

# **Downstream natural gas in Europe – high hopes dashed for upstream oil and gas companies**

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## **Abstract**

Access for independents to retail gas markets was a central concern in European policy reform efforts in the 1990s. Upstream oil and gas companies reacted with strategic intentions of forward integration. By late 2004, forward integration was still weak, however. An important explanation of the gap between announced strategic re-orientation and actual strategy implementation lies in the political failure of EU member states to dismantle market barriers to entry for independents. Variations between companies in downstream strategy implementation are explained by variations in business opportunities and internal company factors.

**Keywords: downstream natural gas strategy; European natural gas market; upstream oil & gas companies**

## **Background and major research question**

Neo-liberal energy policy reforms in Europe, initiated by the UK in the late 1980s and culminating with the EU 1996 Electricity and 1998 Gas Directives, had a dual aim. They aimed at equipping energy customers with freedom to choose energy suppliers in the domestic and wider EU area markets. They also aimed at equipping energy companies with free access to all EU level transmission and distribution grids, as well as free choice to move investment capital across formerly closed national and local markets. Several studies have documented that massive restructuring among European incumbent gas and electricity companies followed in the wake of the reforms, with mergers and acquisitions involving horizontal and vertical integration as well as diversification across previously distinct energy sectors. Incumbent gas transmission and wholesale companies invested forward in the natural

gas chain, backwards into gas production and sideward into electricity generation and supply. Electricity companies integrated vertically and entered the gas supply business (Finon & Midttun 2004).

The micro-economic foundation for such restructuring is diverse. The value of *horizontal integration* lies in the economies of scale associated with increasing the production of a single product type. On the other hand, horizontal integration can be a strategic move to create a dominant market position. All micro-economic theories of *vertical integration* in some way revolve on the presence of market imperfections. Neo-classical approaches tend to focus on vertical integration primarily as a response to pre-existing market power problems or as a strategic move to create or enhance market power in upstream or downstream markets. Organisationally based theories, while not denying market power as motivation, also include in their analyses the transaction costs of mediating transactions through market arrangements and the bureaucratic costs associated with internal organisation. The choice of vertical integration, non-standard vertical contractual arrangements, or simple spot market transactions can reflect efforts to reduce inefficiencies associated with both *ex ante* investment decisions and the *ex post* performance of a trading relationship (Joskow 2005). Finally, vertical integration can be seen from a more strategic management perspective as an instrument of risk management. Liberalisation in many markets can change locations in the supply chain where the value will lie in the future and possibly cause margins to migrate downstream. The establishment of a stable downstream retail customer base could be seen as a hedge to secure demand and prices for upstream assets (Thomlinson et al. 2004). The value of *diversification* across energy sectors lies in 'economies of scope', applying to efficiencies associated with marketing and distribution of various types of energy products rather than only one. Whereas economies of scale refer primarily to supply-side changes (such as level of production), economies of scope refer to demand-side changes (such as sales and marketing).

The massive mergers and acquisitions seen among incumbent gas and electricity companies in the period often involved both horizontal and vertical integration as well as diversification. Thus, motivations were probably a mix of economies of scale, economies of scope, hedging and response to market imperfections. It is reasonable to assume the latter being central since long lead times came to be recorded in the implementation of politically promised market reforms.

EU reform efforts also aimed at spurring independent companies to enter European gas and electricity wholesale and retail markets, as a means of dismantling the dominant position of incumbents in national gas markets. This article focuses on one group of independents that in the late 1990s flagged strategic intentions of entering European downstream natural gas markets: the upstream oil and gas industry. A pilot study showed that, in the 1990s, six majors in the European upstream oil and gas business (BP, Exxon, Hydro, Shell, Statoil and Total) all formulated strategies of forward integration in the natural gas supply chain and sideward into electricity production (Eikeland et al., 2004). Capture of migrating margins, hedging to secure a market for upstream natural gas assets, and economies of scale in marketing were all mentioned as motives. The latter was based on the fact that all the companies were already integrated forward in the oil supply chain, marketing petroleum

products to retail energy customers. The strategic shift signalled a challenge to the historical distribution of labour in downstream natural gas marketing and sales and electricity supply chain activities in Europe. It also signalled changes to upstream oil industry identity, towards diversification into more full-scope energy companies.<sup>1</sup>

