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# Misreading liberalisation and privatisation: The case of the US energy utilities in Europe

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ABSTRACT

In response to energy market liberalisation and privatisation initiatives promoted by the EU and other European states in the 1990s, a large number of US energy utilities expanded their activities in Europe, mainly through acquisitions. The size of their investment was, a decade later, matched by the ensuing scale of their retreat, wealth destruction and often forced exit. Combining interviews, industry studies, published financial data and company reports, this article examines critically their strategy and, in light of widespread failures, seeks to answer the question of what went wrong. It is argued that mistakes might have been avoided through greater appreciation of how market liberalisation evolves given changing government priorities and general sovereign risk.



## 1. Introduction

Energy market regulatory developments on both sides of the Atlantic created conditions for international expansion by US energy utilities to Europe. International acquisitions involving public utilities represented in the 1990s a new and significant phenomenon which led to surprising business outcomes. US acquisitions in the electricity sector peaked in 1998 and 1999 according to industry studies: their estimated value was US$340 bn involving over 1150 transactions, with 55% of the deals by value and 46% by number being in Europe (Wiegand and Kruger, 2004). What sets the US utilities international expansion apart from similar initiatives in network-based industries is their sudden and costly entry and exit from Europe. Over a short period of time, 17 US energy companies (many of them counting among the Fortune 100) acquired a variety of assets, including generation, distribution networks and retail customers, and commenced gas and electricity trading operations. The companies were eager to take advantage of perceived market opportunities thought to be available through the planned liberalisation and privatisation of European electricity and gas markets.

These events suggest a host of research questions regarding the expansion strategy of US energy utilities which this paper will explore. The paper is structured as follows. Section 2 quantifies the scope of US energy utilities market entry and exit in Europe. Section 3 introduces the main research objectives and how they are reflected in the research methods used. Section 4 develops a theoretical framework which is applied in Section 5 to shed light upon US companies' investments in Europe, as revealed through the views and insights of former officials of various US and European energy utilities engaged in these cross-border activities. The last section concludes that the international strategy adopted by the US energy utilities arose out of a facile understanding of the potential opportunities created by recent moves towards energy market liberalisation, privatisation and deregulation. The main factors behind the US business failure and value destruction are summarised combining theory with empirical perspectives.

## 2. American investment in European electricity markets

### 2.1. Energy policy and the liberalisation of markets

The electricity industry can be sub-divided into four parts: generation, transmission, distribution and supply. Historically, in Europe these activities have been vertically integrated and operated as monopolies, many of them state-owned. Some European countries such as the UK and Scandinavian countries had, through privatisation and liberalisation, set in place reforms that resulted in the vertical disintegration of the industry in terms of ownership. In 1996, the EU promoted the Electricity Directive (96/92/EC) designed to break-up existing national integrated monopolies and create competitive energy markets by encouraging competition and equal or fair third-party access to grids and networks. It was argued that a traded market in electricity would promote competition, benefit consumers and provide energy security through adequate investment signals. These objectives

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were reinforced by the EU Gas Directive (98/30/EC) which required most member states to open at least a quarter of their gas markets to competition.

### 2.2. Quantifying the US presence in the European energy market

The move into Europe by US utilities was started back in 1989 by Enron. From 1989 to 2000, 17 US energy utilities entered the EU markets in an attempt to take advantage of anticipated business opportunities created by the liberalisation and privatisation programmes. These are listed in Table 1 and indicate the UK as their main destination where energy market liberalisation was most advanced. As a result, the paper concentrates upon events taking place in the UK energy market. As validated through interviews (organised as described in Section 3), most US companies viewed the UK market as a launch pad for further moves into Continental Europe.

The US companies varied significantly in terms of the size and scope of their activities as well as their European market entry strategies. For example, some US companies, such as Enron and AEP, operated in several energy sectors but the majority of US energy utilities combined only electricity and gas activities. Some limited themselves to electricity generation as such activities were supportive of trading activities. Others were traditional/mainstream utilities, which tried to replicate their home activities in Europe. According to several respondents, some companies sought to emulate energy trading in the fashion promoted by Enron. In other instances, an entirely *asset-less* strategy was conducted hoping that trading alone would be the source of profitability. Finally, some US companies were portfolio investors acquiring whole businesses and pursuing highly speculative strategies in Europe based on expected variations in asset prices over time.

Table 2 not only illustrates the diversity of the US energy companies but also highlights one characteristic shared by most US companies, namely the central role of energy trading activities. Although their priorities varied, almost all US companies relied extensively on power and gas trading activities, as opposed to solely owning and operating assets to produce and sell power. This is not surprising given that a key feature of EU initiatives was the creation of traded markets in electricity, which were designed to replace the aggregation role played by the system operator.

After a few years of acquisitions and expansion with extensive ownership, most US companies had left Europe by 2003. Most visibly, this withdrawal was most visible in the UK where most of the regional electricity generators, suppliers and distributors, previously US owned, now had been acquired by German or French energy utilities often at a fraction of the US acquisition price. For example, the AES Corporation bought Drax power station in 1999 for $3.1bn and sold it in 2002 for $1.1 bn to a newly formed Drax Power Group Plc, financed by private equity. In the process of entering these markets and subsequently exiting, it has been estimated that $20 bn in shareholders' wealth was destroyed (Helm, 2003) and, in many instances, these events led to high-profile bankruptcies in the US, raising issues of corporate governance. By 2003, the UK energy sector came under European ownership. As Tables 3 and 4 show below, all 17 US companies that entered the UK in the 1990s had exited within a decade or so.

The only US energy utilities operating in the UK today are 'late comers' who have taken over the assets from the 'first wave' of US investors: WPD and CEE Electric. Therefore, the 'first wave' international acquisitions by US companies in the UK were short-lived, failing to fulfil the hopes of investors and managers associated with such strategies. Having described what has happened, we turn to the data and methods used to explore why within a decade or so, a massive inward investment was followed by 'fire-sale' divestment.

