is practised throughout the company.

The socially balanced scorecard

In Chapter 14, the balanced scorecard was described. You may remember that the Kaplan and Norton scorecard consists of four dimensions: financial, customer, internal business processes, and growth and learning. For each dimension, there is an objective as well as lead and lag indicators. We also learned that in some organisations different dimensions are included.

Some organisations have added a social and environmental dimension to the balanced scorecard. Two examples are Novo Nordisk and Shell (Zingales and Hockerts, 2003). Novo Nordisk is a Danish pharmaceutical manufacturer. As the company has a major investment in people and in research and development (R&D), the CEO wanted to understand the company's performance in these two areas. He realised that relying on conventional performance indicators was not enough, as it takes some time before people and R&D performance impact on these data. In the late 1990s, the company adopted a balanced scorecard and integrated social and environmental measures. Novo Nordisk's scorecard has four perspectives: Finance, Business Processes, Customers and Society, and People and Organisation. The Customers and Society, People and Organisation and Business Processes dimensions incorporate a range of environmental and social targets and indicators. Performance across the balanced scorecard is reported as part of the company's triple bottom line external reports, and managers' bonuses are based on performance against criteria in the balanced scorecard. Exhibit 17.10 (overleaf) outlines some of the performance indicators for the People and Organisation perspective. Targets are set for each performance indicator, and the performance of the manager responsible is monitored against these targets.

Royal Dutch Shell is a very large multinational petrol company, based in the Netherlands. The balanced scorecard used at Shell contains a dimension called Sustainable Development, as a replacement for the usual learning and growth perspective. At Shell, managers' bonuses are linked to this dimension to encourage them to focus their attention on achieving these outcomes. Shell uses 'strategy maps' to articulate the cause and effect linkages between the different perspectives.

EXHIBIT 17.10

CSFs and KPIs for the People and Organisation perspective at Novo Nordisk

| Critical success factors (CSFs) | CSF—rationale | Key performance indicators (KPIs) |
|-----------------------------------|---|---|
| Attraction and retention of staff | High retention of employees will secure our knowledge and competitive advantage | Reduction of unwanted turnover in selected business units |
| Development of people | Development of people is a key objective for managers | No. of managers with development of people as a personal target |
| Customer relations | Improving customer retention is essential for improving sustainable business processes | No. of dialogues between patients and employees |
| Winning culture | Developing a winning culture will help us strive for stretch targets | No. of team targets |
| Social responsibility | Increasing equal opportunities and diversity throughout the entire company is one of our objectives | No. of plans for increasing equal opportunity |

Source: adapted from Zingales & Hockerts (2003, p. 9)

real life

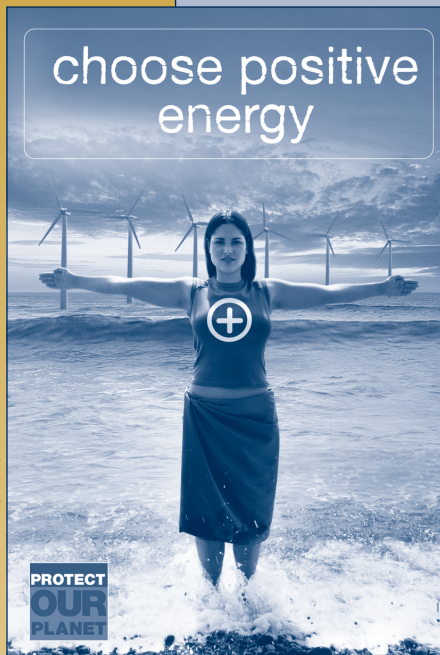
The Body Shop: Environmental reporting

The Body Shop is a skin and personal care retailer that operates in 50 countries through 1900 stores. The Body Shop Australia is a franchise of the international operation, and states its vision as: *'the benchmark company for the integration of economic success, stakeholder fulfilment and positive social and environmental change'*. The company claims that its commitment to this vision influences its decision making in all areas of the business. The Body Shop works to create 'positive social and environmental change' around five core values:

- *Protect our Planet*
- *Against Animal Testing*
- *Strengthen Our Community*
- *Activate Self Esteem*
- *Defend Human Rights*

The aim of environmental management at The Body Shop is to introduce and encourage sound environmental practices, not just to produce an environmental report for the interest of the company's stakeholders. Staff receive environmental awareness training. The company has championed a number of public environmental awareness campaigns in recent times, including:

- National Day of Action (2001)—around Australia, staff and customers volunteered their time to create change to a local environmental problem. Projects included cleaning creeks, tree planting and sand dune regeneration.
- Biodiversity Month (2001)—in-store distribution of information and education resources on maintaining biodiversity.
- Choose Positive Energy (2002)—campaign aiming to help stop climate change. Over 200 000 Australians called on Prime Minister Howard and other world leaders to commit to providing renewable energy to 2 billion people in developing nations.
- Bring 'Em Back (2004)—an in-store recycling promotion and recycling awareness campaign.



The Body Shop's 2002 public environmental awareness campaign was 'Choose Positive Energy'

Current priorities include the introduction of a user-friendly environmental data collection system and a review of current Ethical Procurement Policies and Guidelines.

The company focuses on reducing environmental damage by encouraging actions, including:

- As part of company induction, all new staff are educated on company environmental policies and procedures to minimise daily impacts.
- As part of company job requirements, all staff participate in an ongoing community volunteering programme. In 2004, approximately 800 hours of service directly benefited environmental conservation.
- An innovative representational group of staff meet regularly to discuss and evolve company environmental initiatives and achievements, including green office programmes and community involvement.
- All company fleet travel is offset through a national tree planting program.

The Body Shop does measure environmental indicators, but the focus appears to be on changing the attitudes and behaviour of staff, not just reporting. In 2002, the environmental auditor did find weaknesses in the data collection systems. All the same, the auditor noted the progress towards both improved environmental awareness and accountability.

Source: The Body Shop Australia (2005)

These maps allow the managers to understand how a focus on sustainable development can influence performance across the whole organisation, and create value for stakeholders. An example of the type of linkages found in the strategy map at Shell is shown in Exhibit 17.11.

Measuring and reporting social values

So far in this chapter we have focused primarily on management accounting responses to environmental rather than social issues, although Novo Nordisk and Shell provide examples of measures of social impacts. There are other examples of organisations that have well-developed measures of social performance, particularly in the human services sector of the economy, such as welfare agencies and hospitals. Given their community service roles, organisations like these will want to track the impact they have on the community.

Performance measures that focus on social and environmental issues may be developed in all types of organisations. Some organisations publish these in their external financial reports (as in the case of The Body Shop) or in triple bottom line and other special reports, as management may believe they

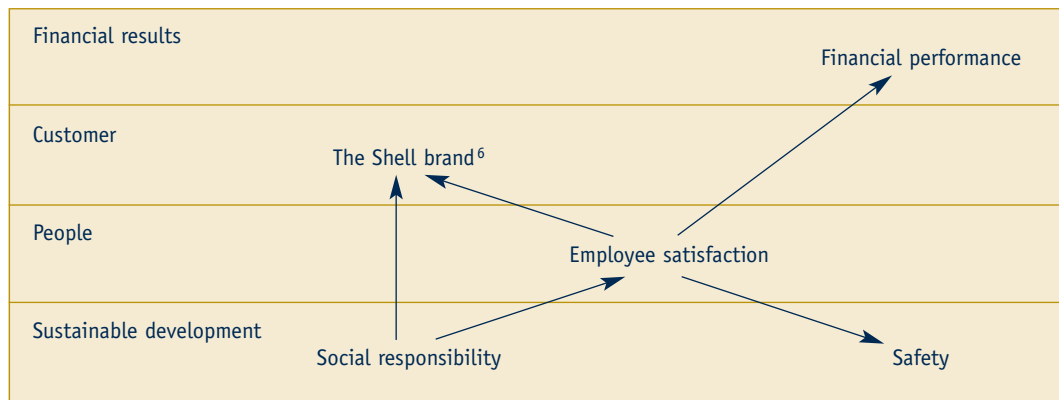


EXHIBIT 17.11

A strategy map at Shell

Source: adapted from Zingales & Hockerts (2002, p. 11)

⁶ In the strategy map reported in Zingales and Hockerts (2002) there was no arrow between the brand image and financial performance. However, this would be a logical causal linkage.

enhance the reputation and profile of their organisation. From a management accounting perspective, we are interested in understanding how these measurement and reporting systems can be used to manage and monitor operations and whether they are effective in directing the behaviour of decision makers within the organisations, from the CEO to employees at operational level. The ‘Real life’ below describes the social goals at the University of South Australia, while the broad range of performance indicators used at Bankstown City Council are described in the ‘Real life’ opposite.

