Business Strategy and the Environment
Bus. Strat. Env. **9**, 108–121 (2000)

ORGANIZATIONAL STRUCTURE AND EFFECTIVE ENVIRONMENTAL MANAGEMENT

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Success in 'greening' a business organization is likely to depend on an appropriate environmental management structure being developed in accordance with the general structure of the organization and then receiving the appropriate support from senior and middle management. The failure to assure such a relationship may provide an explanation of the development of gaps between policy and practice. This article explores differing choices in the structure of the environmental function in a number of UK regional electricity companies and how these choices impact upon the management of environmental issues, producing different outcomes. The paper argues that the environmental structure that is, either consciously or by default, adopted by a company would seem to have some impact on how environmental issues are perceived and dealt with by that company. Therefore, such a decision has the capacity to shape environmental strategy in its implementation and possibly even its conception. Copyright © 2000 John Wiley & Sons, Ltd and ERP Environment.

Accepted 7 September 1999

INTRODUCTION

Increasingly the environmental management literature is moving its focus away from what companies ought to be doing, to consider how the environment can be integrated into the normal strategic processes of organizations (Hutchinson, 1996; Lamming, 1996). This shift in emphasis results partly from a recognition of gaps between environmental policy and environmental performance (Hutchinson, 1996; Bansal and Howard, 1997). In essence the problem has been captured by the 'Green Wall' debate (Shelton, 1996; Miller, 1998) resulting from the Arthur D. Little survey of US organizations which located an 'intramural barrier' between an organization's environmental function and the other operational functions with which it was intended to interact (Shelton, 1996). This paper examines the contribution that environmental structures can make to strengthening or breaking down such barriers.

It is generally recognized that organizational structure has an important interrelationship with strategy and this is likely to

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be the case in environmental strategy as in any other aspect of corporate strategy. Indeed, the need to develop appropriate organizational structures to support environmental management was recognized fairly early in the development of the literature on environmental management and organizational greening (e.g. Hunt and Auster, 1990; Greeno, 1991; Newman and Breeden, 1992; Welford, 1992; Winsemius and Guntram, 1992; Shrivastava, 1994; Stead and Stead, 1994; Shrivastava and Hart, 1995; Maxell *et al*., 1997). The relationship between organizational structure and environmental management is, however, rarely explored in detail and we have not encountered any publications dedicated specifically to this issue.

The purpose of this paper is therefore to look specifically at organizational structure in the context of environmental management. To this end we study how the environmental function has been organized within the overall corporate structure in a number of companies within the UK electricity industry, and how differing structural alignments can interact with the management of the environmental function and produce different outcomes. We acknowledge that interactions with quality and safety functions may complicate the issue, but we focus solely on environmental responsibilities for the sake of clarity.

THE UK ELECTRICITY COMPANIES

The UK electricity industry makes an interesting study for four main reasons. (i) The companies are large enough (in terms of personnel, business diversity and geographical area) for complex group structures to emerge. (ii) The industry has a very real impact upon the environment. These environmental impacts are both direct – e.g. pollution during the electricity distribution process – and indirect – e.g. resource use in the generation process. (iii) The recent privatization and liberalization of the industry has provided the business researcher with an almost unique opportunity to observe the strategic development and adaptive processes of companies coming to terms with new operating conditions. Consequently, the industry provides a tightly constructed sample frame for such an examination. Recent research has identified the development of a variety of differentiated strategic positions being adopted by these companies (James *et al*., 1997; Ghobadian *et al*., 1998). The effect of mergers on consumers (via prices) and on competition has also been examined (Kennedy, 1997), but effects on environmental management seem to have received less attention. (iv) A variety of organizational structures has developed in the industry, thus providing a good sample for our study. These four factors provide us with a unique opportunity to examine the interaction of strategy, structure and environmental management.

The UK electricity industry was privatized in 1989. This resulted in the creation of a number of independent companies. These companies are regulated by the Director General of Electricity Supply who heads the agency OFFER – the Office of Electricity Regulation. In England and Wales the industry also saw industrial de-integration, whereby each of the principal activities within the industry (generation, transmission, and distribution and supply) were allocated to separate companies with the aim of developing a competitive market for electricity. This article focuses mainly on the Regional Electricity Companies (RECs), which distribute and supply electricity in a number of service areas within England and Wales. The situation in Scotland and Northern Ireland is different as vertically integrated companies were created. Since privatization, the UK Government has relinquished its final ownership of these companies, with the expiration of its Golden Share. As a direct consequence, there has been considerable merger and acquisition activity within the industry, with several companies passing into American ownership (James *et al*., 1997). Two companies also merged with the water and sewerage companies in their region, thus creating two regional multi-utility companies in England and Wales.