**Table 1**
Chronology of US energy utilities entering the EU

| Company | Year of entry | EU destination |
|---|---|---|
| Enron | 1989 | UK, Germany, Scandinavia |
| AES | 1991 | UK |
| Aquila | 1991 | UK, Spain, Germany |
| NRG Energy | 1993 | UK |
| Edison Mission | 1995 | UK |
| Mirant | 1995 | UK, Scandinavia, Germany |
| CalEnergy | 1996 | UK |
| GPU | 1996 | UK |
| PPL | 1996 | UK |
| AEP | 1997 | UK, Germany |
| Dynegy | 1997 | UK, Germany, Scandinavia |
| Entergy | 1997 | UK, connections to France and the Netherlands |
| TXU Europe | 1998 | UK, Germany |
| Duke Energy | 1999 | UK, The Netherlands |
| PSEG | 1999 | Germany |
| El Paso | 2000 | UK, Germany, Spain |
| Reliant | 2000 | The Netherlands, Germany |

*Source:* The authors, based on data compiled from Platts, Companies' Records, Financial Press.

**Table 2**
Key US players in European Energy Trading

| Company | Main fuel | Date of entry and first trading activities |
|---|---|---|
| AEP | Electricity/gas | Entered the UK 1997 (50% of Yorkshire Electricity); European Trading Office opened in 1999 |
| Aquila | Electricity/gas | UK gas trading as United Gas since 1991; first Continental trading office in Spain, August 1999 |
| Duke Energy | Gas | Established European HQ in London in 1999 and European Trading in 2000 after buying MEGAS |
| Dynegy | Electricity/gas | European trading since 1997 through Dynegy Europe, Ltd., London |
| El Paso | Electricity/gas | European trading since 2000, El Paso Europe Ltd., London |
| Enron | Electricity/gas/coal | In Europe since 1989, trading operations from 1996; entered UK in 1999 (a stake in Teesside Power Station); currently in liquidation |
| Mirant/Southern Corporation | Electricity | In the UK since 1995 when acquired SWEB; European energy trading since 1999 |
| Reliant | Electricity | Entered Europe with purchase of the Dutch UNA in 2000; left in 2003 |

*Source*: The authors, based on data from Company Reports and Financial Press.

## 3. Data and methods

The experience of the US energy utilities is analysed using qualitative survey data against the background of quantitative information from public sources such as published financial accounts produced for the US Securities Exchange Commission and published energy market data found on the websites of various UK government departments, the US Department of Energy and the International Energy Agency, Paris.[1] The qualitative

[1] Published financial accounts for listed companies do not generally disaggregate performance to division level including the various subsidiaries which the US energy utilities launched in Europe. The qualitative information found in some reports provided anecdotal evidence on companies' plans and strategies overseas.

**Table 3**
Ownership of UK electrical utilities

| Original ownership | Owner 2 | Owner 3 | Owner 4 | Owner 5 | Providence of current owner |
|---|---|---|---|---|---|
| National Power | RWE 2005 | | | | Germany |
| Powergen | E.on 2002 | | | | Germany |
| Scottish Power | Iberdrola 2006 | | | | Spain |
| Scottish Hydro | Merged Southern Electricity 1998 | | | | UK |
| National Grid | Transco 2002 | | | | UK |
| Eastern Distrib | Hanson Trust 1995 | Energy Group 1997 float | Texas Utilities (Pacificorp) 1998 | EdF 2002 | France |
| Eastern Supply | Hanson Trust 1995 | Energy Group 1997 float | Texas Utilities (Pacificorp) 1998 | E.on 2002 | Germany |
| East Midlands Distribution | Dominion 1996 | Powergen 1998 | E.on 2002 | | Germany |
| East Midlands Supply | Dominion 1996 | Powergen 1998 | E.on 2002 | | Germany |
| London Distribution | Entergy 1996 | EdF 1998 | | | France |
| London Supply | Entergy 1996 | EdF 1998 | | | France |
| Manweb Distribution | Scottish Power 1995 | Iberdrola 2006 | | | Spain |
| Manweb Supply | Scottish Power 1995 | Iberdrola 2006 | | | Spain |
| Midlands Distribution | Avon Energy 1996 | GPU 1999 | Aquila 2002 | E.On 2003 | Germany |
| Midlands Supply | Avon Energy 1996 | National Power 1998 | RWE 2002 | | Germany |
| Northern Distribution | CalEnergy 1996 | | CEElectric | | USA |
| Northern Supply | CalEnergy 1996 | Innogy 2000 | RWE 2001 | | Germany |
| Norweb Distribution | NW Water 1995 | | | | UK |
| Norweb Supply | NW Water 1995 | Texas Utilities 2000 | E.On 2002 | | Germany |
| Seeboard Distribution | C&SW Corp 1995 | AEP 2000 | EdF 2002 | | France |
| Seeboard Supply | C &SW Corp 1995 | AEP 2000 | EdF 2002 | | France |
| Southern Distribution | SSE 1998 | | | | UK |
| Southern Supply | SSE 1998 | | | | UK |
| SWALEC Distribution | Welsh Water 1995 | WPD 2000 (PPL) | | | USA |
| SWALEC Supply | Welsh Water 1995 | British Energy 1999 | SSE 2000 | | UK |
| SWEB Distribution | Southern Co 1995 | WPD 1999 (PPL) | | | USA |
| SWEB Supply | Southern Co 1995 | EdF 1999 | | | France |
| Yorkshire Distribution | AEP & PS Colorado 1997 | Mid American 2001 | | | USA |
| Yorkshire Supply | AEP & PS Colorado 1997 | Innogy 2003 | RWE 2001 | | Germany |

*Source:* The authors, data compiled from Financial Press, Companies' Reports.

**Table 4**
Entry and exit of US utilities in the UK

| Original company | Previous US ownership | Year of entry | Year of exit | Length of stay in the UK |
|---|---|---|---|---|
| Eastern Distrib | Texas Utilities | 1998 | 2002 | 4 years |
| Eastern Supply | Texas Utilities | 1998 | 2002 | 4 years |
| East Midlands Distribution | Dominion | 1996 | 1998 | 2 years |
| East Midlands Supply | Dominion | 1996 | 1998 | 2 years |
| London Distribution | Entergy | 1996 | 1998 | 2 years |
| London Supply | Entergy | 1996 | 1998 | 2 years |
| Midlands Distribution | Avon Energy | 1996 | 2002 | 7 years |
| Midlands Supply | Avon Energy | 1996 | 1998 | 2 years |
| Northern Distribution | CalEnergy | 1996 | | Continuing (10 years) |
| Northern Supply | CalEnergy | 1996 | 2001 | 5 years |
| Norweb Supply | Texas Utilities | 2000 | 2002 | 2 years |
| Seeboard Distribution | C & SW Corp | 1995 | 2002 | 7 years |
| Seeboard Supply | C & SW Corp | 1995 | 2002 | 7 years |
| SWALEC Distribution | WPD (PPL) | 2000 | | Continuing (6 years) |
| SWEB Distribution | Southern Co | 1995 | | Continuing (11 years) |
| SWEB Supply | Southern Co | 1995 | 1999 | 4 years |
| Yorkshire Distribution | AEP & PS Colorado | 1997 | | Continuing (9 years) |
| Yorkshire Supply | AEP & PS Colorado | 1997 | 2000 | 3 years |