SOCIAL AUDITS

LEARNING OBJECTIVE 12

social auditing a formal process where organisations measure and report the extent to which they have operated in accordance with their stated shared values and objectives

Social auditing is a formal process where organisations measure and report the extent to which they have operated in accordance with their stated shared values and objectives. Social auditing requires the involvement of stakeholders, such as employees, customers, suppliers and the local community, who will provide some of the feedback on the organisation’s performance. The outcomes of a social audit are usually verified by an external party or panel to give credibility to the findings. Thus, the social audit provides a form of accountability to a broad range of stakeholders. An organisation may adopt this practice to enhance its reputation in the eyes of its stakeholders. Just as lapses in behaviour, real or perceived, can destroy or reduce the reputation of an organisation, a ‘good’ reputation can give an organisation a competitive advantage. As part of a social audit, an organisation may identify potential or existing problems and then invite stakeholders to assist in possible solutions. Another goal of social audits is to help management not only to understand stakeholder concerns, but also to anticipate them.

real life

Equity and social goals at the University of South Australia

When the University of South Australia was established in 1991, social and equity goals were included in its Act of Parliament. Today the university continues to pursue these goals, as well as focusing on its performance in quality teaching and research. To help managers and all staff to focus on these goals, the following performance measures are monitored in all departments of the university and are discussed in corporate planning reviews:

| Area | Measures |
|----------------------|---|
| Equity participation | % of students in equity groups |
| Staff gender ratio | % women academic staff % women professors and associate professors % women in senior administrative roles |

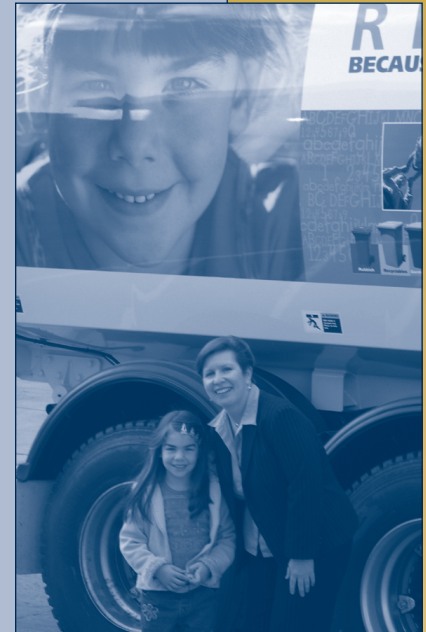
Equity participation includes any group that is under-represented, such as indigenous students, women in male-dominated professions and students with disabilities. The staff gender ratio is considered important because of the historic imbalance of university staffing, which has favoured men. Other more conventional performance measures, such as teaching evaluation scores and research publications, are a key focus within the university. The social measures provide an extra area of focus rather than detracting from efforts to produce quality teaching and research. In the annual planning process the university’s managers are required to include plans to improve performance in these various social measures, and targets are set; and in the annual review process, outcomes are measured against these targets.

Source: www-p.unisa.edu.au/pas/bia/information/kpi/KPIs%202004-2006.doc

real life**Performance audits at Bankstown Council**

Bankstown City Council in the western suburbs of Sydney is part of a national benchmarking project within local government. The council has developed many measures to track its financial, social and environmental performance. Interestingly, a significant number of the measures relate to social performance. There are, however, a series of measures that relate to the environment, including recycling. The measures are used as part of its corporate management framework for setting objectives and assessing the council's performance against its goals.

| Key indicators | 2003/4 | 2002/3 |
|--|---------|---------|
| Debt ratio | 7.34% | 6.91% |
| Unrestricted current ratio | 2.281 | 2.57 |
| Outstanding collectable rates and charges | 2% | 3.98% |
| Operating revenue per capita | \$551 | \$528 |
| Operating expense per capita | \$620 | \$527 |
| Community satisfaction—council governance | 6.87/10 | 7.01/10 |
| No. of council volunteers | 500 | 500 |
| Investment in community services per capita | 12.50 | 16.41 |
| Community connectedness—city | 6.5/10 | 6.7/10 |
| Community connectedness—local | 7.1/10 | 7.4/10 |
| No. of CLAS staff | 15 | 14 |
| KCA recyclables | 183 | 190.63 |
| KCA waste to landfill | 238 | 239.56 |
| No. of DAs determined | 2095 | 2025 |
| Mean DA processing times | 64 | 67 |
| Median DA processing time | 31 | 33 |
| Investment in environmental management per capita | 10.28 | 11.86 |
| Investment in recreation per capita | 41.44 | 34.67 |
| Investment in roads and footpaths per capita | 81.01 | 78.5 |
| No. of 'state of environment' indicators maintained or moving towards sustainability | 11 | 11 |
| No. of hits per quarter council web site | 124 900 | 120 000 |
| Capacity use Library Technology Centre | 94% | 100% |
| Library issues per capita | 7.6 | 6.98 |
| Average monthly outstanding customer action requests | 95 | 679 |
| Lost time injuries/days lost | 36/540 | 39/348 |
| Community satisfaction—personal safety | 5.88/10 | 5.96/10 |
| Community satisfaction—property safety | 5.83/10 | 6.08/10 |
| Source of funds—grants | 13.45% | 11.98 |
| Percentage of council income generated externally | 6.3% | 7.7% |
| Overall score—community survey | 6.9/10 | 6.6/10 |



Council visually reminds residents of the importance of recycling by placing colourful signage on rubbish vehicles

Courtesy of Bankstown Council

Source: www.bankstowncity.nsw.gov.au

ENVIRONMENTAL OUTCOMES: CAPITAL EXPENDITURE ANALYSIS

Techniques used to evaluate capital expenditure proposals are described in Chapters 21 and 22. When social and environmental factors are included the evaluation processes remain the same, except that we need to exercise care when identifying all the costs and benefits. The challenge

real life

Social responsibility at The Body Shop

Like its international parent, The Body Shop Australia is well known for conducting a social audit as well as an environmental audit. The company states its reason for the social audit:

At The Body Shop, we believe business has a moral obligation to account for its social and environmental performance in a transparent and inclusive manner.

It has conducted a survey as part of its social audit every second year since 1998.

The Body Shop has identified its stakeholders as employees, customers, 'At Home' consultants, community groups and suppliers. The survey asks respondents to provide their level of agreement with a series of statements about the company. Some examples of the statements in the survey are as follows:

Employees:

- *Most days I am enthusiastic about my job.*
- *People share their knowledge and skills.*
- *I trust The Body Shop to provide honest information to its relevant stakeholder groups on social, environmental and animal protection.*
- *I trust The Body Shop to always act ethically in business dealings.*

Customers:

- *The service is friendly and helpful.*
- *The Body Shop campaigns effectively on animal welfare.*
- *The Body Shop campaigns effectively on human rights.*

For some key indicators, targets have been developed. For example, 'acting on complaints about bullying' had a target of 95 per cent effectiveness, and the actual result for 2002 was 85 per cent. Trends are reported. For example, increases in scores for 'The Body Shop values long-term employees' and 'I feel I can join a union if I want to' are reported. Each of the social audits is verified by Eva Cox, a well-known academic and social commentator. She comments on particular figures and identifies areas for improvement. For example, in the *2002 Social Audit Report*, she highlighted the need to improve diversity in employment by employing more people with disabilities or from the indigenous community.

In the *2002 Social Audit Report*, Graeme Wise, the director of The Body Shop Australia, stated that the results of the social audits have been used to implement a variety of changes, including development of a Code of Conduct and streamlining of employee pay and benefits.

