THE BUSINESS OF WATER AND SUSTAINABLE DEVELOPMENT

THE 2002 JOHANNESBURG DECLARATION on Sustainable Development stated that: 'we agree to halve, by the year 2015, the proportion of people who are unable to reach or to afford safe drinking water and the proportion of people who do not have access to basic sanitation'.

Given the United Nations predicted growth in global population from 6.1 billion in 2000 to 7.2 billion by 2015, this commitment will pose formidable challenges. To meet it, by the end of just a decade and half, approximately 6.6 billion people will need to have access to safe drinking water supplies. This is more than the current population of the world, and involves not only maintaining existing levels of supply but also providing new or upgraded services to 1.7 billion people. The challenge for sanitation is equally daunting: 5.8 billion people will need to be serviced, including new access provision for 2.1 billion. Even if these ambitious targets are met, representing a major achievement for the global community, there will still be approximately 650 million people in the world without access to safe drinking water and 1.4 billion without sanitation.

What is clear from this is the magnitude of the problem facing the international community in terms of water supply and sanitation. Continuation of the status quo and the type of progress made during the 1990s will not permit the Johannesburg targets to be met. Instead it will be necessary to promote a combination of many different, new and innovative approaches, each of which will contribute towards the overall targets. These approaches must include technological advances that identify new sources and improve the quality of those already in use; managerial techniques that increase the efficiency and effectiveness of service delivery at both micro and macro scale; and fiscal approaches that take advantage of additional financial resources to make improvements affordable.

In the past each of these aspects was seen as primarily the responsibility of government, which supported research into technology, managed supply and disposal systems and provided the funds to pay for them. This view has changed — beginning in the 1980s and increasing in the 1990s with growing moves towards privatisation of many aspects of the water sector. Underpinning this has been a shift away from seeing water as a public good that is essential for life, with subsidised supply provided as part of an overall welfare system, to a more market-oriented approach where the state, although still responsible for maintaining universal access to water services, uses market forces to meet this aim.

The Business of Water and Sustainable Development aims to illustrate the range of approaches that will be necessary if the percentage of the global population having access to adequate and safe water and sanitation is to be increased in line with the brave assertions from the Johannesburg Summit. Some of the approaches will be large-scale 'Western-style' improvements involving the creation of new business models, their effectiveness assessed by traditional approaches of fiscal and social analysis. Such schemes may be instigated and partly funded by governments, but are increasingly turning to the private sector for money and expertise. In contrast, many smaller communities would be better served by following another path to improved water supply and sanitation. Because of their size, location or traditions they may achieve better results through the adoption of local small-scale solutions. Non-governmental organisations have been very active in this area, but to extend their operations many are seeking to adopt a more business-like model. All water supply and waste disposal agencies, large or small, need to support and encourage continued research into technological solutions that seek out better, more sustainable ways to use our increasingly scarce supplies of good-quality fresh water.