*Source:* Authors compiled from various sources.

insights involved formal interviews with eleven senior managers, including several directors and vice-presidents, from nine US energy utilities involved in foreign direct investment (FDI) in Europe. In addition, managers from two of the largest European incumbent energy utilities were also interviewed, to obtain insights into how they perceived their American competitors. Lastly, interviews were conducted on the history and motives of deregulation and privatisation with several UK government officials from the Department of Trade and Industry and Office of Gas and Electricity regulation (OFGEM). The questions used for the interviews are presented in Appendix A. With few exceptions (when interviews were conducted over the phone), most interviews took the form of face-to-face discussions with the aforementioned officials and former officials of the US and European utilities. The interviewees' responses and views were written down during the meeting and were later analysed from a

comparative perspective. In four instances there were follow-up telephone interviews to clarify certain points.

Regarding the qualitative data, we acknowledge that the number of respondents (15 people in total) is not a statistically robust sample but, by circumstance, the set of individuals willing to provide objective and sometimes confidential insights was limited. Nonetheless, the roles played by such individuals within their respective organisations afford unique and useful views on the events surrounding their investment decision making. In addition to the qualitative data, as with any enquiry of this nature, economic, financial and statistical inferences in the form of casual empiricism were utilised.

## 4. The US companies' European acquisition strategy in theory and practice

International acquisitions are cross-border transactions in which foreign investors acquire established local companies and transform them into subsidiaries. International acquisitions by energy utilities are relatively recent phenomena, reflecting the fact that network utilities have been severely constrained in their business strategies by specific national and even local regulatory arrangements (Viscusi et al., 2000; Avernch and Johnson, 1962). Although academic enquiry into international acquisitions is extensive and adopts a variety of perspectives: financial, economic and managerial, the focus upon energy utilities has been limited because of historical circumstances (Dubin, 1975; Hood and Young, 1979; Buckley and Casson, 1985; Hennart and Reddy, 1997; Stopford, 1975). We can, however, use these models and perspectives to shed light upon the inward flow of US investment in Europe, followed by the subsequent outflow.

In the economics literature, the traditional motives for mergers and acquisitions involves such notions as synergies, economies of scale, marketing advantages and even better management. These motives allow the economics literature to explain why an asset, such as a power station, is worth more to potential buyers than it is presently worth to the seller. If the expected gains are not realised then no benefits arise from the acquisition and no value is created. Financial arguments for cross-boarder acquisitions and mergers usually involve a reduction in the cost of capital through risk reduction, such as reducing the threat of bankruptcy (Copeland and Weston, 1992). According to interviewees, in the case of asset acquisitions, such as generation plant, or even entire energy companies, it was believed that the US expertise and better management would be able to increase or extract greater value where little or none previously existed.

In the FDI literature, international expansion through acquisitions is expected to benefit the investing company through enhanced efficiency from location advantages, improved performance from structural discrepancies, increased returns from ownership advantages (proprietary knowledge, resources or assets possessed) and extra growth from organisational learning (Kogut, 1995; Caves, 1996). Differences in industry structure attributes between home and host countries give rise to opportunities for greater profitability and growth. According to our interviewees, the potential business opportunities that might arise from a pan-European gas and power market appeared exciting relative to the staid and modest growth potential of home markets. Evidently, in terms of the FDI paradigm, either the opportunities to be found in European power and gas markets had been miss-calculated or the associated risks ignored.

In the strategy literature, international acquisitions are seen as a fast way to expand one's investment in the target country. In a fast growing market, it is more costly to forego profits because of longer delays associated with building a subsidiary through *organic* growth. It has been reported that acquisition rates are higher in faster-growing foreign markets (Dubin, 1975). Cash flows may be generated in a shorter time because acquisitions offer immediate access to local acquirer's existing resources such as land, manufacturing facilities, distribution channels, supply networks, skilled labour and customer base. Moreover, acquisitions are particularly helpful for entering sectors formerly restricted to state-owned enterprises. Together these insights from the strategy literature help explain what motivated US energy utility decision makers in entering European markets. Despite their differences in size, profile and scope of activities, the motives behind their move to Europe, as confirmed by our interviewees, were similar and consistent with the aforementioned understandings behind international acquisitions.

### 4.1. Low cost of capital and limited home growth

Virtually all US utilities that undertook FDI in Europe had access to relatively low-cost capital, which may have encouraged them to set lower return requirements on investment. Many US energy utilities operated under a regulated monopoly regime that enforced an allowed rate of return on assets which lead to stable low-risk returns based upon fixed assets (Newbury, 2000, p. 38). Although such returns were usually below comparable market-based returns, as for example those earned by the Oil Majors, the regulated monopoly status meant that bank and investor expectations were 'conservative', i.e. the cost of capital was relatively cheap. Thus, in accordance with the strategy literature, energy utilities could use the cheap capital available from their regulated businesses to launch themselves into unregulated businesses such as energy trading. In addition, the scope for growth in home markets was limited: inter-state activities were curtailed by the Federal Energy Regulatory Commission (FERC) and investments in new home-based assets needed regulatory approval.

Expanding on the above, during the 1980s and 1990s, the US energy companies operated in partially deregulated and highly fragmented home markets characterised by low energy prices. These, in the opinion of our interviewees, created conditions for financial experimentation and promotion of new business ideas and concepts. The few licensed companies which could operate inter-state were constrained by severe financial regulations (Thomas, 2003). In the US, the liberalisation of controls over natural gas markets in the 1980s allowed energy utilities to respond to market forces while the return from assets, including generation and distribution, were still constrained. We were reminded by our US interviewees that neither their domestic retail nor the wholesale prices were attractive for investment at the time, given historically low energy prices that followed deregulation in the US.

The passage of the Energy Policy Act in 1992 in the US allowed the US utilities to develop business overseas and represented an important step towards liberalising markets and the returns which energy utilities might earn. Several high-profile black-outs and brown-outs lent weight to the FERC's agenda which was to build a national power market to encourage grid integration and the movement of power across regions. The pace of reform gathered speed in the mid-1990s, when a number of states introduced various forms of competition in the market (Hausman and Neufield, 1991; Sioshansi, 2001). Despite the changing regulatory environment within the United States which improved the local investment environment, in the eyes of nearly all the interviewees, the appeal of overseas 'expansion' into what was perceived as a lightly regulated environment was even greater. The promise of an open pan-European market for gas and power enticed the US investors.