RESEARCH BACKGROUND

This article integrates knowledge from three different studies of this sector, which give different perspectives on organizational structure. One of these looks into the processes by which a number of regional electricity companies (RECs) have adapted to the new situation created by privatization, using a multiple case study approach to highlight emergent business strategies. The study also focuses upon changes to organizational and management structures, and the effects of changing ownership within the industry.

The second study is an in-depth case study of the environmental management in one REC, largely based on participant observation methodology over a period of two and a half years from 1996 to 1998. During this period the researcher was able to observe some of the structural changes described in this paper at first hand while assisting the company in establishing an environmental management system.

The third study[1] also uses a multiple case study approach, looking at the environmental strategy and management of six companies in the UK electricity distribution and water and sewerage sectors. The study focuses in particular on agents and processes of organizational change with respect to environmental strategy and management, taking into account the effects of regulation, organizational structure and the way in which environmental strategy and management is embedded in overall corporate strategy and management.

Each of the projects shared a common interest in the effect of structure upon strategy formulation and implementation: project 1 from a general strategy perspective, and projects 2 and 3 from a specifically environmental perspective. This article, therefore, attempts to synthesize observations drawn from the three projects and develop an exploratory conceptual framework of the environmental strategy/structure relationship within organizations. It is intended that this initial exploratory research will be followed by later confirmatory research within other public utility and non-public utility industries.

All three researchers were granted relatively easy access to the case study companies but on the understanding that company names would not be revealed in any subsequent publications. We do not believe that this distracts significantly from the conclusions to be drawn in this article as our purpose is to show general patterns of environmental management structure, not particular achievements or shortcomings of individual companies. The examples given in the remainder of the article are drawn mainly from five different companies. We have named these Electricity Company A, Electricity Company B (part of Multi-Utility 1), Electricity Company C, Electricity Company D (part of Multi-Utility 2) and Electricity Company E.

ORGANIZATIONAL STRUCTURE AND ORGANIZATIONAL STRATEGY

Organizational structure is a framework that allows corporate strategy to be pursued. It refers to the relationship of the various components of the organization with each other and impacts very considerably on the strategies that a company finds itself able to pursue successfully. Miles and Snow (1978) identify the relationship between strategy and structure as being of vital importance, as inconsistencies between the two will lead to difficulties in the application of strategy. There is some controversy on the precise nature of this relationship. Authors within the 'classical' school of corporate strategy (see Whittington, 1993), which sees strategy as a deliberate, top down activity, tend to argue that organizational structure should be adapted depending on the strategic goals of the company. On the other hand, authors taking a more process-oriented view of corporate strategy have argued that in reality it is more likely that existing structures frame the kinds of strategy that a company could and would adopt (Mintzberg, 1983, 1990). It is not within the remit of this article to advance the

[1] Funded by the Economic and Social Research Council Global Environmental Change Programme.

argument on the precise relationship between strategy and structure. Rather, we hold that, despite these ongoing arguments, authors of different persuasions agree that there is a significant interaction between strategy and structure in general and, consequently, that the interaction between environmental structure and strategy merits some attention.

Handy (1985) has identified a small number of basic managerial structures. These structures reflect the characteristics of the organization, in relation to five possible diversities: regional diversity – the extent to which an organization operates in more than one area, region, country or continent; market diversity – the extent to which an organization operates in more than one market; product diversity – the extent to which an organization produces a range of products; technological diversity – the extent to which an organization uses a variety of technologies in its production activity – and goal diversity – the extent to which an organization has a single set of goals, or a portfolio of goals.

In response to this diversity, a company will inhabit one of a variety of structures that best fulfils the demands of the unique set of pressures experienced by the organization. These were identified by Weinshall (1971) as the following: (i) entrepreneurial structure, exhibiting informal practices in its pursuit of business goals, and hence goal oriented, but a high degree of centralized control; (ii) functional structure, with a clearly defined hierarchy, formalized management control practices and centralized leadership and management functions; (iii) decentralized, product focused structure, grouped around products, and (iv) decentralized, geographically focused structure, grouped around geographical divisions. A further two forms of structure have latterly been distinguished: (v) the holding company structure and (vi) the matrix structure, a hybrid representing an attempt to marry the most effective aspects of centralized and decentralized structures. Our assessment of the evolving organizational structures of the RECs will refer back to Handy's and Weinshall's models.