Greenleaf
PUBLISHING

www.greenleaf-publishing.com

THE BUSINESS OF
WATER AND SUSTAINABLE DEVELOPMENT

CHENOWETH and BIRD

EDITED BY
JONATHAN CHENOWETH and JULIET BIRD

THE BUSINESS OF WATER AND SUSTAINABLE DEVELOPMENT

- Bixio D., G. Parmentier, D. Rousseau, F. Verdonck, J. Meirhaen, P.A. Vanrolleghem and C. Thoeys (2001) 'Integrating Risk Analysis in the Design/Simulation of Activated Sludge Systems', in *Proceedings of the 74th WEF Annual Conference and Exposition (WEFTEC)*, 15-19 October 2001; Atlanta, USA.
- Cullen, A.C., and H.C. Frey (1999) *Probabilistic Techniques in Exposure Assessment: A Handbook for Dealing with Variability and Uncertainty in Models and Inputs* (New York: Plenum Press).
- Grum, M., and R.H. Aalderink (1999) 'Uncertainty in Return Period Analysis of Combined Sewer Overflow Effects Using Embedded Monte Carlo Simulations', *Water Science and Technology* 39, 4: 233-40.
- Henze, M., C.P.L. Grady Jr, W. Gujer, G.V.R. Marais and T. Matsuo (1987) *Activated Sludge Model No. 1* (Scientific and Technical Report 1; London: International Association on Water Quality [IAWQ]).
- NRC (National Research Council) (1998) *Issues in Potable Re-use: The Viability of Augmenting Drinking Water Supplies with Recycled Water* (Washington, DC: National Academy Press).
- Ossenbruggen, P.J., H. Spanjers and A. Klapwijk (1996) 'Assessment of a Two-step Nitrification Model for Activated Sludge', *Water Research* 30, 4: 939-53.
- Rousseau, D., F. Verdonck, O. Moerman, R. Carrette, C. Thoeys, J. Meirhaen and P.A. Vanrolleghem (2001) 'Development of a Risk Assessment Based Technique for Design/Retrofitting of WWTPs', *Water Science and Technology* 43, 7: 287-94.
- Schijven, J.F., and S.M. Hassanizadeh (2000) 'Removal of Viruses by Soil Passage: Overview of Modelling, Processes and Parameters', *Critical Review of Environmental Science and Technology* 30, 1: 49-127.
- Shuval, H., Y. Lampert and B. Fattal (1997) 'Development of a Risk Assessment Approach for Evaluating Waste-water Re-use Standards for Agriculture', *Water Science and Technology* 35, 11-12: 15-20.
- SVW (Studie Voor Water) (2002) *Health Risk by Re-use of Treated Waste-water: Final Report* (Confidential Study 4-7, 2002; Antwerp, Belgium: svw; in Dutch).
- US EPA (US Environmental Protection Agency) (1998) *Drinking Water Contaminant Candidate List: Federal Register Notice about the Contaminant Candidate List* (63 FR 10273; Washington, DC: US EPA, 2 March 1998).
- (2002) 'Integrated Risk Information System (RIS) Data Base Access', www.epa.gov/iris, accessed May 2002.
- WHO (World Health Organisation) (1989) *Health Guidelines for the Use of Waste-water in Agriculture and Aquaculture* (Geneva: WHO).
- (1996) *Guidelines for Drinking Water Quality. II. Health Criteria and Other Supporting Information* (Geneva: WHO, 2nd edn).

4

Environmental management with the balanced scorecard

A CASE STUDY OF THE BERLIN WATER COMPANY, GERMANY

Carl-Ulrich Gminder

Institute for Economy and the Environment, Switzerland

It is strategically important for a waterworks company to devote resources to the environment. The quality and availability of its main resource—water—is crucial for the successful and responsible business in the mid and long term. But waterworks are increasingly focused on short-term revenues: the private companies feel the pressure of shareholders; the public companies are squeezed by the financial crises in the public sector.

- How can positive environmental strategies be set and implemented taking these conditions into account?
- How can positive environmental strategies be translated into real substantive action and not just paid lip service?

These issues are examined in this case study about the Berlin Wasserbetriebe (hereafter referred to as the BWC [Berlin Water Company]). The BWC, which is the largest water supply and waste-water treatment company in Germany, serves 3.4 million people. It has a monopoly on the water supply and waste-water treatment business in its service area. In 1999, 49.9% of the company was sold to Vivendi and RWE (Rheinisch-Westfälische Elektrizitätswerke), but the remaining 50.1% is still state-owned. The partial privatisation brought tremendous changes in management and organisation. Strategic goals were implemented that focused only on the shareholders, the customers and the employees and not on societal needs and the environment. Indeed, environmental management was in danger of being entirely removed from the agenda. A new management tool, the balanced scorecard, was launched in order to translate these the new strategic priorities into action.

The case study¹ presented here shows how, as a result of a project involving the company's environmental manager and the University of St Gallen, the strategic importance of the environment was enhanced, primarily by integrating sustainability into the main management tool, the balanced scorecard. A sustainability balanced scorecard was first developed for the environmental department of the BWC; then, using this, as well as actively participating in the first rework cycle of the existing balanced scorecard of BWC, the environment was discussed and reintroduced as a strategic concern. A company-wide environmental goal was developed, introduced and translated into indicators and measures (see Gminder and Bergner 2002).