### 4.2. Perceived growth opportunities in Europe in general and in the UK in particular

The programme of energy market liberalisation promoted by the EU as well as the privatisation initiatives adopted in the UK presented an attractive proposition to foreign investors in the form of US energy utilities (OFGEM, 2002). Our interviewees said they had been pleased and impressed with the 'hands-off' approach of the British government that provided strong incentives to inward investors through its market liberalisation policy between 1992 and 1997. According to them it was a marked change from the highly politicised fora of US Public Utility Commissions. In the UK, domestic conditions were particularly appealing. To open markets and encourage competition, the big UK generating companies were required to divest capacity, while corporate strategies favouring vertical or horizontal re-integration between domestic companies were disallowed. In addition, regulation with a light touch favoured the perception that generous returns were possible as a means to encourage new investment and increase the chances of privatisation being successful, translating into high returns to potential investors (Colling and Clark, 2006). The absence of return on capital regulation and market determined tariffs, at least for the largest customers was together very appealing in the opinions of our interviewees.

### 4.3. Energy trading as a strategy

In making acquisitions in Europe most US companies hoped to generate new income streams through energy trading. According to all of the former US managers interviewed, it was widely believed that superior ability in trading would allow their firms to make profits at the expense of incumbents. Some US energy companies had experimented with energy trading for a number of years prior to entering Europe and company officials regarded such skills as yielding strong ownership advantages. In some regions in the United States, the emergence of exchanges and over-the-counter markets for buying and selling electricity and gas between industry participants as well as large industrial and commercial consumers had grown in importance. The US companies had adopted a 'trading-commodity model' for their business which placed energy trading at the heart of a modern energy utility. According to interviewees, energy utilities would now model themselves upon financial institutions in which trading environments would be the repository of market and credit risk.

The trading model was seen as a means of accurate transfer pricing between business divisions and as a way of taking advantage of emerging traded markets for electricity and gas which were replacing bilateral long-term contracts and the management of investment risk, through trying to match generation capacity with customer load. As noted by all of our interviewees, the emergence of fast-moving electricity markets (quoting prices 48 times a day in the UK and 96 times per day in Germany) and the promise of an exciting high-risks high-returns environment—where some of their newly experimental business models could be used—proved alluring. According to interviewees, the emergence of deregulated and privatised energy trading markets would favour the new entrants from the United States, placing the traditional, asset-focused European incumbents at a disadvantage. Traditional business models of matching customer liabilities with generation assets would not be necessary in a liquid traded market, even if concerns over whether the new deregulated markets would provide adequate long-term investment signals were eschewed (Haar, 2004).

### 4.4. 'Follow-the-leader' strategy

The large number of the US companies that moved to Europe over a short period of time can also be partly explained by the need to be in the market where one's rival has gone, not unlike the *'follow-the-leader' strategy* described in industrial organisation literature which explains the impact of an industry's oligopolistic structure upon investment behaviour (Knickerbocker, 1973). Follow the leader approaches were used to justify pursuit of acquisitions as arose in newly liberalised markets, fuelled by liquid capital markets are available to acquirers to buy other companies which will improve the growth prospects of the bidder (Jones, 2004). Evidently irrational exuberance and 'me-too-ism' had figured strongly in the plans of new entrants. An element of investment mania can be identified here for it might have been difficult for companies to remain aloof when others were bidding all over Europe. The direct consequence of this was the high price paid for assets given the sudden demand. The US companies led to substantial premiums in asset acquisition, but, in the view of our interviewees, those capital acquisitions were justified by high expectation of future profit streams.

### 4.5. A summary of methods and rational of US investment strategy in Europe

In accordance with the above theories-supported motives in favour of international acquisitions, our interviewees ranked among the most important factors to invest in the deregulating European energy markets the following: access to capital markets at investor grade rating, good debt capacity, a belief in the superiority of their energy market trading skills and the limited growth opportunities in the US market. Besides, the 1990s witnessed strong share markets, raising debt capacity and encouraged companies to pursue new business opportunities. The major opportunity created by deregulation of markets was seen to be energy trading. In this context, entering the newly created UK and European traded energy markets was believed to offer new sources of returns and greater opportunities than home markets, many of which were rate-of-return regulated. According to our interviewees, deregulated power markets in which electricity and gas were traded on both formal exchanges and over-the-counter markets, were viewed as a means of addressing many of the risks inherent to operating in network businesses. Even though typical liquidity in such forward power markets was limited to barely two years or so, it was felt that long-term investment risk relating to power station assets could as well be handled through trading. The emergence of the 'trading-commodity model' as an organising principle for a network utility reflected the situation on the ground both in the United States and Europe: electricity was to become a traded commodity, like oil or wheat. Competition would replace traditional regulatory mechanisms and liquid traded market reliance upon forecasts. According to our interviewees, the emerging energy markets of Western Europe presented an ideal environment for the application of advanced financial engineering and trading methods.

According to interviewees, it was clear that the EU Directives intended to promote competition in electricity and gas markets and to encourage energy trading were positively regarded. Thus it was not surprising to see US energy companies entering the emerging European energy markets and organising themselves around their trading functions. To varying degrees, virtually all of the officials with whom we spoke, had been involved in energy utilities in which trading served as an organising principle for the enterprise. In addition to hoping to build reliable source of income, according to interviewees, trading was seen as a means of

learning about new investment opportunities (and this has been largely the case for many US utility entrants to the EU such as AEP; Duke Energy; Mirant; Dynegy; Aquila, Enron, TXU and Reliant). Quoting from the Duke Energy Annual Report of 2000, "We are leading the evolution from regulated utilities to full-scope competitive energy companies. We saw the market signs and moved into profitable new ventures. Smart moves." By 2004, as losses mounted, Duke Energy abandoned its prestige offices in London, terminated contracts with employees and closed down all its trading operations in Europe.