Source: The Body Shop Australia (2002)

for many organisations is that a project may not be economically viable for the organisation, but once the external costs and benefits are included it may be considered more attractive. The alternative is that a project may be viable on financial grounds, but if all the environmental costs and benefits are included it may appear less attractive for the organisation. In some situations, these analyses indicate whether the organisation is willing to put the broader interests of society above its own interests. Of course, some capital expenditures are driven by the organisation's need or desire to be environmentally responsible. These are the environmentally-induced capital expenditures described in an earlier section of this chapter. In this section we will look at two examples that demonstrate how environmental factors may be accounted for in capital investment decisions. The 'Real life' on page 832 provides a further example of the

advantage of taking a life cycle approach to determining the full range of costs in a capital expenditure proposal.

At Cormack, the energy that was consumed by air compressors was considered to be a major part of the total energy cost of the moulding process. Cormack needed to purchase a new compressor, but in the past had assumed that a more energy-efficient compressor may be too expensive.

A cost analysis revealed that while an energy-efficient compressor would cost \$17 500 more than the conventional model, it would save \$4500 per year in energy cost. Clearly, the extra cost of purchasing the energy-efficient compressor would be recovered in the first four years of its operations. Even a discounted cash flow approach (see Chapter 21) to analysing the energy savings over the 15 year life of the compressor indicated that an energy-efficient compressor would result in significant savings. In addition, the environment would benefit from the reduction in 773 tonnes of CO₂ over the 15 year life of the compressor.

In this type of decision, the identifiable benefits to an organisation could include:

- savings in energy;
- reductions in the cost of disposing of waste and emissions;
- reduced insurance and costs of cleaning up environmental damage;
- reduced materials and packaging; and
- new by-products that can be sold.

Exhibit 17.12 shows a range of less tangible factors that may be considered in making such a decision.

Our second example relates to the purchase of a piece of equipment by a furniture manufacturer. Dubbo Whitewoods, a large manufacturer of pine furniture, is considering the purchase of a paint mixer to mix paint continuously instead of in batches (adapted from the Anderson case, EPA 2000). The new mixer would also have several environmental advantages compared to the old mixer. An evaluation has shown that the new mixer would have a high initial purchase price, but would result in reductions in many costs.

The first step in the analysis is to estimate the financial costs and benefits of the purchase. Some of these are relatively easy to estimate. Exhibit 17.13 (on page 833) indicates that the replacement of the paint mixer would yield savings of \$195 010 per annum. However, there are other cost savings or quantitative factors that can be identified but may be difficult to quantify.

EXHIBIT 17.12

Important factors in capital investment analysis

Productivity

- Product quality
- Production throughput
- Production flexibility
- Production reliability
- Worker absenteeism
- Worker morale

Potential liability

- Business shutdown costs
- Non-compliance fines
- Site clean-up costs
- Legal costs
- Personal injury claims
- Property damage claims
- Natural resource damage claims

Future regulation

- Stricter enforcement of current regulations
- Modification of current regulations
- New regulations

Insurance

- Workers' health insurance
- Workers' compensation
- General property core fire insurance
- General liability/hazard
- Environmental liability
- Unemployment

Company image

- Access to customers and markets
- Access to financing
- Public relations

real life

Using a life cycle approach to include environmental costs at MLC

Methodist Ladies College in Perth developed a pilot project to look at environmental costs in its decision to replace its air-conditioning plant. The capital expenditure decision was based solely on the acquisition cost of \$488 449. However, if a life cycle approach had been taken then the decision may have been different. Taking a life cycle costing approach requires a range of additional costs to be considered, including energy and service costs over the life of the plant. As can be seen in the table below, if this approach had been taken the total estimated cost of replacing the air-conditioning would have more than doubled. (Life cycle costing is discussed in more detail in Chapter 15.)

Including costs, such as energy, which affect the environment, may produce a very different outcome to a decision based solely on acquisition cost. A system that was more expensive to buy but had lower energy costs to run might have been bought if it had a lower total life cycle cost. For example, given the low humidity of Perth, could an evaporative air-conditioning system be used, significantly reducing the energy and service costs although increasing water costs?

The costs analysis below identifies energy costs but ignores other environmental costs (such as the costs of disposing of the existing plant, including the wastage and landfill). Also, there should be consideration given to whether the existing plant could be recycled or reused rather than dumped.

Replacing air-conditioning at MLC—a life cycle perspective

| | Auditorium | Resource Centre | Primary School | Total |
|-------------------------------|-------------------------|-------------------------|-------------------------|---------------------------|
| Estimated life (years) | 15 | 12 | 12 | |
| Capital expenditure: | | | | |
| Acquisition cost | \$238 170 | \$83 120 | \$167 159 | \$488 449 |
| Additional direct costs | 32 369 | 13 185 | 14 096 | 59 650 |
| Additional indirect costs | 33 536 | 64 130 | 58 778 | 156 444 |
| Total capital expenditure | <u>\$304 075</u> | <u>\$160 435</u> | <u>\$240 033</u> | <u>\$704 543</u> |
| Costs over expected life: | | | | |
| Energy costs | \$32 000 | \$26 000 | \$39 000 | \$97 000 |
| Service and maintenance | 75 000 | 36 000 | 120 000 | 231 000 |
| Other costs | 2 000 | 2 000 | 5 000 | 9 000 |
| Total costs per annum | <u>\$109 000</u> | <u>\$64 000</u> | <u>\$164 000</u> | <u>\$337 000</u> |
| Total life cycle costs | <u>\$413 075</u> | <u>\$224 435</u> | <u>\$404 033</u> | <u>\$1 041 543</u> |

Source: ICAA (2003c, p. 72)

Two examples are as follows:

- *Material handling charges.* The reduction in the use of paint and solvents results in a substantial reduction in the costs of handling and storing the materials.
- *Waste handling and storage.* Less waste means less costs in handling toxic waste products.

Management may wish to include estimates of these costs in the financial analysis. A full cash flow analysis can then be prepared for the life of the asset, using evaluation tools such as net present value, internal rate of return or the payback period. This analysis would take into account the initial cost of the mixer, as well as the annual cost savings.

EXHIBIT 17.13

Financial benefits from the paint mixer replacement project at Dubbo Whitewoods

| Reductions in: | Material reductions | Annual savings |
|---|---------------------|------------------|
| Workers' compensation:* Reduced insurance premiums due to reduced employee exposure to hazardous materials | | \$10 000 |
| Paint use and waste: | | |
| Paint—purchase and freight inwards | 14 100 litres | 100 374 |
| Waste treatment, transport and disposal | | 14 387 |
| Emission investigations | 600 kg | 162 |
| Solvents and waste: | | |
| Solvents—purchase and freight | 35 000 litres | 58 710 |
| EPA charges | 1500 kg | 560 |
| Flush solvents: | | |
| Purchases | 10 000 litres | 10 687 |
| Emissions | 2000 kg | 130 |
| Total annual savings | | \$195 010 |

* Workers' compensation premiums are insurance premiums paid by the company to compensate employees if they suffer injuries during employment.

However, there are other intangible factors that need to be considered in this decision, which cannot enter into the formal financial analysis:

- *Benefits to the environment.* The reduction in toxic emissions and the dumping of waste paint may result in significant benefits to the environment. It may also lead to local residents developing a more positive attitude towards the plant.
- *Improved labour attitudes.* The elimination of dangerous jobs of cleaning up toxic wastes not only reduces workers' compensation insurance premiums, but may result in a positive impact for employees who no longer engage in risky and unpleasant tasks.

The final decision will involve considering these additional intangible factors alongside the results of the financial analysis. The final outcome may well rest on how much management values the benefits to the environment and to the community.

SUMMARY 17

In this chapter we have explained how environmental and social management accounting can be used by organisations. Key points include:

- Corporate social responsibility involves managers taking social and environmental factors into account when making decisions, and is regarded by some managers as a key to increasing profitability and long-term sustainability.
- Triple bottom line (TBL) reporting is a form of external reporting aimed at a range of stakeholders. TBL reports on financial, environmental and social performance.
- Environmental management accounting (EMA) focuses on material and energy flow information, environmental costs, and other related cost and physical information, which are identified, collected, estimated, analysed and reported for use by decision makers within an organisation.