4.1 Using the balanced scorecard for managing sustainability

The concept of the balanced scorecard (BSC) was developed in the beginning of the 1990s by Kaplan and Norton (Kaplan and Norton 1996) in order to bridge the gap between strategic management and operational daily management. The BSC became successful because of its simple yet intelligent design, ease of communication and flexibility of application. It can be applied at the corporate, business unit, department or even employee level. Its potential for use as a management tool for corporate sustainability has been discussed for a number of years, and although the existing approaches primarily emphasise the financial aspects it has been found that the BSC approach can successfully integrate other sustainability aspects such as the societal and environmental (see Bieker *et al.* 2001; Epstein 1996; Epstein and Wisner 2001; Figge *et al.* 2002; Gminder and Bieker 2002; Hockerts 2001; Johnson 1998; Schaltegger and Dyllick 2002; SIGMA 2001; Zingales and Hockerts 2002).

4.1.1 What is the balanced scorecard?

The term 'balanced' refers to a balance between soft facts of organisational development and hard facts of finance, a balance between internal and external stakes and a balance of leading and lagging indicators. The BSC approach has two main components. One of these is a management tool that is built up from three aspects:

- Objectives
- Key performance indicators (KPIs) that measure progress in achieving the objectives (so-called leading indicators and strategic projects, such as the number of customer orders)
- KPIs that measure the results (so-called lagging indicators and targets, such as profit or turnover)

1 The study was carried out within the research project 'Sustainability Balanced Scorecard' (SBSC) of the Universities of St Gallen (Switzerland) and Lüneburg (Germany), funded by the German Ministry for Education and Research (BMBF).

The other part of the BSC is a management methodology for translating strategic goals into action and supporting the 'management by objectives' idea. The traditional BSC comprises four perspectives: financial, customer, process, and learning and development. The perspectives are established in order to manage the concerns of the shareholders, customers and employees and also to address aspects of business processes, finance and corporate development. Each organisational unit that applies the BSC can choose the number and naming of the perspectives. A recent development is the recommended inclusion of a fifth perspective, that of sustainability. Within each perspective, objectives, indicators and measures are all defined.

A sustainability balanced scorecard (SBSC) is a type of BSC specifically designed to reflect the issues and objectives of corporate sustainability. In order to clarify appropriate sustainability strategies and translate them into action, it is generally recommended that managers first design a separate SBSC. This must then be integrated into the traditional BSC in order to ensure a holistic view of sustainability. This process will help overcome the distinction between a traditional financially oriented management approach and one emphasising sustainability or environmental management concerns. Figure 4.1 shows how the SBSC can be integrated either completely or partially. It also shows the option of creating a further perspective applicable to societal management (for an explanation, see Gminder *et al.* 2002: 121).

Where a traditional BSC does not yet exist, the development of the BSC and the integration of sustainability can be done in one step (see the case study of Volkswagen, in Bieker *et al.* 2002). Even where a traditional BSC exists, the development of a separate SBSC may not be necessary. Instead it may be sufficient to develop new environmental or societal goals, then enrich them with indicators and measures and integrate them into the traditional BSC in the course of the next review cycle, as was done in the case study of the BWC discussed here.

An important structural element of the BSC is the strategy map. This is a diagram that shows all perspectives and all objectives at a glance. The objectives are linked by arrows expressing the cause-effect relationships between the different objectives. It is a rule in a traditional BSC to place the financial perspective at the top and follow this with all links in that perspective. This rule may need to be reappraised when the orientation is skewed toward sustainability. In addition, the links between the objectives may be contrary, and the earlier a contrary relation is made clear the better the company can seek ways to resolve potential conflicts. If this is not done, management may be unaware of problems that will become apparent to employees responsible for implementing the BSC at the operational level.

4.2 Integrating the environment into the balanced scorecard of the Berlin Water Company

The case study focuses on integrating environmental protection into the BSC at a company level. The first step is to evaluate the existing company situation. Once this has been done the task is to explain how environmental objectives, indicators and measures can be developed and integrated into the company BSC. The final step is to examine the results and draw conclusions.

FIGURE 4.1 The possibilities for integrating a sustainability balanced scorecard (SBC) into the balanced scorecard (BSC)

Source: Gminder et al. 2002: 123

The research methodology that was used for this case study was 'action research'. Document analysis, combined with evidence gained from interviews with company employees at all levels, from the CEO to workers in a sewerage maintenance team, was used to understand the company's structure and function and to allow identification of a way to manage environmental and societal issues. Four workshops were then held to further develop the company's BSC. Finally, the results were written down and presented for validation throughout the company.