ENVIRONMENTAL MANAGEMENT STRUCTURE

Much of the environmental management literature focuses on the need to develop an organizing framework to translate corporate commitment to the environment and an environmental policy into initiatives, and to integrate environmental concerns throughout the organization (Hunt and Auster, 1990; DeChant and Altman, 1994; Zeffane *et al*., 1995). These authors argue that appropriate organizational structures to support the environmental goals of the company are a common feature shared by companies that have successfully managed environmental issues. They also point out that such a structure was critical to foster change and promote integration and co-operation across lines and levels.

The literature generally also agrees on the importance of appointing a 'good' environmental manager in order to co-ordinate the company's efforts to develop a more comprehensive environmental strategy and management (Greeno and Robinson, 1992; Newman and Breeden, 1992; Winsemius and Guntram, 1992). Such an environmental manager is seen to perform a number of tasks. Firstly, he/she may be charged with ensuring the implementation of an organization's formal environmental policy. Secondly, he/she may be charged with ensuring the organization's compliance with all aspects of environmental legislation that applies to the organization. These two responsibilities may, of course, overlap. A third role is often to raise the awareness of the environment among all levels of employees within an organization. A fourth role involves providing support to functional managers who are managing environmental programmes of their own, or who are seeking to integrate environmental considerations into their own business practices.

MODELS OF ENVIRONMENTAL MANAGEMENT STRUCTURE

Since privatization UK RECs have developed in a number of different strategic directions,

some continuing to focus mainly on electricity distribution, others trying to build significant generation capacity or entering overseas markets (Ghobadian *et al.*, 1998). Parallel to, and partly in consequence of, this diffusion in strategy a variety of different structural patterns have emerged. In part, these differing structures can be seen as a consequence of the widespread merger activity that has occurred within the industry as well as a change in management thinking, with less traditional management approaches imported from the private sector after privatization. Within these overall group structures we have observed a variety of sub-structures that assign environmental roles and responsibilities across the group.

In the following we present five models of environmental structures observed in the UK electricity industry. In each case the organization of the environmental function, as far as it exists, can be seen to correspond to the overall structure of the organization. These models should not be taken to represent any one company exactly. By necessity they are simplifications of actual organizational complexities and are perhaps best regarded as a kind of 'ideal type' in the Weberian sense.

It should also be noted that environmental management structures in the companies' studies did not appear to be particularly stable or long lasting. During the time of our various studies we observed considerable flux in the environmental structures of a number of companies. This was partly due to rapidly changing corporate structures, induced by the high incidence of mergers and take-overs. On the other hand, companies were experimenting with different environmental structures, which was part of an ongoing learning process as environmental issues were increasingly incorporated into their management practices. Thus, in a period of little more than three years one company moved first from a functional product-focused structure (model 2) to a divisional structure with strong group centre (model 4) in order to co-ordinate environmental management better across the company, and to take account of a significant increase in generation activity. It then moved to a decentralized divisional structure (model 3) following a take-over by an American company and a separation of generation from the distribution and supply business. Similar rapid changes took place in other companies.

Model 1: regionally based structure (prior to privatization)

Prior to and shortly after privatization the structures of the RECs were typically regionally based, with a number of disparate businesses having joint management in each region (see Figure 1). This corresponds to Weinshall's decentralized geographically focused structure. No examples of this structure survive today. We have, therefore, not been able to observe this type of structure at first hand. However, many managers we spoke to had been in the company before privatization and were able to give us some idea of environmental management at that time. Privatization of the electricity industry in the UK coincided with a rapid growth in societal and commercial awareness of environmental issues. Thus, it only became common to have designated environmental managers after 1990. Prior to that, arising environmental

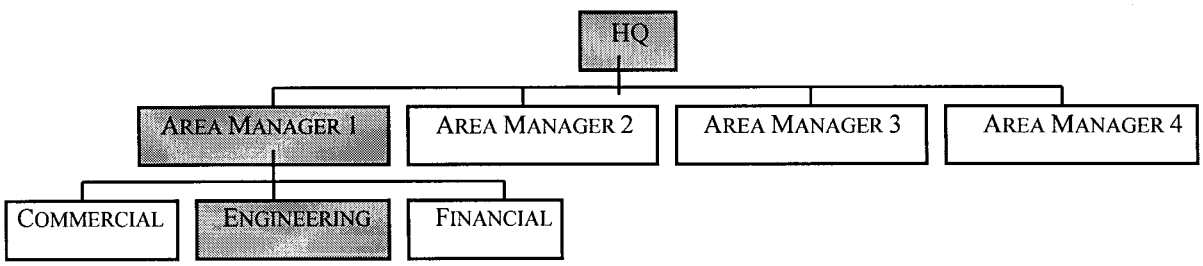

Figure 1. No designated environmental manager.

issues were normally dealt with in an *ad hoc* way according to the judgement, knowledge and commitment of local engineers and managers. This could result in quite different practices being adopted in different regions on issues such as waste management and oil handling.