## 5. Investment and expansion in reality

The risks associated with strategies based on international acquisitions have been extensively researched in the international business literature. The first years of operations are regarded as the most difficult for managers, especially when companies have little previous experience in overseas markets. Importantly, the benefits from overseas acquisitions are contingent upon host market conditions (Weber, 1965; Buckley and Casson, 1976; Anderson and Gatignon, 1986; Thompson, 1995; Hennart and Reddy, 1997). Investment is often undertaken in uncertain environments where changes in local regulation can be important. The effect of uncertainty is particularly significant in emerging markets undergoing privatisation and liberalisation reforms, despite promising business potentials (Werner et al., 1996). For these reasons, international diversification does not always bring rewards for investing companies and, when investment decisions are not properly assessed, foreign businesses may meet with dramatic failure rates, notwithstanding traditional prescriptive paradigms (Mitchell et al., 1994; Chen and Hu, 2002; Contractor et al., 2003).

Importantly, the literature suggests that the timing and scale of investment can greatly affect business outcomes and emphasises the trade-off between economic returns and the uncertainty/risks related to being an early and large-scale entrant to a market (Lieberman and Montgomery, 1988; Mascarenhas, 1992; Buckley and Casson, 1981; Buckley and Casson, 1998). The latter refer to costs associated with higher uncertainty (underdeveloped regulations, lack of government experience, embryonic industry), operational risks (lack of supply and inputs, lack of supporting services, poor infrastructure, unstable market structure) and extra-operational costs (learning/adaptation costs, local training costs, anti-imitation costs). The theory also predicts that early, large-scale commitments to a market usually elicit strong reaction from local competitors, especially if the latter operated previously in protected markets. In the case of the US energy utilities, the capital-intensive and infrastructure requirements of gaining a presence in European energy markets precluded an incremental approach to investment. Power stations come in specific rated sizes, and even establishing a trading room requires front, middle and back-office functions. (According to a former Aquila Energy official, their trading room cost £10 million per year.)

The entrants to the EU markets were to face such barriers and requirements and this begs the question as to whether difficulties were anticipated and what risk reducing measures were envisaged at EU level. From interviewees, we learnt that managers viewed investment risks as substantial but manageable and acceptable in the wider context of limited opportunities back home. As one interviewee remarked, "…after all we were in 'risk business." They had long-term plans in Europe and remained optimistic with regard to their investments to worry about any possible dip in their short-term returns. As suggested by some interviewees, the perceived success of Enron, in transforming itself from a stodgy utility (InterNorth), into a dynamic international energy company heavily involved in energy trading, created a model for success and emulation. But hopes notwithstanding, in the following we identify the main problems that contributed to the US companies' early retreat from Europe.

### 5.1. Overpaying for assets

Confident vis-à-vis potential gains from recently liberalised European market, US utilities entered Europe as soon as the deregulation and liberalisation agenda became clear. Not surprisingly, the rush to enter European markets led to premium prices for assets, often involving limited due-diligence and unrealistic expectations of performance (Helm, 2003). Industry studies suggest that US energy companies paid an average price per customer of 2.3 times higher than the customer's estimated value when buying into the German utility sector, and up to 2.6 times higher prices than estimated customer value when acquiring UK retail customers (Allas, 2001). According to the same source, premium prices were also paid for generation capacity: acquisition prices in Europe per kilowatt of installed capacity were, on average, 1.4 times higher than the investment cost per kilowatt for a new combined-cycle gas turbine plant, which became the norm for new facilities. Despite high prices, the drive and the strategic expectation of the US companies were such that they acquired nine out of twelve regional electricity supply companies in the UK alone and spent billions of pounds in the process (see Table 4).

### 5.2. Misreading the pace and implications of European energy markets liberalisation

According to our interviewees, premium prices were paid for assets and companies to position themselves for the future. As a former official of Mirant Energy remarked in the course of our interviews, "…we paid a lot, but we hoped it would be worth more in the future." As the EU energy markets began to liberalise, it was imagined that incumbents would be at a competitive disadvantage relative to new entrants with their sophisticated trading culture and financial skills. However, despite the EU Electricity Directives, most governments adopted a 'cautious' approach and delayed the introduction of necessary changes to industry structure required to create a competitive market without barriers to entry (EU Commission reference). The result was a variety of market structures across Europe, each presenting opportunities but also risks for prospective investors. According to most respondents, the slow place of liberalisation had not been anticipated from an FDI perspective.

#### 5.2.1. Reform in the UK

As already mentioned, the energy sector privatisation in the UK was grounded in the belief that the benefits of market forces, together with a competitive model in the electricity market, would replace the prevailing monopoly structures, established through nationalisation in the 1950s (Thomas, 2006; Branson, 2002). The reform in energy sector had the support of politicians, regulators and the City of London's financial community (Helm, 2004) and was consistently pursued until 1997 when a change in government revisited energy policy. According to the interviewees, the 'hands-off' approach adopted by the UK government sent a strong signal to energy investors. Green light was given to a large number of company takeovers and to building of the many gas-fired generating facilities of the 1990s. Some respondents likened the situation to 'Big-Bang', when the big US central banks 'invaded' the City of London financial markets in 1986 on the back of deregulation.

However, the reform did not benefit foreign investors as anticipated. Under the liberalising agenda of the 1990s, the UK

generators and the new entrants were encouraged to build and commission new gas-fired generation to take advantage of initially high wholesale prices, and relatively cheap natural gas supplies. As supply increased however and competition increased, wholesale and traded prices fell. From 1997 onwards, the returns on investment of prospering privatised utilities were revisited when sector-regulated prices were reviewed downwards in order to favour consumers (Cooper, 2000; OECD, 2002). The entrants to the UK market focused instead upon trading as a route to market for their power, rather than building up a base of wholesale or even retail customers. The combination of greater competition and over-supply in generation led to a 40% fall in wholesale prices. The sharp fall in wholesale prices hit hard those generation-only US utilities which had no customers under contract.

#### 5.2.2. Reform in continental Europe

Market conditions on the continent were also viewed in a positive light by US energy companies. According to three interviewees, if deregulation and privatisation were slow, the refrain was that early entrance would give one an advantage over late-comers and would be better placed against the competitive threats of incumbents. Any progress on the deregulation/privatisation front indicated that no time should be lost before entering. Germany, for example, embarked upon deregulation and privatisation reforms at the end of 1990s, when the German Electricity Directive attempted to transform the prevailing fragmented market structure. This allowed thousands of local utilities to earn comfortable economic rents as a result of their local monopoly power though, in practice, nine companies dominated both generation and high voltage transmission. The Directive aimed at promoting competition in generation and retail supply and as a result, wholesale electricity prices fell dramatically by 60% (Allas, 2001). The fluid state of the restructuring in Germany was nonetheless sufficient to attract interest from US companies: Southern Corporation, for example, purchased Bewag AG (a German utility involved in generation and distribution of electricity, district heating and air conditioning) only to discover that the power of vested incumbents precluded profitable power generation and distribution, as fuel supplies could not be purchased competitively and prices to all but largest customers were regulated. That led to a complicated law suit, and a costly exit.