4.2.1 The Berlin Water Company

As noted in the introduction, the BWC is the largest water supply and waste-water treatment company in Germany; in 2001 its 5,500 employees produced a turnover of €982 million and an operating profit of €269 million. One activity of the BWC is the supply of drinking water, almost all extracted from the ground in Berlin itself. Seven waterworks extract 220 million m³ water from the ground each year and pump it through a 7,800 km pipe network. Each of the waterworks is certified to ISO 14001.² The quality of the water is extremely high for a large city, and no disinfection or chlorination is necessary. The other activity is the treatment and discharge of waste-water, which also occurs in the city. Seven sewage works treat 240 million m³ waste-water each year, transported through a 9,000 km sewerage network. Two of these

² For more details of ISO 14001, see www.iso.ch/iso/en/prods-services/otherpubs/iso14000/index.html.

works are ISO 14001-certified. In order to preserve the lakes and rivers within the city where the treated waste-water is discharged, several measures of monitoring and treating the lake and river water quality are carried out.

The waste-water treatment is a state-run task and a non-profit business, in contrast to the water supply business, which is run for profit. Both parts have a monopoly, but their tariffs are determined by municipal law.

4.2.2 The management of the Berlin Water Company

The formal organisation structure starts at the top with the board and a group of 'shared service' departments, followed by 14 business units, departments, works and maintenance units, with various groups and teams below them, down to the single employee.

In 2000, the board publicised a company vision and its corporate objectives. The vision comprises four areas. One of these addresses the major tasks of supplying water and the careful, environmentally friendly treatment of sewage. The other three address stakeholder interests, including those of the shareholders, the customers and the employees, for each aspect of which five to six company objectives are stated. However, the environmental and societal interests are not operationalised by specific objectives, and many employees do not see why this would be necessary, because they recognise that a clean environment with clean water is necessary for the sound economic operation of the company. In fact, the omission of environment was a deliberate decision by the board because of the dominating financial interests of the private and the state shareholders.

The company objectives are the strategic input of the company's BSC. They also serve as objectives for the individual business units. Within the units the objectives are translated into personal agreements for all departmental or team leaders. This recently implemented approach of 'management by objectives' is reported to be viewed very positively by the employees.

Explicit business strategies do not exist but, implicitly, there are two main strategies. First, the profit orientation strategy emphasises the importance of reducing costs and enhancing distribution (water use declined in the 1990s). Second, the customer orientation strategy places importance on customer satisfaction and on the training of employees. Measures to implement the strategies are taken within a framework of projects. Many different types of indicators are used within the company, and the BSC has the benefit of pointing out those that are really important.

The management and control of the BWC involves regular internal reporting, which triggers activities if necessary. The management system is in transition from the old state-oriented planning system towards the new system with a business-oriented focus, and institutional controlling processes are not yet set up. The budget plan for the coming years is still the most important management tool. The BSC is one of the tools for changing existing systems along with a risk-management approach, the principle of management by objectives and new reporting to the board, but all struggle to gain acceptance given the power of the old structures, rules and plans.

The BSC has been in use since July 2001 on a company level, operated through the Shared Service Department for Corporate Development (the VUE [Vorstandsbeirat-

ung Unternehmensentwicklung]). The company's objectives are directly integrated as goals of the BSC, each specified by between two to four indicators and by a range of measures. The reporting cycle of the BSC is not monthly as usual, but quarterly. Individual business units have also established BSCs. All BSCs are still in the trial phase and need to be completed and enhanced through application and evaluation, and in interviews most employees claimed that the BSCs were still too weak and subordinate to the budget plans.

4.2.3 The management of environmental protection

The strategic importance of environmental protection for the BWC is clear. Groundwater is the crucial resource for the core business of the BWC (i.e. selling clean drinking water), and the purer the groundwater the lower the cost of treating it to drinking-water standards. Strong treatment processes for waste-water are of similar importance, because exploitation and discharge is done in the same geographical area, so the quality of the discharged water influences the quality of the ground water. Environmental protection is also critical in the mechanical processes of the works, the burning of sewage sludge and eco-efficiency in the administration.