Managers in the companies varied in their opinions as to whether this lack of an identifiable environmental function meant that environmental issues were not usually considered. Some felt that environmental issues had always been taken seriously by the company's staff even without the existence of formal environmental management procedures or a designated environmental management function. The following comment from the director of the systems division at one REC illustrates this feeling.

> Certainly if you talked to some of our engineers, yes, they were concerned about putting underground cables where we can, and as I say we were doing trenchless excavation long before the environment became the issue in society that it is now. So it's been a development over time and it is not something that suddenly has come along and we thought: Oh, we'd better get environmentally friendly. Our engineers are environmentally friendly, anyway (Director, Systems Division, Electricity Company C).

At the same time, most respondents felt that a designated environmental function had an important role to play in raising the profile of environmental issues across the company, in acquiring and disseminating environmental information and in acting as a kind of 'environmental conscience' for the company. This is illustrated in the following comment:

> I think it is like any issue, you need to be professional in that . . . we need environmental professionals, it's as simple as that. We need some environmental professionals. And you need the specialists in the actual engineering area to apply that environmental legislation and requirements (Performance Standards Managers, Systems Division, Electricity Company A).

This feeling seems to have had widespread credence in the companies shortly after privatization as all subsequent structures we identified contain an identifiable environmental function, albeit it different forms and at different levels in the company hierarchy.

Model 2: functional product-focused structure

After privatization many of the RECs adopted a structure that, instead of persisting with regional management, introduced management of the various businesses across the whole REC. This structure has elements of Weinshall's functional classification as it has a more centralized leadership and more formalized controls, but it is also product focused as it allows managers to specialise in distribution supply, appliance retail etc. In Handy's terms it aimed at overcoming problems associated with market, product and technological diversity. It was into this type of structure that many of the first environmental managers were placed, often located closest to the principal environmental impact. This would be the distribution business (see Figure 2) as, in a traditional REC, most of the environmental risk would be here.

This follows the viewpoint put forward by Lent and Wells (1992) among others that, to be effective, environmental managers must be near to the execution of operational policy.

However, the manager will also be expected to direct environmental policy in the other divisions of the organization and this arrangement risks bias towards the distribution business. This is perhaps less of a concern when other impacts are limited, but might be more of a concern if they are substantial, for instance if a REC develops substantial generation capacity.

Electricity Company B had used this type of structure until quite recently, before the entire company was restructured following a merger with a water and sewerage company to form Multi-Utility 1. Opinions regarding the merits of this structure varied. Some respondents implied that the environmental manager was largely invisible in this structure and thus had

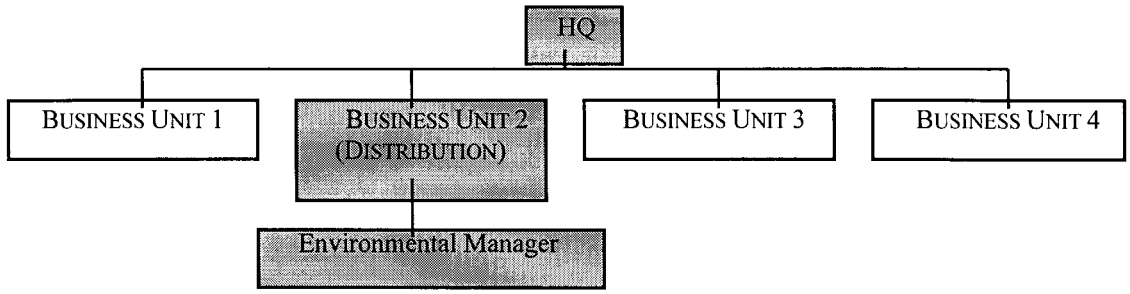

Figure 2. Environmental manager based in one functional business unit.

limited opportunity to influence the environmental strategy of the company as a whole.

> If you see an old organogram of [REC 2], and you see where [the environmental manager] used to work from [. . .] there is no recognisable group centre . . . Lots of people hanging on the washing line all at the same level, and they were all first among equals [. . .] but there was no recognisable central focus at that level. So you find that a lot of what was running at [the water and sewerage company] at group level, to try and provide some strategy and direction, wasn't there. It was embedded and hidden down in the operations manager's part of the operations directorate. So [the environmental manager] historically was down here, was just hidden somewhere under safety, didn't even figure in the organogram. And what they were trying to do was to influence the whole span of the organization from deep down within the organization. Which is different from the organization [in the water and sewerage company] where you had a recognisable group centre at the top, who had some form of power to influence across the divisions (HSE Manager, Multi-utility 1).