In contrast to Germany, the market liberalisation agenda had progressed in Scandinavian countries. Norway was the first to set up an electricity spot market in 1971, and restructured the market in 1991 when the Energy Act split the vertically integrated company Statkraft into generation and transmission. In 1996, Sweden and Norway integrated their markets into NordPool, a voluntary wholesale electricity system based on spot market, which accounts for about 20% of the total volume of electricity traded and also allows electricity to be traded in forward and futures markets (Newbury, 2000). Measured by trading volume as a percentage of total consumption and liquidity, the NordPool markets have proved more successful than the British energy market. Notwithstanding the pace of economic reforms in Scandinavia, new entrants such as the US energy utilities had meagre results from their considerable FDI efforts. Although these markets offered opportunities for power trading and structured transactions, according to our respondents from some US companies—including Aquila, Enron, Entergy and Koch Trading—no sustainable sources of value ever emerged. Merely taking speculative positions in tightly priced markets was not profitable.

In most other European countries energy market liberalisation has evolved very slowly, partly because of the entrenched positions of some large and integrated domestic businesses such as Electricite de France (EdF) of France, Electrabel of Belgium, Endesa and Iberdrola of Spain and Enel of Italy. In some instances, tacit government support or even shareholding by the state allowed these companies to behave as 'national champions', limiting competition and maintaining high-energy prices. France's energy sector remains dominated by state-owned monopolies, although tentative moves towards privatisation have begun, with the sell-off in June 2005 of a 20% stake in Gaz de France and a 15% stake in EdF in November 2005. Across Europe, vertical integration between generation and distribution remains common leaving the impact of newly created power exchanges (such as the PowerNext Exchange in Paris) upon power trading at a minimum. The trend towards consolidation in Europe continues led by incumbents. E.On, RWE and EdF have established themselves in the UK. In the Netherlands, Essent is merging with Nuon, while Gaz de France is merging cross-boarder with Indo-Suez in Belgium. Other countries, such as Austria, Netherlands and Switzerland, opened power exchanges in the late 1990s, but industry studies suggest the amount of traded electricity remains low, at around 10% of the total power consumption (Schroder, 2001; EU COM (2006)851).

Overall, outside the UK and Scandinavian region, obstacles remain in place in other European energy markets that limit trading related opportunities. In some markets, notably Spain and Portugal, the growth in demand for electricity presented opportunities to foreign and domestic companies willing to build, acquire and expand existing electricity plants, although regulatory obstacles and, again, the position of entrenched incumbents created difficulties, according to at least two of our panel of respondents. Companies such as Aquila opened offices in Madrid, hired employees but business never developed. Various investment ideas were looked at in Spain and in the UK, according to two former officials, but were dropped because financial criteria could not be met. In the Iberian Peninsula, for Aquila and other companies the emerging consensus was that an open and fair market for Spanish consumers was many years away and any attempt to gain a foothold at the present juncture was unlikely to succeed.

To summarise, EU Electricity Directives did encourage some market changes, but as countries began with different market structures, their progress towards electricity market deregulation and liberalisation varied considerably. While some opportunities for investment existed, they needed to be carefully assessed, for each European market displayed its own characteristics in terms of supply and demand, regulatory framework, existing competition and type of assets. Although market liberalisation saw some quick results in some parts of Europe, such as Germany, (where wholesale prices fell as a result of ensuing competitive pressures upon market players) and Scandinavian countries (where liquid power exchange markets operated at a satisfactory level), for most of Europe, the UK market included, market liberalisation failed to yield sustainable results. With hindsight, our interviewees believe that achieving open and competitive market conditions through privatisation and liberalisation across Europe and the UK, as originally intended, remains years away and may never be achieved. According to the EU Commission, gas markets in Germany and France remain particularly challenging without fair third-party access. In addition, the new exigency of having sufficiently large companies to offset the monopoly power of Gazprom (which supplies 35% of the EU gas) has lent new arguments for maintaining the status quo—i.e. the emergence of vertically integrated incumbents (EU COM (2006)851).

### 5.3. Strategic moves by incumbents and the role of energy trading

The US energy companies underestimated the strengths of incumbents and overestimated the role of energy trading. In

contrast to the ideals of the liberalisation agenda, vertical integration from generation to wholesale and retail remained the norm and put the US investors at a disadvantage. A policy of 'national champions' continued in France, Spain and Italy while in Germany the dominant incumbents, through consolidations, used their secure home markets to finance moves abroad, expanding into new regions via mergers and acquisitions. Such moves eventually led to the purchase of nearly one-half of UK power supply, in the form of Npower (RWE), PowerGen (E.on), London Electric (EdF) and Scottish Power (Iberdrola) even though the creation of regional integrated monopolies was supposed to be precluded under the UK legislation. Through these majors, the bulk of power and gas trading to meet short-term system balancing needs still occurs on a bilateral, over-the-counter basis. The establishment of two rival power exchanges in Frankfurt and Leipzig were no challenge to the two key players, only adding some short-term liquidity to the market, based upon the percentage of trading volumes relative to total market demand.

The strength of incumbents and the rigidity of market structure were major impediments to US companies which hoped to rely on superior trading skills in Europe. According to former officials of RWE, the boards of many European incumbents were sceptical of the merits of trading and a trading-commodity business model as a means of organising a network energy business, managing long-term investment risk and as a steady source of profit. While US energy companies expected trading to be the main source of profits, with less reliance upon retail, wholesale customers and ownership of generation assets, the Europeans regarded trading as merely a means of managing short-term risks, not suitable for providing long-term market signals for investment. Our interviewees observed that European incumbents (such as British Energy, E.On, RWE and PowerGen) used trading primarily to manage risks in physical assets and to optimise physical assets in the short term.