The task of environmental protection is decentralised across the business units, where it is the responsibility of environmental managers, co-ordinators and skilled workers. Central support and co-ordination is provided by the Shared Service Department for Operations Officers and Environmental Affairs (VBÜ [Vorstandsabteilung Beauftragung und Umweltschutz]). The VBÜ is in charge of environmental organisation and legal compliance, providing environmental training, checking the environmental performance of the works and identifying potential societal and legal trends. It has 14 employees whose tasks are determined mostly by the legally defined officers for waste, water protection, emissions, accidents and radiation protection.

Since the partial privatisation the main focus of the company has been to optimise the formal protection of the environment, as shown in Figure 4.2. Indicators are used to guide the framework of internal environmental data surveys (e.g. the results of water analysis; some 480,000 analyses are made from 78,000 samples each year). The costs and quantity of waste are managed by means of the SAP software, and data from the water and sewage works are reported monthly. The 3wC does not publish an environmental report but supplies data for the reports of its private co-owners—Vivendi and RWE.

4.2.4 The integration of environment into the balanced scorecard

To enable the integration of environmental protection into a BSC it is important to develop objectives, indicators and measures according to the structure of the BSC. Apart from the formal structure it is also essential to integrate environmental protection into the organisational processes (e.g. the review processes of the BSC) and into

/BIU = Shared service Department for Operations Officers and Environmental Affairs

FIGURE 4.2 Organisation of environmental protection at the Berlin Water Company

Source: Gminder and Beraner 2002: 205

the organisational hierarchy and the minds of the employees. To achieve this it is necessary to co-operate with the department that manages the BSC and get support from the board or the CEO. 'Soft' processes, such as talking to people, convincing them and including them in development activities, are far more important for the success of a BSC than 'hard', more formal actions such as defining objectives, indicators and measures, but both have a role to play. The head of the VBU department at the BWC was well aware of the importance of 'soft' processes, though sound 'hard' action was guaranteed by the support of the VUE, which manages the BSC. In this organisation the company level was considered to be the most appropriate for integration of environmental protection; Figure 4.3 shows the steps taken in the integration process.

Before starting training workshops, strategic clarification of the value of environmental protection was necessary at the board level. This clarification was not easy because the company was struggling with the operational change from non-profit bureaucracy to profit management, and the opinions of the four board members differed. After three months of uncertainty, the shared service departments responsible for the BSC (the VUE) and for the environment (the VBU) took action themselves and decided to start with four workshops and to develop proposals for the company objectives as well as operationalising them for the BSC.

Participants in the workshops were employees of VUE and VBU, together with those from the department of water and the sewage works co-ordination. First, the

FIGURE 4.3 Process of integrating environmental protection into the balanced scorecard of the Berlin Water Company

Source: Gminder and Beigier 2002: 215

term 'sustainability' needed to be clarified, and the group decided to focus on environmental protection and excluded societal and economic sustainability. The aim of the group was to develop usable results, rather than 'dreams' that would stress the company too much in the current situation. Although this aim was perhaps necessary in order to produce acceptable results, it turned out to be a constraint when it eliminated some valuable and progressive proposals too early.

After the clarification of the meaning of 'sustainability', environmental objectives were developed in a brainstorming session, then bundled, grouped and reduced. The reduction was one condition of acceptance. The results were a mixture of objectives and measures; thus a separation was also necessary. During this process a new strategic objective was identified—'protection of natural resources (water, soil, air)'—and this was listed alongside the other 15 company objectives.

The next step was to link the environmental objectives to the other perspectives in the BSC. In addition to the perspective of the employees ('learning'), each of the perspectives was discussed, as it was argued that protection of natural resources serves the financial wealth of the company in the long term. It also benefits customers through ensuring good water quality and is a goal achieved by good process practices. The creation of a separate sustainability perspective was deemed to be unnecessary as it involved only a single goal. Finally, the process perspective was chosen as the most pragmatic solution. Other environmental goals could be subordinated to other company objectives and therefore automatically to the relevant perspectives. Most of the other objectives were also put into the process perspective—for example, the objective 'enhancing material and energy efficiency' related to the objective 'increasing productivity'.