While this implied a feeling that influencing the entire organization from deep down in the structure would be difficult, the environmental manager in question seemed less concerned about this, suggesting that a simple functional structure like this could actually make it easier to get decisions made.

> We simply had a Chairman, and then there was a board of directors, who were all executive directors, there was no group structure with divisions or similar. All decisions were made at the executive committee, which could be useful if you wanted to get a decision made, because you only had to go to the board meetings or that group of people and there was no further, lower structure that you had to get on your side (Environmental Advisor, Multi-utility 1, former Environmental Manager of Electricity Company B).

Company E switched to this type of environmental structure after using a more centralized approach. General environmental responsibility for the whole group now lay in the distribution business whilst company-wide responsibility for energy efficiency lay in the supply business. The company was not studied after this change so the outcomes are not known, but the switch shows that change is not unidirectional. Grand evolutionary trends are not in evidence.

Model 3: decentralized divisional structure

As many RECs developed quite considerable business interests outside their traditional field of electricity distribution and supply, mostly in generation or international activities, they often saw the need to reflect this in the corporate structure. Consequently they developed formal divisional structures where separate business units tended to develop their own teams to address operational issues,

including environmental issues (Figure 3): hence, a decentralized product focused structure (Weinshall, 1971), aimed at overcoming market diversity (Handy, 1985). This trend was accelerated in the RECs by the fact that supply and distribution businesses were split and regulated separately by the industry regulator (OFFER). This has led to an arrangement where each of the separate divisions has an environmental manager who is charged with managing the environmental impact of that unit alone.

Several examples of this type of structure exist among the RECs. In Electricity Company C a group environmental function was split into separate teams for distribution and supply businesses after the generation business was split from the rest of the company by the new US owners. The restructuring of the environmental function was thus in line with the general restructuring of the company. Clearly, the reasons for this restructuring had little to do with environmental issues but were to be found in the overall strategic direction of the company, following the take-over. All the same such a restructuring, undertaken for different reasons, is likely to affect the workings of the environmental function and presumably the effectiveness of environmental management. At the time when our studies were conducted there was not yet any evidence as to the relative merits – or otherwise – of the newly re-established decentralized divisional structure compared to the previous, more centralized structure. It would certainly be interesting to go back to the company after some time to see what, if any, effects the restructuring has had on environmental management.

The decentralized divisional structure would seem to redress the problem of lower level impacts being ignored, which was identified as a possible danger of the functional product-focused structure, but it raises other concerns. For such an arrangement to be effective adequate staffing and financial resources would seem to be needed for each of these separate divisional environmental functions. Unless environmental issues have high priority in a company these resources may not always be provided, making environmental management highly dependent on the commitment and goodwill of divisional management. This in turn may lead to a lower level of environmental engagement than would be the case in other structures where an influential environmental group centre existed. Divisional environmental managers, without the support of a strong group centre, may well find that they lack the authority to influence decisions taken on purely operational grounds.

Another problem may arise in the co-ordination of environmental management between divisions. Divisional environmental managers may find it difficult to share information, ideas and initiatives. In many companies there is now considerably less co-operation between supply and distribution businesses than prior to privatization. Under the decentralized divisional environmental structure this can easily lead to relatively little co-operation between the environmental functions of the different divisions. The publication of a group-wide environmental performance report would also seem to be made harder. As we shall see in the next model, co-ordinating the environmental management

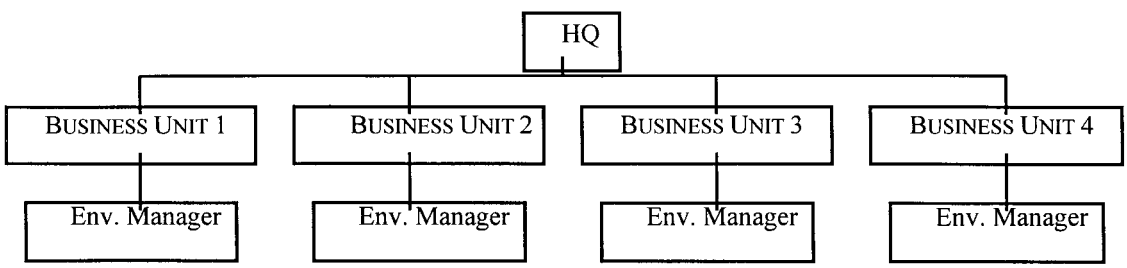

Figure 3. Environmental manager based in all business units.

activities of different divisions and departments and fostering communication between environmental staff in different parts of the company is seen as one of the more important tasks of a central environmental function.