- Recognising environmental and social impacts can provide a range of benefits for organisations, including:
 - the attraction and retention of highly skilled employees;
 - enhancement of the organisation’s reputation as a responsible and caring organisation;
 - identification of cost savings; and
 - reduction in the risk of current and future activities.
- However, environmental and social impacts can be difficult to recognise because:
 - future ecological and social issues are not yet known;
 - many costs and benefits occur outside of the organisation; and
 - many costs and benefits are difficult to measure in financial terms.
- Environmental costs are the costs that an organisation incurs to prevent, monitor and report environmental impacts. They can also include the costs an organisation incurs when it does not comply with environmental regulations. These costs may extend well into the future.
- The five tiers of environmental costs include:
 - conventional costs;
 - hidden costs;
 - contingent costs;
 - relationship and image costs; and
 - societal costs.
- Environmental costs can be used in a variety of management decisions. One form of analysis is to classify costs as prevention, appraisal, internal failure and external failure costs.
- EMA techniques can improve a range of management decisions, where both cost performance is enhanced and environmental benefits are achieved.
- Environmental and social costs can be used in managing the supply chain. Suppliers’ performance can be assessed in terms of their ability to deliver responsible environmental and social performance. Organisations can work with customers to enhance environmental outcomes for both parties.
- Performance measurement systems can include social and environmental indicators, sometimes as part of balanced scorecard.
- Social audits are used by some organisations to measure and report the extent to which they have operated in accordance with their stated shared values and objectives.
- Environmental and social factors can be taken into account in capital investment decisions to assess a broader set of inputs into the proposal, as well as outcomes.

KEY TERMS

| | | | |
|---|-----|--|-----|
| corporate social responsibility | 806 | environmentally-induced revenues (or benefits) | 810 |
| eco-efficiency measures | 825 | financially-oriented EMA | 810 |
| eco-intensity measures | 825 | management performance indicators | 824 |
| environmental condition indicators | 824 | operational performance indicators | 824 |
| environmental costs | 810 | physically-oriented EMA | 811 |
| environmental management accounting (EMA) | 807 | private costs | 815 |
| environmental management systems (EMS) | 811 | social auditing | 828 |
| environmental performance | 807 | social performance | 806 |
| environmental product costing | 810 | triple bottom line (TBL) report | 806 |
| environmentally-induced capital expenditure | 810 | | |

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E-STUDENT



International articles related to accounting are available at the Online Learning Centre at www.mhhe.com/au/langfield4e.



There are approximately 30 interactive questions on environmental and social management accounting waiting online at www.mhhe.com/au/langfield4e. The questions are written with additional feedback for incorrect answers, and text excerpts with page references for follow-up study.

SELF STUDY

17

SELF-STUDY PROBLEM 1: SOCIAL AND ENVIRONMENTAL COSTS

Coburg Casual Coffee has made an evaluation of the social and environmental costs of its coffee roasting facility. The total cost of running the roasting facility is \$987 654, including \$689 001 for the cost of unroasted beans and environmental costs of \$91 173, as shown overleaf.




SELF STUDY

| | |
|---|------------------------|
| Depreciation of oven fume extractor system | \$4 325 |
| Employee training costs to reduce environmental accidents | 5 600 |
| Monitoring system to detect fumes | 4 891 |
| Fine from Victorian EPA for dumping coffee grounds into the sewer | 5 691 |
| Inspection of drainage systems to detect problems with discharge | 1 241 |
| Reduction in value of nearby houses due to odour | 53 651 |
| Routine cleaning of extractor system to remove coffee residues | 2 561 |
| Disposal of waste coffee grounds | 5 652 |
| Medical costs relating to employees' inhalation of fumes | 7 561 |
| Total | <u>\$91 173</u> |

Required:

- 1 Identify the social costs that relate to the operation. Is there a link here between social costs and environmental costs?
- 2 Prepare an environmental cost analysis of the existing cost of \$91 173, highlighting appraisal, prevention and failure costs.

Solution to Self-study problem 1

- 1 The reduction in value of nearby houses is a social cost, as is the medical cost of employees who have inhaled fumes. In the first case, the real cost is the reduction in the quality of the residents' lifestyle, but the reduction in value of the houses emphasises the potential financial loss that could be realised if the houses were sold. There is a link between social and environmental costs. The medical cost of treating employees who have inhaled fumes will be classified as an environmental cost (internal failure cost). However, it also has social impact, as it affects the health of employees.
- 2 Environmental cost analysis

| | | |
|---|--------------|------------------------|
| Prevention: | | |
| Depreciation of oven fume extractor system | \$4 325 | |
| Employee training costs to reduce environmental accidents | 5 600 | |
| Routine cleaning of extractor system to remove coffee residues | <u>2 561</u> | |
| | | \$12 486 |
| Appraisal: | | |
| Monitoring system to detect fumes | \$4 891 | |
| Inspection of drainage systems to detect problems with discharge | <u>1 241</u> | |
| | | 6 132 |
| Internal failure: | | |
| Disposal of waste coffee grounds | \$5 652 | |
| Medical costs relating to employees' inhalation of fumes | <u>7 561</u> | |
| | | 13 213 |
| External failure: | | |
| Fine from Victorian EPA for dumping coffee grounds into the sewer | \$5 691 | <u>5 691</u> |
| Total | | <u>\$37 522</u> |

In this example, the reduction in the value of nearby houses has not been included as an environmental cost, as it does not reflect a cost incurred by the company. However, some companies may choose to include this. At this stage most of the cost relates to prevention activities. This is not necessarily a problem as these activities may help to reduce failure costs. Internal failure costs are also high, accounting for 35 per cent of the total environmental costs. Management may need

to consider if there are any preventive activities that could be undertaken to minimise the need to dispose of waste coffee grounds. There may also be ways of preventing future problems with fume inhalation. Appraisal activities may need to be improved to prevent future failure costs.

SELF-STUDY PROBLEM 2: ENVIRONMENTAL COST ANALYSIS

Girabandi Foundry operates two plants, one at Bankstown in Sydney and the other at Newcastle. There has been a reduction in demand for their products and it is not viable to operate both plants. Management need to decide which of the two plants it will continue to operate in the coming year.

A preliminary investigation shows that the Bankstown plant is able to process material at a faster rate than the Newcastle plant. However, this is because of an inefficient heating process. Transport costs are cheaper at Bankstown as it is located closer to the major suppliers. The following information relates to the two plants for the past year:

| | Bankstown | Newcastle |
|---|-------------|-----------|
| Material cost per kg of cast metal | \$3.50 | \$3.15 |
| Other variable operating costs per kg of cast metal | \$12.50 | \$7.50 |
| Fixed cost of the plant per annum | \$375 000 | \$195 000 |
| Net cost of closing the plant | \$1 100 000 | \$800 000 |
| Transport costs inward per kg (including in operating variable costs) | \$0.15 | \$0.38 |
| Lost days due to injury per annum | 56 | 21 |
| Number of employees | 56 | 39 |
| Emissions per annum | 60 tonnes | 45 tonnes |
| Waste disposal sent to landfill (per kg of cast metal) | 15 kg | 10 kg |

Currently, both plants process 150 tonnes of castings per annum, and both plants have operating equipment that can be used for another five years with no residual value.

Required:

- 1 Calculate the annual running cost of the two plants and evaluate which of the two plants seems more efficient.
- 2 What social and environmental factors might you also consider in assessing which plant should be retained?
- 3 What would you recommend?

Solution to Self study problem 2

- 1 Financial comparison of the two plants.

| | Bankstown | Newcastle |
|---|--------------------|--------------------|
| Material cost: | | |
| (\$3.50 per kg × 150 tonnes × 1000) | \$525 000 | |
| (\$3.15 per kg × 150 tonnes × 1000) | | \$472 500 |
| Other variable costs: | | |
| (\$12.50 per kg × 150 tonnes × 1000) | 1 875 000 | |
| (\$7.50 per kg × 150 tonnes × 1000) | | 1 125 000 |
| Fixed overhead | <u>1 375 000</u> | <u>1 195 000</u> |
| Total production costs | <u>\$3 775 000</u> | <u>\$2 792 500</u> |
| Production cost per tonne | \$25.17 | \$18.62 |
| Transport costs inward per kg (including in operating variable costs) | \$0.15 | \$0.38 |
| Net cost of closing the plant | \$1 100 000 | \$800 000 |




SELF STUDY

The Newcastle plant appears to be the most efficient plant, with an average production cost per tonne of \$18.62 compared to the Bankstown cost of \$25.17. This is despite the cost of transport being higher at Newcastle. It would cost more to close the plant and terminate employees if the Bankstown plant were closed, but this is a one-off cost. Overall, on financial grounds the Newcastle plant seems the more attractive option.