‘Strategic rhetoric’ is a different game than strategy implementation, however. Closer scrutiny of the investments reported by the companies in the period 1991–2004 led us to conclude that none of the companies had done very much to translate downstream natural gas strategies into practice (Eikeland, 2004). However, some companies did significantly more than others – they demonstrated greater ‘implementation strength’. This article discusses *why upstream company implementation was generally weak across European gas markets, and why it varied so widely in strength*.

We begin by presenting the implementation indicators employed, and how the companies scored on these indicators. We then propose factors to explain the generally weak implementation, and the differences among companies in terms of strength of implementation.

## **Indicators of ‘implementation strength’**

In this article, wide geographical spread of company downstream natural gas marketing activities is taken to indicate strong implementation, and narrow spread to indicate weak implementation. We take geographical presence in all ‘core’ gas markets as sufficient for strong implementation, as it would be less expected to find presence beyond these, in more poorly developed markets. The core European gas markets in the period included high volume and medium volume markets with high growth rates. Table 1 shows natural gas consumption in Western European OECD countries in 1990, 2000 and 2002, together with growth rates.

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<sup>1</sup> These companies had historically been fully integrated in the oil supply chain, in exploration, production, through wholesale and transport, manufacturing of fuels and chemicals, as well as retail marketing and sales.

**Table 1 Natural gas markets in Western European OECD countries in 1990, 2000 and 2002, by consumption in 2002 (billion cubic feet)**

	1990	2000	2002	% annual growth 1990–2002	% annual growth 2000–2002
United Kingdom	2,059	3,373	3,313	6.1	-0.9
Germany	2,669	3,098	3,204	2.0	1.7
Italy	1,674	2,498	2,485	4.8	-0.3
Netherlands	1,535	1,725	1,765	1.5	1.1
France	997	1,505	1,586	5.9	2.7
Spain	192	588	725	27.8	11.6
Turkey	122	524	621	40.7	9.3
Belgium	341	554	540	5.9	-1.2
Austria	215	272	283	3.2	2.1
Norway	80	140	256	22.0	41.2
Denmark	73	182	180	14.7	-0.4
Finland	95	148	160	6.8	3.9
Ireland	82	142	151	8.4	3.1
Portugal	0	81	109		17.9
Switzerland	70	105	107	5.2	1.1
Greece	4	72	77	181.7	2.9
Luxembourg	17	27	42	14.7	28.9
Sweden	23	30	34	5.0	6.5

*Source: US Department of Energy, Energy Intelligence Agency (EIA)*

The core gas markets in Europe in the period included the large and mature markets of the UK, Germany, Italy, the Netherlands and France. Also Belgium had substantial gas consumption throughout the period. Some markets, notably those of Portugal and Greece, showed nominally high growth rates, but this was deceptive since their base-year consumption rates had been so negligible. The high growth rate in Norwegian gas consumption was mainly associated with growth in upstream activities, since gas infrastructure was poorly developed. Conversely, the Spanish and Turkish markets showed a combination high growth and substantial volume. We would expect strong implementation companies to have targeted at least the high-volume markets of the UK, Germany, Italy, the Netherlands and France, as well as the high-growth/medium-volume markets of Spain and Turkey. Another cross-cutting indicator of implementation strength would be ‘range of market segments’ targeted for downstream marketing and sales. Targeting all market segments would surely indicate greater implementation strength than if only the largest and most lucrative customers in the commercial and industrial market segments were targeted. Table 2 summarises the geographical spread of company downstream natural gas activities in Europe by early 2005. In the upper part of the table, ‘1’ indicates downstream activities in each of the core gas markets, ‘0’ indicates none. The lower part of the table shows i) the number of additional non-core European markets where the companies were present

downstream; ii) the sum of core and non-core market presence; and iii) presence by the two market segments, ‘industrial and commercial’ and household customers.