Model 4: divisional structure with stronger group centre

The structural arrangement described in this section (Figure 4) seeks to overcome some of the problems evident in the preceding structure, particularly those arising from a manager's isolation within a functional division. The organization's structure is again a decentralized, product-focused structure, aimed at overcoming market diversity. Arguably, such companies are moving towards complex matrix structures. In this structure there is some group level influence upon environmental management by setting group environmental policy, stipulating levels of environmental engagement expected of the divisions and providing support to the environmental managers in each functional division. This may come in the form of consultation, co-ordinating joint programmes or adding the head office seal of approval to initiatives, thus strengthening their potential for widespread acceptance. External reporting may also be undertaken at this level.

This type of structure was used in a number of companies. For instance, it was the structure developed in Multi-Utility 1 after the merger of Electricity Company B with the regional water and sewerage company, when the entire group was re-structured on a divisional basis, including the separation of electricity supply and distribution. The newly created group environmental function set a framework environmental policy which required divisions to write and implement their own more detailed policies. Working groups addressed cross-divisional issues and a group environmental performance report was produced. The group centre environmental function saw its task as providing overall direction but not in guiding the environmental management of individual divisions closely.

> So that is the structure now, that we have a clearly recognizable HSE team at the group centre. The question is what do we do? The role of the group centre [. . .] is very clearly [. . .] not a group of people who will do things. It sounds terrible to say that, but they are not detailed doers. They are there to provide overall direction, strategy, policy, philosophy and to provide the bridge across all of these (HSE Manager, Multi-Utility 1).

After giving a large degree of autonomy to the divisions, the group environmental function had limited influence over the importance that the divisions placed on environmental management. Two divisions with lower environmental burdens accelerated their process of environmental engagement compared to activities before merger (which were very low). This increased activity on

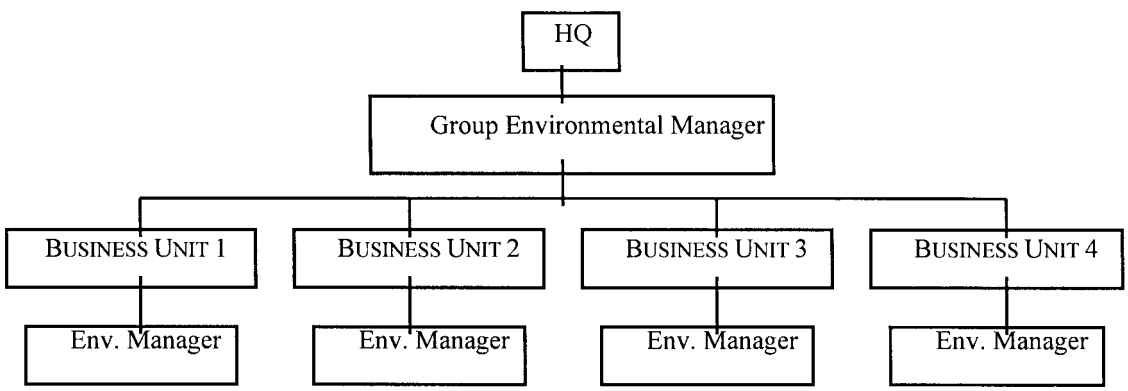

Figure 4. Environmental managers in each unit but group has consulting role.

issues such as procurement. Conversely, the pace of engagement in the distribution business was slower than pre-merger. The change in structure from model 2 to model 4 moved the one full time environmental manager to group level. Distribution business management did not consider a full time environment professional to be justified, despite the bulk of the environmental burden of the former REC residing there. The combined effects of the structure and the attitudes of divisional management were at least as influential as the group policy.

Both Electricity Company A and Electricity Company C had adopted a similar structure prior to take-over by American companies (when company structures changed again to absorb the companies into the world-wide structure of their respective new parents). In both cases the group environmental managers were striving for a situation where divisions would automatically take environmental considerations into account and could be left to implement environmental policy and develop environmental management activities on their own.

> It would be wonderful if you could think . . . that in 15 years time . . . I wouldn't be here anymore, that people like me didn't exist. I mean it would be wonderful (Group Environmental Manager, Electricity Company A).

Yet, to varying degrees these managers also felt that for the time being their hands-on involvement was needed to move environmental management in the divisions forward.

> Which varies, it varies from the strategic, in terms of discussing with directors and managers what kind of environmental objectives targets we should have, but in some areas my job has actually been quite specific. It's been very on the ground, on the level, dealing with waste management on a particular site, because there has not been the knowledge and expertise within the company (Group Environmental Manager, Electricity Company A).