- 2 While the Newcastle plant is the more attractive on financial grounds, there are other issues that the company may need to take into account:
 - Lost days due to injuries at the Bankstown plant average 1 per employee, compared to 0.538 per employee at the Newcastle plant.
 - Suppliers need to travel further if the Bankstown plant is closed and this entails more greenhouse emissions, which is harmful for the environment.
 - The Bankstown plant is more inefficient in its energy use, which is more harmful for the environment compared to the Newcastle plant.
 - The Bankstown plant disposes of more waste in landfill compared to the Newcastle plant.
 - The company may also consider the impact on employees and their families of closing the Bankstown plant, and any financial hardships that this may cause.
- 3 Overall, the Newcastle plant is still the most attractive option. It is not only more cost effective, it is more efficient in the waste that it produces, in its emissions and in employee injuries. The transport cost is higher at Newcastle, and this also has undesirable environmental impacts. The company may want to consider if it can change to more locally-based suppliers.


CYBER
SEARCH

- 1 Find the triple bottom line report of at least one Australian organisation. How might this report contribute to improving the environmental and social management practices of the organisation?
- 2 Find the web site for the Victorian Government Environmental Protection Agency (EPA), and find the page on business sustainability. Here you will find case studies of organisations that practise environmental management. Select one of these case studies and outline how management accounting might assist in achieving the environmental goals of the organisation.
- 3 Locate The Body Shop Australia web site, and find the company's latest Social Audit Report and Environmental Report. Review the results and consider how management might use these reports to improve The Body Shop's performance in these areas of social responsibility.

For a list of useful web sites to help you with these exercises visit the Online Learning Centre at www.mhhe.com/au/langfield4e



QUESTIONS

- 17.1** Explain the meaning of *corporate social responsibility* and why some managers may wish to adopt this approach.
- 17.2** Define the term *triple bottom line reporting*. Explain some of the benefits that may arise to companies that provide these reports to stakeholders.
- 17.3** Explain the meaning of *environmental management accounting* and describe some of the techniques that are used.
- 17.4** What is an *environmental management system*? How does it relate to *environmental management accounting*?
- 17.5** Outline the major benefits that may arise from recognising, managing and reporting environmental and social impacts.
- 17.6** Explain why it is difficult to recognise and measure environmental and social impacts.
- 17.7** Explain why managers might wish to recognise Tier 4 and Tier 5 environmental costs, which are external to the organisation?
- 17.8** Provide an example of a cost for each tier of the five tiers of environment costs.
- 17.9** List five social and environmental costs that may not be easy to find in the management accounting system.
- 17.10** Explain how social and environmental cost information may change management decision making. Provide two examples.
- 17.11** Provide an example of how a firm might reduce environmental cost by increasing the cost and time involved in product design.
- 17.12** Review the criteria listed in Exhibit 17.8 that may be used to evaluate supplier performance. Which criteria could you:
 (a) quantify in financial terms
 (b) quantify in non-financial terms
 (c) treat only as a qualitative factor?
- 17.13** Outline the major types of performance indicators that may be used under ISO 14031. Provide two examples of each type.
- 17.14** How can the balanced scorecard be adapted to take into account social and environmental issues?
- 17.15** Discuss how the capital expenditure evaluation process can take account of social and environmental costs.
- 17.16** What measurement issues may arise for a hospital that is interested in measuring and reporting social performance?
- 17.17** List five different social costs that may exist in an after-school childcare centre.
- 17.18** An organisation is looking at a new location for its warehouse. What environmental costs might it consider and how could they be measured?
- 17.19** Provide three examples of approaches to addressing social and environmental factors that may:
 (a) increase financial costs, and (b) decrease financial costs.
- 17.20** Provide an example of a social and environmental impact that, if reduced, could also reduce costs for:
 (a) a local government council
 (b) a motor vehicle repairer
 (c) a university
- 17.21** Give two examples of how an organisation might reduce the cost of its services or products by increasing social and/or environmental costs.
- 17.22** Give two examples of how an organisation might increase the cost of its services or products by increasing social and/or environmental costs.

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EXERCISES

E17.23 Decision making; considering social and environmental factors: manufacturer

Livingstone Bikes is looking at two alternatives for disposing of an annual production of 287 kilolitres of waste paint, both of which are acceptable to the Victorian Environment Protection Authority.

- Livingstone can pay paint recyclers to remove the waste paint at a cost of \$52.70 per kilolitre. The recycler would then process the waste into 5 kg of solid waste compound per kilolitre and dispose of this in landfill.
- Rent a recycling machine which strips the residues and produces 10 kg per kilolitre of waste compound, which then needs to be disposed of in landfill. The annual rent of the machine is \$12 500 and the operating cost is \$0.21 per kilolitre.

Required:

- 1 Which alternative is superior on financial grounds?
- 2 List five social and environmental factors that Livingstone may need to consider before selecting an alternative.

E17.24 Cost analysis: winery

Margaret River Winery has developed the following analysis of its environmental costs and revenues for the last financial year:

| | |
|---|-------------------------|
| Employee training costs to improve the management of effluent disposal | \$5 600 |
| Scrap value of broken bottles | (12 561) |
| Cleaning of exhaust fans | 4 891 |
| Fine for minor leakage of untreated waste into the Margaret River | 12 569 |
| Inspection of drainage systems | 15 421 |
| Restoring land where wastes were dumped in the 1980s | 16 986 |
| Study tour to the Barossa Valley to select new equipment to reduce wastes | 4 769 |
| Developing air pollution monitoring systems | 14 897 |
| Lost sales due to poor environmental reputation | 3 787 |
| Workers' compensation claim due to poor environmental practices | 5 652 |
| Obtaining ISO 14001 certification | 67 908 |
| Total | <u>\$139 919</u> |

Total costs for the plant were \$1 309 670 per annum.

Required:

- 1 Prepare an environmental cost report showing appraisal, prevention and internal and external failure costs.
- 2 Use this cost report to recommend what the winery might do to improve its environmental performance.

E17.25 Life cycle costing: orchard

Renmark Orchards and Cannery is considering buying high pressure cleaning equipment that vacuums waste liquids into a storage tank and then purifies the waste. The waste water can then be pumped back onto orchards. The system will avoid any leakage of liquid waste into the Murray River, which has happened once every two years, and will avoid the related workers' compensation claims that have arisen every five years. The operating characteristics are as follows:

| | |
|---|---------------|
| Initial outlay for new equipment, 10 year life, no residual value | \$489 345 |
| Annual operating cost over 10 year life | \$15 904 p.a. |
| Depreciation | 10% p.a. |
| Savings in water cost due to reclaimed water | \$15 987 p.a. |
| Total cost of cleaning and maintaining the system every 4 years | \$14 900 |
| Workers' compensation claim | \$5 500 |

Required:

- 1 Prepare a summary of the total costs for the waste cleaning system for the next 10 years.
- 2 Should Renmark Orchards invest in this equipment even if it is uneconomic?

E17.26 Costing for decisions: refinery

An aluminium refinery in Gladstone is planning to implement an environmental management project. The project is to purchase new equipment that will lower operating costs and reduce emissions from the factory, which are currently spread over nearby residential districts.

| | Additional costs | Cost savings | Reduction in emissions (tonnes of airborne particles) |
|----------------|------------------|--------------|---|
| Initial outlay | \$289 000 | | |
| Year 1 | 145 500 | \$20 500 | 50 |
| Year 2 | 130 000 | 20 500 | 50 |
| Year 3 | 125 000 | 20 500 | 50 |
| Year 4 | 125 000 | 20 500 | 50 |
| Year 5 | 125 000 | 20 500 | 50 |

It is estimated that each tonne of emissions currently causes health costs that average \$1 per annum for each of Gladstone's 50 000 residents.