Further, as within-day trading allowed generators with flexible plant to meet the within-day half-hourly profile of specific customers, there was additional profitability in matching generation to the half-hourly needs of customers, as pursued by incumbents. In contrast, many of the US energy utilities were without retail customers, largely selling into the day-ahead traded market and hence without the pricing premium gained by matching half-hourly 'profiles' unique to power markets. To a lesser extent incumbents used new investment opportunities in fixed assets, trade in related commodities or selling risk management services to third parties, although as remarked by some interviewees, incumbents did not rely exclusively upon illiquid forward curves to value assets and, in addition, used a mixture of fundamentals and forecasts. As a result, the new entrants pinned their hopes on trading in day-ahead markets while, in contrast, according to one respondent, "incumbents did not take forward curves seriously", i.e. they were useful for meeting short-term system balancing needs but not a source of long-term investment signals. On the other hand, the US companies were either information gatherers, hoping to use trading to price new investment opportunities in fixed assets and to engage in proprietary/speculative trading (such as AEP, Endesa, Mirant) or pure speculative traders (such as Aquila and Dynegy), who favoured mainly proprietary activities and selling risk management services to third parties when available. The fact that incumbents with physical plant could 'game' the system to their advantage, placing new entrants at a sharp disadvantage, according to our respondents was something of a surprise. Such lack of 'fairness' combined with inherent challenges of any trading operation—that of beating the market—yielded poor results.

Thus, in response to deregulation and foreign competition and, as feared by critics of European and British privatisation programmes, vertical integration structures prevailed across Europe, even though incumbents made efforts to introduce arm's length transfer pricing (Thomas, 2006). Our European interviewees indicated that incumbents could only defend their markets from the US competitors through consolidation and some form of vertical integration which offered them the ability to internalise risks after the removal of existing market structures and instruments that allowed independent generators to manage their risks. This move towards integrated structures among European energy players put their US generation-only and trading-only utilities at a considerable disadvantage, as they were unable to match their risks in the absence of retail customers. As a relevant example, AEP had placed its Drax power plant into receivership. In several instances (Aquila, Southern Corporation) the European burdens of these companies contributed to insolvency and administration. For Duke Energy and Aquila Energy, according to respondents, the results from trading were disastrous.

In conclusion, although our respondents attributed their failure to the immaturity of European energy markets, it may have been their approach, emphasising trading as market entry strategy, which led to failure. According to three of our interviewees who were previously with European incumbents, the affection for energy trading as an organising principle for a large capital-intensive enterprise was definitely unique to the new entrants. Although steps had been made towards creating a more liquid power market in Europe, levels of trading were slow to develop especially where previous incumbents enjoyed protected markets. The US energy utilities placed their hopes on using trading to unlock opportunities available in liberalised markets: their plans assumed that market liberalisation efforts would continue and competition will prevail on the long run but these hopes proved illusory in the face of the entrenched position of incumbents and differing political agendas of European governments.

## 6. Conclusions

According to existing literature on international acquisitions, from an FDI perspective, a large-scale commitment to a recently liberalised market represents a risky proposition even for experienced overseas players, not to mention new investors into a politically sensitive sector as was the case with the US energy utilities. In addition, the combination of cash reserves and expertise in trading and pricing of market risk, may bring only small benefits from internationalisation for network utilities. Although companies may be global in scope, power generation and distribution are, like gas procurement and distribution, regional by nature, at most national, with occasional cross-border opportunities. When such companies invest abroad they have to 'replicate' themselves to some extent in foreign markets and this is not an easy process for energy utilities due to considerable costs involved and the inherent absence of economies of scale. Therefore, the extent to which such companies can internationalise activities is limited by the very nature of their industry. With these constraints in mind, the present analysis suggests that, while there were good strategic reasons for investing in Europe, the US energy utilities misread the process of liberalisation and privatisation of the European energy markets.

Our interviewees agreed that their companies had limited knowledge of operating outside their regulated US markets and, given the prices paid for assets, they believed that liberalisation and privatisation programmes would create conditions to utilise successfully their skills and capital. Many of them believed that the experience of banks with the 'Big-Bang' of the 1980s could be repeated for gas and power markets. But, as explained, although market liberalisation made gains in some parts of Europe such as

Germany (where wholesale prices fell as a result of competitive pressures upon market players) and in Scandinavia (where liquid power exchange markets did exist), for most of Europe, the UK market included, competition failed to deliver expected results. Overall, the speed and scope of deregulation and privatisation in EU countries was overestimated hence the scope for sustainable and successful investment was reduced. The fall in wholesale prices hit hard those generation-only US utilities which had neither wholesale nor retail customers and revealed the importance of asset ownership: *as one official remarked,* 'incumbents traded around assets while Americans just… traded'.

The present analysis suggests that US companies also underestimated the strength of European incumbents especially in having access to retail and wholesale customers. Under competitive pressures, with physical assets, power stations and pipelines, the US companies miscalculated the advantages of incumbents. According to interviewees, no such scenarios (predictable from a theoretical standpoint) were considered by US companies' officials prior to investment in Europe as they believed that officially announced Brussels-led policies would be carried through. But European governments, dependent upon their constituencies (many of whom remained opposed to market liberalisation and all that it entails), were reluctant to adopt promptly EU legislation in a politically sensitive sector.

Not all cross-border investments went sour. Mid-American is still present in the UK, together with European utilities such as E. On, RWE, EdF and, of late, Iberdrola. Although the history of transatlantic expansion and takeovers in the utility sector over the last two decades is not positive, several European incumbents such as RWE, E.On and Iberdrola have recently expanded their activities in the Americas. Importantly, energy utility investors should never underestimate the role and support national governments can offer, even when competition is encouraged at regional level.

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## Appendix A. Main topics for the interviews with companies' officials (mid-level managers and senior analysts)

1. What was the most important motivation for investment?
2. What challenges were anticipated?
3. Why was the commodity trading model regarded as the preferred mode of organisation and means of taking advantage of opportunities?
4. Did you see differences in opportunities between proprietary trading versus trading around assets?
5. To what extent was following the trend of other companies a motivating factor?
6. What challenges did you face in the valuation of European Assets which were purchased for market entry?
7. What were the perceived barriers to entry into European energy markets?
8. How and why did you think that deregulation would create opportunities for Europe?
9. On the trading side, do you think there was adequate appreciation of the risk vis-à-vis performance?
10. What did you know about the energy business of European/American counterparts?
11. How did you perceive the policy of 'national champions' as promoted by many European governments?
12. What role was reserved for non-American managers?
13. What was the greatest frustration while operating in Europe?