> So there is a change in emphasis from one person who is an expert, if you like, an advisor in the group, to one who is co-ordinating risk assessment and flows of information and management. So, my role is basically one of overseeing what is going on within the group and attempting to rate the whole of the effects that we have. [. . .] there is a bit hands-on, but that tends to be when people are in trouble. So, I, for instance, at the moment have got a waste working group together, because of the landfill tax and its implications and we were not satisfied with the way that was working. And then there are other issues, more important issues, that require in-depth treatment (Group Environmental Manager, Electricity Company C).

Model 5: complex structures after merger

To date mergers have created three multi-utilities, comprising water and electricity companies. Water and sewerage and electricity distribution and supply pose quite different environmental problems and the two industries face very different levels of environmental legislation and regulation so a divisional approach with group co-ordination, as the one described in the previous section for Multi-Utility 1, has advantages.

The constituent businesses of the multi-utilities 1 and 2 serve roughly the same regional markets but this is not always the case. While newly formed groups may want to develop a unified structure to unite the whole company, in practice geography or other factors may lead to the adoption of separate environmental management structures. Figure 5 shows the sort of arrangement that may emerge in a merged utility operating in two or more geographically separate areas. Such structures are decentralized, geographically focused, but also resemble matrix forms (Handy, 1985), to accommodate all aspects of operational diversity, including goal diversity (Weinshall, 1971).

Eventually, it is possible that holding company structures could emerge along these lines, especially where a foreign-based owner

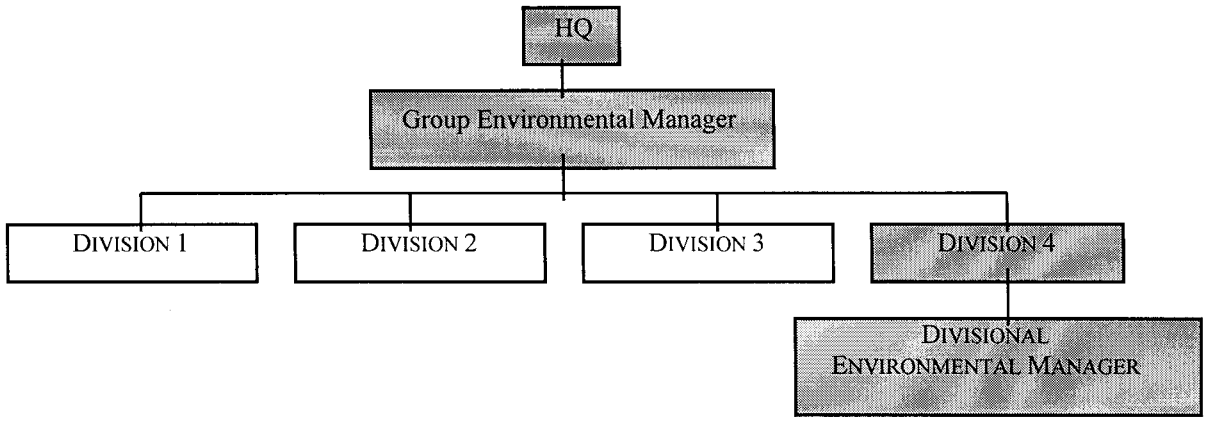

Figure 5. Merged companies with separate management.

is in place. A tendency to separate out the (environmental) management of individual business units may occur where the holding company wishes to incorporate parts of the newly acquired company into its existing management structure but where regulation necessitates separate management of different businesses.

Merged companies may show quite a variety of structural arrangements, depending on their geographical spread and the extent to which the two businesses are to be integrated into one function. In both Multi-Utility 1 and Multi-Utility 2 the REC and the water and sewerage companies both served roughly the same geographical market. However, while Multi-Utility 1 had adopted a unified divisional structure with central environmental function (model 4), Multi-Utility 2 had so far kept most management aspects of the two constituent businesses apart. This included the environmental function, which was handled independently by the water and sewerage and by the electricity business (model 3).

DISCUSSION AND CONCLUSION

In the early years after privatization, the vast majority of a REC's environmental concern rested with its distribution network. Although upstream power stations and downstream end-use energy efficiency may have had larger impacts, the RECs had little control over these impacts within the constraints of their commercial and regulatory environment. Hence, it was appropriate to concentrate on aspects of the distribution business, which either posed a direct risk to the company or presented the opportunity for cost savings. This changed with liberalization and the ensuing opportunity to develop other business interests, such as generation. As the companies widened their business interests and as various take-overs and mergers with other companies took place, organizational structures changed, and became increasingly complex, to accommodate new businesses or to combine various business units of two or more merged companies. This generally affected the way in which environmental management was structured and organized. The organization of the environmental function was generally brought in line with the overall structure of the company, i.e. if a company went over to a divisional structure, then the environmental function would also be structured on a divisional basis. Likewise, a company with a generally centralized structure would normally also have a centralized environmental function, whereas the environmental function in a decentralized company would also be decentralized.