Required:

- 1 Calculate the net financial cost to the refinery of investing in the new equipment.
- 2 Calculate the financial cost or benefit to the community over the five years.
- 3 What other information might you need to gather in order to undertake a more comprehensive analysis of the project?

E17.27 Selecting a supplier: milk producer

Cunnamulla Custards is looking for a new supplier of milk. It needs approximately 2 000 000 litres per annum. The following data have been collected for each supplier:

| | Dalby Dairies | Longreach Lite | Hughenden Herefords | Charleville Cows |
|--|---------------|----------------|---------------------|------------------|
| Transport distance (km) | 427 | 379 | 705 | 199 |
| Transport costs per litre | \$0.03 | \$0.025 | \$0.05 | \$0.01 |
| Pesticide (litres) used per kilolitre of milk produced | 15 | 0 | 5 | 0 |
| Milk quality rating | AA | B | A | B |
| Milk purchase cost per litre | \$0.41 | \$0.39 | \$0.41 | \$0.38 |
| Percentage of product rejected on delivery | 1 | 5 | 0.5 | 2 |
| Antibiotic used per cow (ml per month) | 50 | 0 | 10 | 15 |

Required:

- 1 Analyse the above financial information to decide which supplier Cunnamulla might use.
- 2 Consider the other information supplied, and make your overall recommendation.

E17.28 Classifying costs for environmental reporting

Classify each of the following environmental costs as relating to prevention, appraisal, internal failure, and external failure costs:

- 1 Medical costs of employees injured by chemical leakage.
- 2 Increased workers' compensation insurance following chemical leakage.
- 3 Decreased sales due to loss of reputation as an environmentally-responsible company.
- 4 Cost of new waste monitoring system.
- 5 Cost of new environmental reporting systems.
- 6 Depreciation of waste emission system.
- 7 Fines for violation of waste disposal laws.
- 8 Cost of attaining ISO 14001 certification.

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- 9 Cost of audit of EMS systems.
- 10 Cost of testing waste disposal systems.
- 11 Cost of environmental training programs for staff.
- 12 Salary of the environmental quality manager.
- 13 Engineering costs to solve environmental problems detected during process inspection.
- 14 Lost time to correct environmental emission problem.
- 15 Legal costs associated with land contamination.
- 16 Cost of restoring contaminated land and water.

E17.29 Environmental cost report: manufacturer

The following costs were incurred by Grouse Plating Company during June:

- Operating cost of waste reprocessing, \$15 700.
- Repairs to faulty waste management equipment, \$15 000.
- Cost of retraining employees in new waste management processes, \$900.
- Cost of disposing of chemicals in landfill, \$34 900.
- Cost of processing chemicals ready for landfill recycling, \$28 000.
- Legal fees related to chemical spill during transport to landfill, \$22 900.
- Cost of independent environmental audit, \$23 700.
- Cost to achieve ISO 14001 certification, \$34 300.
- Cost of protective clothing for employees, \$16 200.

Required:

- 1 Prepare an environmental cost report highlighting prevention, appraisal internal failure and external failure costs.
- 2 Comment on the implications of the relative proportions of each of the four categories of environmental costs.

E17.30 Performance measurement: community organisation

Meals on Wheels provides daytime meals for senior citizens and disadvantaged people in their homes. It is developing a performance measurement system to monitor the performance of each branch across Australia.

Required:

- 1 Identify five performance indicators that Meals on Wheels might use to reflect its social and financial goals.
- 2 Discuss any difficulties that Meals on Wheels might experience in gathering data to measure these indicators.

E17.31 Performance measurement: hotel

Return to the Woolloomooloo Sands Hotel problem in P12.40. For each department, provide two different examples of performance measures that could be used to monitor social or environmental factors.

E17.32 ISO 14031: manufacturer

Penrith Parts manufactures components for the European auto industry and needs to be compliant with ISO 14031. Oriana Davies has been hired by the CEO to develop a system of performance measures. So far, she has found that the company uses the following measures:

| | |
|---|-------------------------|
| Staff occupational health and safety training | 487 hours |
| Air pollution in Penrith district | 25 ppm |
| Energy consumption | 1278.5 kwh |
| Waste dumped in landfill | 4.8 tonnes |
| Management audits of the casting plant | 3 per annum |
| Supplier audits of environmental practices | 2% per annum |
| Production volume | 2800 tonnes of castings |
| Staff environmental training | 57 hours |

Required:

- Assist Oriana by separating the measures into the following three categories and presenting them in an appropriate report format:
 - operational performance indicators
 - management performance indicators
 - environmental condition indicators
- Suggest some further measures that could be added to improve the performance measurement system.

E17.33 Balanced scorecard: airline industry

The Environmental Guidelines of Lufthansa Airlines state:

Environmental protection is a high priority goal—Protecting the environment is an expression of corporate responsibility. We aim for constant improvement—We adhere to environmental regulation. However, we want to do more: we employ the best available technology within the limits of our economic possibilities to continuously reduce the negative impact of our activities on the environment.

The Lufthansa balanced scorecard has the following perspectives and performance measures:

Shareholders:

- Profitability
- DCF yield
- Sales growth

Customers:

- Customer loyalty
- Quality image
- Global presence

Employees:

- Employee engagement
- Management qualities
- Service culture

Required:

- Explain why Lufthansa might not have included measures that address its environmental goals in the scorecard?
- Suggest some measures that Lufthansa might include if it were to have a fourth perspective for social and environmental performance.

PROBLEMS**P17.34 Analysis of environment costs: local government**

Brisbane Council is looking at buying two new minibuses for transporting senior citizens to the Gold Coast and other areas. A bus is expected to travel 250 000 kilometres per annum, and will last 3 years, with zero disposal value. There are three types of buses that look attractive: a conventional petrol engine that can be converted to LPG, a petrol electric (battery) model, and a diesel bus. The operating information for each bus is below:

| | Petrol/LPG | Petrol Electric Model | Diesel |
|----------------------------|---|-----------------------|----------------------|
| CO ₂ emissions | 290 gms per km | 15 gms per km | 250 gms per km |
| Purchase price | \$175 000 | \$295 000 | \$195 000 |
| Maintenance costs per km | \$0.46 | \$0.56 | \$0.89 |
| Fuel consumption | 35 litres per 100 km on petrol 15 litres per 100 km on LPG | 10 litres per 100 km | 15 litres per 100 km |
| Fuel price | \$1.05/0.45 | \$1.05* | \$1.10 |
| Life of the engine | 400 000 km | 450 000 km | 1 000 000 km |
| Cost of replacement engine | \$14 000 | \$19 000 | \$35 000 |

* Cost of petrol. Assume that fuel costs for electric power are insignificant.

Required:

- Consider which of the three buses is the more attractive option on financial grounds. State clearly any assumptions that you need to make.
- Repeat the analysis again, but only taking into account the environmental criteria.
- Write a recommendation to council outlining which bus it should purchase.

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P17.35 Analysis of social and environmental costs: manufacturer

Rockhampton Sofa Company is thinking of setting up a plant in Chengdu, China. Operating data for Rockhampton and Chengdu are as follows:

| | Rockhampton | Chengdu |
|--|---------------------|--------------------|
| Material per sofa | \$103 | \$79 |
| Labour time per sofa | 30 mins | 90 mins |
| Labour cost per hour | \$24.00 | \$1.10 |
| Waste per sofa | 15 kg | 35 kg |
| Effective working weeks per annum per employee | 40 | 49 |
| Fixed manufacturing cost | \$100 000 per annum | \$50 000 per annum |
| Delivery time | 7 days | 27 days |

If the Chengdu plant is opened, then the Rockhampton plant will be closed. If the Rockhampton plant is closed the workers will almost certainly be unemployed. There is consternation in the local community about the closure, especially among older workers. The plant appears to have few airborne pollutants and does not contaminate waterways and sewers.

Required:

- 1 Rank the alternatives using financial data only.
- 2 Rank the alternatives using only social and environmental data.
- 3 Write a recommendation to the board outlining the issues it should consider when making this decision.