## References

Allas, T., 2001. The M&A trap for utilities. The McKinsey Quarterly 3, 21–32.
Anderson, E., Gatignon, H., 1986. Modes of foreign markets entry: a transaction cost analysis and propositions. Journal of International Business Studies 17 (3), 1–26.
Avernch, H., Johnson, L.L., 1962. Behaviour of the firm under regulatory constraint. American Economic Review 52, 1052–1069.
Branson, J.R., 2002. The price of independents: an analysis of the independent power sector in England and Wales. Energy Policy 30, 1313–1325.
Buckley, P.J., Casson, M., 1976. The Future of the Multinational Enterprise. Holmes and Meier, New York.
Buckley, P.J., Casson, M., 1981. The optimal timing of a foreign direct investment. Economic Journal 91, 75–87.
Buckley, P.J., Casson, M., 1985. The Economic Theory of the Multinational Enterprise. Macmillan, London.
Buckley, P.J., Casson, M., 1998. Analysing foreign market entry strategies: extending the internationalization approach. Journal of International Business Studies 29 (3), 539–562.
Caves, R.E., 1996. Multinational Enterprise and Economic Analysis. Cambridge University Press, Cambridge.
Chen, H., Hu, M.Y., 2002. An analysis of the determinants of entry mode and its impact on performance. International Business Review 11 (2), 193–210.
Colling, T., Clark, I., 2006. What happened when the Americans took over Britain's electricity industry? Exploring translational sector effects on employment relations. The International Journal of Human Resource Management 17 (9), 1625–1644.
Contractor, F.J., Kundu, S.K., Hsu, C., 2003. A three-stage theory of international expansion: the link between multinationality and performance in the service sector. Journal of International Business Studies 34 (1), 5–18.
Cooper, J., 2000. Regulation but not as we know it—the Utilities Bill. New Law Journal 150 (6926).
Copeland, T.E., Weston, J.F., 1992. Financial Theory and Corporate Policy. Addison-Wesley Publishing Co, Workingham.
Dubin, M., 1975. Foreign Acquisitions and the spread of the multinational firm. DBA Thesis, Graduate School of Business Administration, Harvard Business School.
EU COM (2006)851 final, Inquiry pursuant to Article 17 of Regulation (EC) no. 1/2003 into European gas and electricity sector. Final Report, 10 January 2007.
EU Directive 96/92/EC of the European Parliament and of the Council of 19 December 1996, concerning common rules for the internal market in electricity.
EU Directive 98/30/EC of the European Parliament and the Council of 22 June 1998, concerning common rules for the internal market in natural gas.
Haar, L., 2004. Pricing power in wholesale markets: a risky business. Public Utilities Fortnightly, 25–42.
Hausman, W.J., Neufeld, J.L., 1991. Property rights versus public spirit: ownership and efficiency of US electric utilities prior to rate-of-return regulation. Review of Economics and Statistics 73, 414–423.
Helm, D., 2003. Energy, The State And The Market. Oxford University Press, Oxford.
Helm, D., 2004. Energy, The State And The Market: British Energy Policy Since 1979. Oxford University Press, Oxford.
Hennart, J.R., Reddy, S., 1997. The choice between mergers/acquisitions and joint ventures: the case of Japanese investors in the United States. Strategic Management Journal 18 (1), 1–12.
Hood, N., Young, S., 1979. The Economics of Multinational Enterprise. Longman, London.
Jones, T., 2004. Business Economics and Managerial Decision Making. Wiley, Chichester.
Knickerbocker, F.T., 1973. Oligopolistic Reaction and MNEs. Harvard University, Boston.
Kogut, B., 1995. Designing global strategies: comparative and competitive value added chains, part 1. Sloan Management Review 7 (Summer), 15–28.
Lieberman, M.B., Montgomery, D.B., 1988. First-mover (dis)advantages: retrospective and link with the resource based view of the firm. Strategic Management Journal 19, 1111–1125.
Mascarenhas, B., 1992. Order of entry and performance in international markets. Strategic Management Journal 13 (7), 499–510.
Mitchell, W., Shaver, J.M., Yeung, B., 1994. Foreign entrant survival and foreign market share. Strategic Management Journal 15 (7), 555–567.
Newbury, D.M., 2000. Privatisation, Restructuring and Regulation of Network Utilities. MIT Press, Cambridge, MA.
OECD, 2002. Regulatory reform in the United Kingdom. OECD Reviews of Regulatory Reform, Paris.
OFGEM, 2002. Electricity wholesale market—facts and figures 〈www document〉, http://www.ofgem.co.uk (accessed July 14, 2004).

Schroder, 2001. Power trading in Europe: a new business model for utilities? Industry Report. SchroderSalomonSmithBarney, 15 June 2001.
Sioshansi, F.P., 2001. US electricity restructuring experience: hits and misses. Energy Policy 10.
Stopford, J.M., 1975. Changing prerspectives on investment of British manufacturing multinationals. Journal of International Business Studies 7 (Fall/Winter), 15–18.
Thomas, S., 2003. The seven brothers. Energy Policy 31, 393–403.
Thomas, S., 2006. The British model in Britain: failing slowly. Energy Policy 34 (5), 583–600.
Thomson, R.S., 1995. Risk reduction and international diversification: an analysis of large UK multinational companies. Applied Economics 17 (3), 529–541.
Viscusi, K., Vernon, J.M., Harrington, J.E., 2000. Economics of Regulation and Antitrust. MIT Press, Cambridge, MA.
Weber, A., 1965. Locational factors and locational dynamics. In: Weber, A. (Ed.), The Theory of Location of Industries. Chicago University Press, Chicago, pp. 17–36.
Werner, S., Brouthers, K., Brouthers, L., 1996. International risk and perceived environmental uncertainty: the dimensionality and internal consistency of Miller's measure. Journal of International Business Studies 27 (3), 571–587.
Wiegand, M., Kruger, D., 2004. National champions to global giants? A review of utilities mergers and acquisitions. PriceWaterhouseCoopers, 19th World Energy Congress, Australia.

## *Energy Companies Annual Reports:*

AEP, 2000. Annual report and proxy appendix 〈www.document〉, http://www.aep.com/investors/annrep/00annrep/Appendix 2000.htm (accessed 15 March 2003).
Duke Energy, 2000. Annual Report.
Dynegy, 2000. Annual Report 〈www.document〉, http://stockprofiles.com/dynegy/15_03.htm (accessed 5 March 2003).
Innogy, 2003. Annual Report.
Mirant, 2000. Annual Report.
Reliant Energy, 1999. Annual Report 〈www.document〉, http://www.reliantenergy.com/investors/ar99/bottom.htm (accessed 5 March 2003).