A broadening of the companies' business interests through organic growth, merger or take-over, and the changing organizational structures that went hand in hand with them, could have further impacts on the ways in

which environmental issues were perceived and managed. Companies now perceived different and more varied environmental impacts. One possible consequence of this is that, by spreading environmental aspects and risks among different divisions, single divisions may no longer perceive their environmental impacts to be high enough to warrant serious attention. An advantage of the structures shown in Figures 4 and 5 is that the centralized environmental function has an overview of the whole group's impact and can press for appropriate action. On the other hand, a centralized group function may not have the necessary detailed operational expertise to assess environmental impacts and decide on appropriate levels of engagement in individual divisions. If common levels of environmental engagement are stipulated by group for all divisions then progress may be accelerated in some divisions (probably those with lower environmental impact) whilst decelerated in other divisions. Of course, a decision to seek group-wide certification to ISO14001 forces all divisions to adopt a high level of environmental engagement.

Such issues need to be addressed alongside other considerations when a company is developing its environmental management structure. Any one structure can be used in different ways with different splits of responsibility between group and divisional environmental managers (Beveridge, 1996). Senior management will often determine the level to which an organization's environmental performance will aspire. However, they must also be aware of the difficulties that could arise in implementing that policy if appropriate environmental management processes and responsibilities are not clearly defined and appropriate for the whole of the organization's structure.

These considerations suggest that the environmental structure that is, consciously or by default, adopted would seem to have some impact on how environmental issues are perceived and dealt with, i.e. it has the capacity to shape environmental strategy in its implementation and possibly even its conception. Environmental structure is thus not neutral and its influence on the environmental strategies that are possible or likely to emerge deserves further consideration by managers and researchers. The interrelationships between environmental, safety and quality structures that complicate these matters also merit investigation.

It seems difficult to draw any conclusions regarding which of the organizational forms we have identified could be said to be the most appropriate for a utility organization to adopt. This may, to a large extent, accurately reflect the fact that best practice in the electricity industry has yet to be established for environmental management. We do not claim that there is a natural evolution between the different types of structure. It may well be the case that there is no single best environmental structure; different structural arrangements are appropriate for different companies at different times, given that business structure generally tends to be a function of historical circumstance as well as the five factors identified by Handy (1985) and discussed above.

The group structure of RECs and other utilities may be atypical of wider industry. The regional nature of their businesses and environmental impacts, and their public sector history, may lead them towards decentralized geographically focused structures perhaps placing them closer to local authorities than to site-based process industries. Also, the regulatory split of the distribution and supply businesses has pushed RECs towards some degree of product focus as in models 3 and 4. Nevertheless, an array of group structures exist or have existed since privatization, most of which will be familiar to large companies in other sectors. As competition and liberalization increased RECs became less distinct from other industries. Moreover, this paper's focus is on how environmental sub-structures are created within wider group structures. The approach of the electricity industry is likely to be distinct more in terms of pace of change than in results. In this respect the findings from our three studies should be no less generalizable than those drawn from any case study.

It is possible to hypothesize to some extent about potential future developments. We would argue that the increasing diversification

of activity among companies notionally within the same group will lead to the development of very different environmental burdens, and would call for differing degrees of environmental management. It would appear appropriate therefore for a divisional structure to operate policy management on a divisional basis; that is each unit will possess its own environmental management team, and its own environmental policy.

This does not eliminate the need for a group environmental centre. It is possible to speculate that any such role could comprise of five main elements. Firstly, the group responsibility could be to set the general parameters, or vision, which defines the policy. Secondly, it may choose to stipulate specific levels of environmental engagement expected of divisions. Thirdly, it may choose to provide consulting expertise to the divisions to help them develop divisional policies and procedures. Fourthly, it may produce group performance reports and promote a positive external image of the company. Fifthly, it may facilitate joint projects across and between divisions and encourage sharing of information and experience.

In such an arrangement, each operational unit would be able to develop the appropriate environmental response to its unique impact, as well as the method by which to ensure that that response is adequately implemented. The group centre could encourage such an autonomous approach, whilst maintaining a company-wide strategic perspective that ensures that environmental impacts receive a level of attention proportionate to their significance, whether contained in one division or common across the whole group.

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