Clarification on the strategic level was emphasised at the same time. The defensive attitude towards environment was found to change during the case study, and by spring 2002 the CEO defined increased 'environmental awareness' as one of

the five necessary changes for the year. Given the definition of the strategic 'natural resource' objective and the ongoing discussion about sustainability, it became obvious that, for political reasons, environmental protection could not be excluded from consideration. As a result, it was proposed that an SBSC working group be incorporated into the strategic planning and review process. This suggestion was presented to the annual conference for upper management, where the board and the heads of the business units decided that it should be integrated into the BSC, even though the number of goals was reduced from 16 to 12 and one board member was still strongly opposed to it. There was still no update to the vision for the company, though the board agreed to undertake this and to clarify new company objectives, after 2004.

To assist the process, new indicators needed to be defined and discussed. A prerequisite was to limit the number to an average of one to three per goal, but aggregation was possible. For example, for the objective 'increasing productivity' (where eco-efficiency is subsumed) the costs per m³ water and waste-water must be measured. In doing this, the working group determined that waste costs, energy costs, waste-water fee and compliance penalties should all be taken into account. Another way in which aggregation could be done is through the construction of an index. Hence an environmental pollution index was designed, including emission figures for several pollutants, such as carbon dioxide (CO₂), sulphur dioxide (SO₂) and methane (CH₄), mercury and so on, and was used as one of the five indicators for the 'natural resource' objective. Other indicators in addition to the index included:

- An approved average daily extraction rate for the drawing of raw water (in order to control the quantitative use of groundwater)
- The amount of cleaned groundwater in relation to the amount of polluted groundwater (in order to control the qualitative use of the groundwater)
- The number of works certified according to ISO 14001 or the EU Eco-Management and Audit Scheme (EMAS)³
- Expenditure on research and pre-emptive measures for resource protection, groundwater management, soil protection as well as lake and river management

The process proved controversial. The vice head of the VUE complained that 'no other objective has so many indicators'. The head of the VBU objected to the aggregation: 'Does this number tell us anything?'. It seems that the pressure of reducing goals or indicators is inevitably a painful one, yet it increases the clarity and simplicity of the controlling process. It also forces more detailed management on lower hierarchy levels.

The last step was the construction of the strategy map. Here, the cause-effect relationships were discussed and determined, and all objectives related to sustainability were identified and linked. An interesting picture of the corporate sustainability of the BWC evolved from all perspectives, as shown by Figure 4.4.

3 For more details of EMAS, see www.europa.eu.int/comm/environment/emas/index_en.htm.

also shown that environmental protection is only one of several strategic objectives of a company. It does not provide the amount of detail that an environmental manager would need; thus a company SBSC neither substitutes for environmental management nor removes the need for there to be an effective environmental management system (such as ISO 14001 or EMAS) in place.

The SBSC can be a good way to bring discussions about corporate sustainability issues to the attention of general management, but it is only a tool to get people to sit down and talk about the issues. The real integration takes place in the minds of the employees, especially the top management. The BSC enables workshops, discussions, meetings and communication to clarify the importance of corporate sustainability. It also encourages the translation of corporate sustainability policies into action by integrating them into general management rather than simply paying lip service to the issues.

Waterworks management is under enormous financial pressure at the moment, whether it be under private or municipal ownership; thus other issues may seem far more important than sustainability. In a situation where all thoughts and actions are checked against profitability, environmental protection is quickly filed under 'costs or expenses', where it may be incorrectly suggested that in order to reduce costs it is necessary to reduce environmental protection. Although this may bring short-term gain, the mid-term and long-term costs are liable to be far higher: 'In Paris they need 18 steps for purifying the drinking water', the vice head of VUE reported, 'in Berlin we just need two because our groundwater is still so clean'. The importance of a clean environment and clean water resources for a water company was a permanent topic in workshops and interviews for this study. Most employees acknowledged a need, and even demand, for a pro-environment policy from top management, arguing that environmental protection should never be subordinated to productivity and quality for political reasons.

This case study shows that the discussion of environmental protection leads to a revaluation of the 'new' (profit-only) management way of thinking. The 'new' management tool BSC places the topic firmly on the agenda. Without it, environmental protection may be reduced to the minimum level that allows for legal compliance, an approach that undervalues the strategic importance that pro-environment policies have in the business of water supply and waste-water treatment. As summarised by a member of the workshop team:

The research project was helpful to discuss with the board, to get clarification about just how important a clean environment is for a clean product. And that this issue should be not neglected, just because the current focus is on profit.