P17.36 Life cycle costs: manufacturer

Fischer Chemicals in Williamstown wants to purchase cooling systems for its new materials handling equipment in the warehouse. The warehouse is located near a residential district so management wants to ensure that there is minimal disruption to local residents. There are three different systems currently on the market.

| | System 1—water cooled | System 2—aircooled | System 3—refrigerant |
|------------------------|-----------------------------|-------------------------|--------------------------|
| Initial outlay | \$275 000 | \$465 000 | \$685 150 |
| Cost of coolant p.a. | \$115 000 | 0 | \$4 000 |
| Maintenance costs p.a. | \$45 000 | \$35 000 | \$17 500 |
| Energy costs p.a. | \$47 500 | \$37 500 | \$26 000 |
| Waste p.a. | 230 000 kilolitres of water | – | 50 litres of refrigerant |
| Major refurbishment | \$35 000 every 5 years | \$20 000 every 10 years | \$40 000 every 5 years |
| Sound tiers | 95 db* | 75 db | 55 db |

* db = decibels.

Required:

- 1 Prepare a life cycle analysis over the next 10 years for the three systems, taking into account all of the above costs. (If you have studied Chapter 21, calculate the NPV using a 10 per cent discount rate.)
- 2 Prepare a recommendation to the board as to which system it should adopt.

P17.37 Environmental cost analysis: manufacturer

Darvall Paint Ltd produces industrial paint. Senior management has recently expressed concern at the waste management systems that are currently used at its Launceston plant. During the last year, the plant was prosecuted for excessive chemical emissions as well as for leakage of wastewater into the local bay.

The financial controller, the plant manager and other members of the management team have met to discuss these issues. While there are already some environmental systems in place, the management team knows that there must be areas where performance can be improved. At the end of last year, the plant took its first step in improving environmental practices: new environmental

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monitoring systems were implemented, upgrades were made to production equipment, and employees were trained in responsible environmental practices. The next stage is to implement an ongoing reporting system to help monitor environmental costs. The financial controller has isolated the environmental costs for the last financial year. These are as follows:

| | |
|---|----------|
| Depreciation of plant fume extractor system | \$54 300 |
| Employee training costs to reduce environmental accidents | 15 800 |
| Depreciation on new monitoring systems to detect fumes | 24 800 |
| Cost of upgrading of production systems to reduce waste | 38 000 |
| Fine for dumping waste into the waterways | 45 691 |
| Inspection of drainage systems to detect problems with discharge | 32 500 |
| Fine for excessive emissions | 60 000 |
| Cost of legally dumping chemical waste in landfill | 25 000 |
| Routine cleaning of extractor system | 2 561 |
| Inspection of waste water monitoring systems | 12 000 |
| Medical costs relating to employees' inhalation of chemical fumes | 9 000 |
| Investigation of waste water leakage problem | 25 000 |

Required:

- 1 Prepare an environmental cost report highlighting appraisal, prevention, internal failure and external failure costs for the past year.
- 2 Explain the benefits that may arise for the Launceston plant if it analyses environmental costs in this manner.
- 3 Use the environmental cost report to recommend areas for improvement.
- 4 Explain how the company might take account of social costs in this analysis.

P17.38 Environmental cost analysis: manufacturer

Western Dairies has four plants south of Perth. The environmental cost reports show the following information:

| Plant | Prevention | Appraisal | Internal failure | External failure | Total |
|--------------------|------------------|------------------|------------------|------------------|------------------|
| Manjimup | \$21 000 | \$29 000 | \$150 000 | \$40 000 | \$240 000 |
| Donnybrook | 12 000 | 38 000 | 17 000 | 17 000 | 84 000 |
| Busselton | 132 000 | 62 000 | 44 000 | 8 000 | 246 000 |
| Boscobel | 1 000 | 3 000 | 6 000 | 40 000 | 50 000 |
| Total costs | <u>\$166 000</u> | <u>\$132 000</u> | <u>\$217 000</u> | <u>\$105 000</u> | <u>\$620 000</u> |

Managers in all four plants have been instructed by the head office in Perth to try to cut the wastage of milk. Wastage occurs when refrigeration fails, and where there are delays in milk collection and transport. In the past, spoilt milk was poured into open pits, but head office managers no longer believe that this is an acceptable arrangement.

The Boscobel and Manjimup plants are the oldest plants, and they both drain waste milk into a septic system. There is no control over airborne pollutants that result from this practice. The Busselton plant has purchased a system where all wastes are reprocessed, and the final waste can be used as fertiliser on vineyards. The system relies on careful monitoring of waste levels. The manager of Donnybrook monitors the waste levels in a closed vat, and waits until complete biological breakdown occurs before piping the waste onto local apple orchards.

Required:

- 1 Which plant appears to be an environmental leader? Be specific in any assumptions that you need to make.
- 2 Which plant appears to be the worst performing from an environmental viewpoint? What could be done to improve this performance?
- 3 A Perth share analyst wishes to invest in companies that are environmentally friendly. Would you recommend Western Dairies?

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P17.39 Balanced scorecard; triple bottom line reporting; travel company

In Chapter 14 you may have studied Problem 14.34. This problem referred to Clean Living Ltd, a travel company that specialises in ‘green tours’ (package tours to environmentally-sensitive destinations). Review this problem now.

Clean Living’s objectives, based on the structure of its balanced scorecard, were as follows:

| Perspectives | Objectives |
|-----------------------------|---|
| Financial | Increase net profit Improve cash flow |
| Customer | Increase market share Improve customer satisfaction |
| Internal business processes | Improve office cost effectiveness Develop innovative tours |
| Learning and growth | Improve environmental knowledge of employees |

Clean Living has now been taken over by Invertors, which is a market leader in the provision of environmentally-focused tours. The CEO of Invertors, Barry Forest, is intrigued by the balanced scorecard that has been used by Clean Living—he has never come across this idea before. However, he is concerned that the focus of the scorecard promotes economic performance, and pays only token attention to the environmental dimension. Invertors focuses on the social responsibility aspects of the company’s performance, which are an important part of its mission. Forest believes that his company should ‘walk the talk’ in all aspects of its operations, not just in the products that it provides.

Required:

- 1 Consider the structure of the balanced scorecard that has been used by Clean Living, and explain to Forest how it may be modified to take into account his concerns.
- 2 Be creative—use your imagination to add an environmental and social flavour to the balanced scorecard. Identify the dimensions, objectives and some possible lead and lag indicators. State clearly any assumptions that you need to make.

CASES

C17.40 Social auditing; environmental issues; ethics: manufacturer⁷

Erica Hopkins has recently joined the staff of a chemicals factory located in Newcastle, New South Wales. She is employed as an internal auditor.

Erica is a well-respected and experienced accountant who also has a strong interest in ‘green’ issues. She is an active member of Friends of the Earth. For the last six years she has been living with Geoffrey Benn, a mining engineer. Geoffrey shares her concerns about the environment and is much engaged with promoting a more responsible attitude towards mining and mining communities. This has brought him into many conflicts with mine managers and colleagues over values.

Until now, Erica has been able to keep her professional work and her personal interests separate, but she is no longer able to do so. From her internal audit she has discovered that the factory is very wasteful of energy resources and is inefficient in its use of equipment and investment funds. Particularly serious is the plant’s practice of depositing untreated toxic waste into a river, for which Erica believes it could incur a \$50 million fine.

Senior management inform her that, as an internal auditor, she has no right to criticise how they operate the business. They stress that running the business is difficult enough, given the competition from overseas companies. They remind her that they are employing 2000 staff, and they do not wish to put their own positions or the jobs of their employees in jeopardy. There is already a high level of unemployment in the region.

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Erica counters that if they ran their plant more efficiently they could save money, which could then be invested in treating the toxic waste. She also warns them that they might have to face a substantial fine for dumping the toxic waste. The managers disagree. They consider that she does not have the scientific or technological background to qualify her to judge the matter. Moreover, as managers, it is they who have to assess the risks involved, not the internal auditor.

George Holt, the financial director of the chemical factory, supports Erica privately but has made it clear that he will not do so openly. 'It is more than my job is worth,' he states emphatically.

Erica tries to appeal to George's sense of social responsibility: 'What about the health of the people in this area and the irreversible damage to the environment? What about the legacy to future generations we shall be leaving if activities like this are allowed to continue?', Erica argues.

George remains unimpressed. 'What have future generations done for me?' he snaps. 'I owe a duty of loyalty to this firm, my colleagues and the shareholders. If I blow the whistle now this plant will be seriously harmed and will either go out of business or be closed down.'

Erica is very unhappy about what she has found out. She decides to discuss her problem with Brian Henderson, a professional accountant friend. Brian advises her to keep strictly to the accustomed role of auditing the books and not to be concerned with the other issues, such as harm to public health and the environment and the efficient use of energy resources and investment.

His advice is:

Erica, I really do not believe your role as an internal auditor is to engage in a social audit of firms. Your training and expertise is in financial auditing, and you should leave to others the question of social auditing. You will invite criticism of accountants if you go off half-cocked on this one and stir up trouble on matters that are not concerned with the traditional role of internal auditors. My advice is to keep your professional and your private concerns separate. I realise that you have a deep-felt concern for the environment and you wish to try to prevent harm being done to our beautiful country. I respect this in you, and I support you personally and privately in what you are doing as an active member of the Friends of the Earth.

Erica is in a dilemma and does not know where to turn for further professional and personal help.

Required:

- 1 What are the ethical issues expressed in this case? (You may need to revisit Chapter 1.)
- 2 Do you agree with Brian's advice?
- 3 Are there any ethical justifications for Erica, and other accountants who are similarly placed, to adopt a stand on 'green' issues in particular, and social auditing in general?
- 4 What are the likely implications for all concerned if Erica leaks information to the media on the chemical plant?
- 5 How should the management of the chemical factory handle Erica's complaints?
- 6 To whom could Erica turn for professional and personal help?

C17.41 Analysis of information for decisions: manufacturer

Parks Spice Company is considering making dramatic changes to the company. It currently has production facilities in Wollongong, New South Wales, as well as in South East Asia. The CEO, Jayne Mitchell, is concerned about several issues currently facing the company and she would like to solve these in a socially- and environmentally-sound way.

First, the major supplies of spices are imported from the small countries of Vendor and Celadon. In both countries toxic chemical sprays are used on plantations, and these sprays have a long life. The spice processors in both countries pay their employees only A\$3 per hour. The employees work long hours and breathe in chemical fumes, which over time may burn the lungs. Jayne is considering setting up a factory for preliminary processing of spices in Vendor. Finance manager, Cedric Blanche, believes that setting up this factory is a good

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idea, as the setup costs will be only A\$1.2 million. The current cost of processing spices at Wollongong is \$0.33 per kg but will fall to \$0.11 per kilogram if pre-processing is undertaken in Vendor. The Wollongong figure is based on the following costs:

| | | Cost per kg |
|--------------------------|---|----------------------|
| Direct labour | \$19 per hour to process 126 kg | \$0.1508 |
| Variable overhead | \$5 per hour to process 126 kg | 0.0397 |
| Fixed overhead | \$145 000 per annum to produce 1 039 427 kg | 0.1395 |
| Total cost per kg | | <u>\$0.33</u> |

Geoff Tureen, the production manager, believes that the quality of the final spice products will not reduce if the pre-processing is undertaken off shore.

Second, although the Wollongong plant currently meets the required environmental emissions standards, it has been prosecuted in the past for several violations of air pollution standards, and neighbours still complain about the smell. An improved filtering system would cost \$290 000 to purchase and \$17 500 per annum to run. Cedric believes there would be no financial benefits in improving the air quality since the facility meets government standards. He does not think that the new system should be purchased. The quality manager, Ravi Nath, disagrees and believes that the improvements would enhance the company's reputation and reduce discolouration of the buildings. The local newspaper has twice run stories that were critical of Parks Spice. A recent story suggested that they were also water polluters, an assertion that the company claims is untrue. No contaminated water is released into the waterways; it is all evaporated using recycling ponds and a septic system.

The third problem is continuing low employee morale at the Wollongong plant. The previous production manager came to the plant from the army, and ran the factory very smoothly and efficiently, but using a military style. This led to serious clashes with some of the production staff and 12 of these staff continue to be unhappy. Jayne has thought about offering these staff redundancies at a total cost of \$285 000. Another alternative is to engage an external consultant to act as a mediator between management and staff, to see if problems can be resolved and to help improve the morale. The approximate cost of the consultant would be \$43 000. Cedric is opposed to this as the performance indicator for staff in the company's social and environmental report is already satisfactory and is getting better every year. The money would therefore be wasted in trying to calm only 12 staff.

Required:

For each of the three problems outlined above:

- 1 Outline the financial, environmental and social issues that the company needs to take into account.
- 2 Highlight any further information that the company may need to gather before it can resolve these issues.

C17.42 Environmental performance indicators; triple bottom line reporting; insurance company

WealthWise Insurance has recently set up an internal information system to improve social and environmental practices within the company. The company has its head office in Brisbane and offices in all capital cities and every regional city with a population of more than 50 000 people. One of the underlying principles of the company is to be socially and environmentally responsible. This principle has been in place for many years, dating back to the firm's founder, Jeannette Dai, who felt that she would like to contribute to society rather than simply maximising profits.

The company is a major contributor to charities, particularly those that focus on the homeless and the poor. It actively promotes environmental management in all of the company operations. It sponsors a program that provides scholarship to disadvantaged students to allow them to attend university, and it is proud to offer employment in the company to long-term unemployed and the poor. Each year it publishes a triple bottom line report that summarises its achievements across each area of performance.

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Over time these activities have become a marketing strength of WealthWise. The social and environmental stance taken by the company has attracted many customers to the company. Listed on the Australian Stock Exchange in 2001, the company has also become a preferred stock of ethical and green investment funds.

The mission statement of WealthWise states that it will aim to:

- support employees in achieving their personal and career goals;
- act in a socially-responsible way when dealing with insurance clients and the general community; and
- promote a better social and physical environment for the world.

However, the current CEO, Sylvia Trott, thinks that the firm has become complacent and is resting on its past achievements. She is concerned that the firm has built up a reputation for good social and environmental practices but is not 'walking the talk'. There is some level of discontent among employees about the way that management treats staff, and this is impacting on employee satisfaction. There have also been negative reports in the media of its treatment of businesses in Phuket and Langkawi that were damaged in the December 2004 tsunami. The reports claim that the company has tried to minimise the amounts paid to these businesses by strictly applying clauses in the insurance contracts that cover earthquake damage but not flood damage.

In 2004, the company's net profit rose by 15 per cent to \$173 million on an asset base of \$1 235 million. This is the third consecutive year of increased profits. Earnings per share were 62 cents on a \$2 par value share, and the market value was \$5.40 per share. The board is concerned that WealthWise makes a loss on its insurance business, while its investments yield a strong return and are the main reason for the increase in profitability. Its investment portfolio includes shares in BHP Billiton, Visy, Qantas, Telstra and James Hardie Industries.

The board adopts a triple bottom line approach to viewing its performance and uses the following key performance indicators to assess company performance:

Financial:

- Net profit
- Gross insurance premiums
- Return on investment

Social indicators:

- Employee satisfaction ratings
- Percentage of women in the top three tiers of management
- Number of indigenous employees
- Customers' ethical ranking of sales staff
- Number of staff hired who were previously unemployed teenagers

Environmental indicators:

- Tonnes of paper recycled per annum
- Percentage reduction in electricity usage
- Litres of fuel per dollar of sales

Required:

- 1 Explain what is meant by triple bottom line reporting and why a publicly listed insurance company like WealthWise may adopt this approach.
- 2 Consider the list of key performance indicators used by WealthWise. Explain how these measures could be used to help achieve the mission.
- 3 Suggest alternative performance measures that could be included in the performance measurement system to assist WealthWise to achieve its mission.
- 4 Write a report address to the CEO explaining what steps she can take to encourage staff to behave in a socially- and environmentally-responsible way. Specifically, explain to her how the performance measurement system could be used in a balanced way to support the achievement of the company's goals.