References

- Bieker, T., T. Dyllick, C.U. Gminder and K. Hockerts (2001) 'Towards a Sustainability Balanced Scorecard: Linking Environmental and Social Sustainability to Business Strategy', in *Proceedings of the 10th Business Strategy and the Environment Conference, September 2001, Leeds* (Shipley, UK: ERP Environment): 22-31.

FIGURE 4.4 Sustainability-oriented strategy map of the Berlin Water Company (BWC)

Source: Gminder and Bergner 2002: 223

4.3 Conclusions

At the BWC, an acceptable solution was developed for managing environmental protection by using the BSC, and the results of the case study work had high practical benefit for the company.

From a theoretical point of view, the case study has shown that the BSC is a management tool that is flexible enough to deal with environmental and societal issues. It offers a method to translate the strategies of corporate sustainability into action and integrate them into the general management of a company, so that sustainability no longer has to be managed apart from other management tasks and systems. It has

- , S. Herbst and H. Minne (2002) 'Nachhaltigkeitskonzept für die Konzernforschung der Volkswagen AG', in S. Schaltegger and T. Dyllick (eds.), *Nachhaltig managen mit der Balanced Scorecard* (Wiesbaden, Germany: Gabler): 315-42.
- Dyllick, T., and K. Hockerts (2002) 'Beyond the Business Case for Corporate Sustainability', *Business Strategy and the Environment* 11.2 (March/April 2002): 130-41.
- Epstein, M.J. (1996) *Measuring Corporate Environmental Performance: Best Practices for Costing and Managing an Effective Environmental Strategy* (Chicago: Irwin Professional Publications).
- and P. Wisner (2001) *Good Neighbours: Implementing Social and Environmental Strategies with the BSC* (Balanced Scorecard Report 3.3; Cambridge, MA: Harvard Business School).
- Figge, F., T. Hahn, S. Schaltegger and M. Wagner (2002) 'The Sustainability Balanced Scorecard: Linking Sustainability Management to Business Strategy', *Business Strategy and the Environment* 11.5 (September/October 2002): 269-84.
- Gminder, C.U., and M. Bergner (2002) 'Die Weiterentwicklung der BSC bei den Berliner Wasserbetriebe', in S. Schaltegger and T. Dyllick (eds.), *Nachhaltig managen mit der Balanced Scorecard* (Wiesbaden, Germany: Gabler): 199-229.
- and T. Bleker (2002) 'Managing Corporate Social Responsibility by Using the Sustainability Balanced Scorecard', in *Proceedings of the Contribution to the 10th International Conference of the Greening of Industry Network*, June 2002, Gothenburg, Sweden.
- , —, T. Dyllick and K. Hockerts (2002) 'Nachhaltigkeitsstrategien umsetzen mit einer Sustainability Balanced Scorecard', in S. Schaltegger and T. Dyllick (eds.), *Nachhaltig managen mit der Balanced Scorecard* (Wiesbaden, Germany: Gabler): 95-148.
- Hockerts, K. (2001) 'Corporate Sustainability Management: Towards Controlling Corporate Ecological and Social Sustainability', in *Proceedings of Greening of Industry Network Conference, 21-24 January 2001, Bangkok*.
- Johnson, S.D. (1998) 'Identification and Selection of Environmental Performance Indicators: Application of the Balanced Scorecard Approach', *Corporate Environmental Strategy* 5.4 (Summer 1998): 34-41.
- Kaplan, R.S., and D.P. Norton (1996) *The Balanced Scorecard: Translating Strategies into Action* (Boston, MA: Harvard Business School Press).
- and — (2001) *The Strategy-Focused Organisation* (Cambridge, MA: Harvard Business School).
- Schaltegger, S., and T. Dyllick (eds.) (2002) *Nachhaltig managen mit der Balanced Scorecard* (Wiesbaden, Germany: Gabler).
- SIGMA (2001) 'The SIGMA Sustainability Scorecard', in *The SIGMA Project Guidelines*, Chapter 6.4, www.projectsigma.com, accessed 12 March 2002.
- Zingales, F., and K. Hockerts (2002) 'Nachhaltige Balanced Scorecard: Beispiele aus Literatur und Praxis', in S. Schaltegger and T. Dyllick (eds.), *Nachhaltig managen mit der Balanced Scorecard* (Wiesbaden, Germany: Gabler): 151-66.

Part 2 Privatisation