**Table 2 Downstream natural gas strategy implementation: geographical and market segment spread 1990–2005**

	BP	Exxon	Hydro	Shell	Statoil	Total
UK	1	0 (Divestment of former activities)	1	1	1	1
Germany	1 (Negligible market share)	1	0	1	0	1
Italy	1 (Only initial investments)	0	0	0	0	0
Netherlands	1	1	1	1	0	1
France	0	0	0	0	0	1
Spain	1	0	0	1	0	1
Turkey	0	0	0	0	0	0
Other non-core European	0	0	0	1 (Denmark)	1 (Denmark)	0
<b>SUM</b>	<b>5</b>	<b>2</b>	<b>2</b>	<b>5</b>	<b>2</b>	<b>5</b>
I&C markets	5	2	2	5	2	5
Household markets	0	0	0	0	1	0

*Sources: Company annual reports and web sites*

Table 2 indicates that none of the companies can be characterised as *very strong* implementers. None of them targeted all core gas markets in Europe for downstream marketing and sales, and few companies were present outside the most lucrative industrial and commercial market segment. Despite this modest showing, we can note substantial inter-company differences. BP and Total reported downstream presence in five of the seven core gas markets in Europe, Shell in four of them plus Denmark. Exxon and Hydro reported presence in only two of the core markets, and Statoil reported presence in one core market and Denmark.

### **Explaining general implementation weakness**

If market perfection removes the benefits of vertical integration, we might conclude that lack of downstream strategy implementation reflects how European gas markets have grown competitive, from the lead period from when the oil companies formulated their strategy to when implementation was to be carried out. Some observations support this argument, notably that two of the companies, Exxon and Hydro, first went in and later withdrew from the most liberalised European market, that of the UK, when competition grew harder. However, it can hardly explain why the other companies maintained and developed their

activities in precisely the same market. Weak implementation may also reflect the opposite situation: that the companies in fact met barriers when seeking entry into the core natural gas markets in Europe. From this perspective, and on the basis of the geographical patterns displayed in Table 2, we should expect substantial barriers to entry in downstream markets where none or few of the companies chose to invest downstream (France, Italy and Turkey); few barriers in the UK, where all companies invested; and medium barriers in the Netherlands, Germany and Spain, which attracted downstream investments from some of the companies. And indeed, asymmetries in removal of entry barriers have repeatedly been mentioned in various EU Commission reports on Gas Market Directive implementation (Eikeland 2004).<sup>2</sup> European Commission decisions in June 2005 to launch an inquiry into competition in gas and electricity markets demonstrate the persistence of the problem. In its former second and third benchmarking reports on the state of implementation in 2002 and 2003, the EU Commission recorded a series of breaches with internal market principles that threatened competition from developing satisfactorily in national gas markets.<sup>3</sup>

**Table 3 Member-state implementation of internal gas market measures, 2002 and 2003 (Number of deviations from ideal internal gas market conditions)<sup>a</sup>**

Core natural gas markets							Non-core gas markets					
	UK	SPA	ITA	NET	FRA	GER	AUS	DEN	BEL	IRL	LUX	SWE
2002	0	1	1	4	7	7	1	3	2	3	5	6
2003	0	1	1	2	3	4	1	1	2	3	4	5

<sup>a</sup> In 2002, the EU Commission reported on 9 conditions that should be fulfilled for national gas markets to adhere to free-market principles. In 2003, it only reported on 8 conditions.

Source: The Commission of the European Communities, Second and Third benchmarking reports on the implementation of the internal electricity and gas markets

From Table 3 we can see that, by 2002, the European Commission had assessed the UK as the only member state without significant impediments to competition and barriers to entry in the downstream natural gas market. The UK was first among European countries to allow customers to freely choose supplier – for industrial and commercial consumers in 1992 and all customers in 1998<sup>4</sup> – and was therefore chosen as testing ground by all the companies for implementation of their downstream gas market strategies.<sup>5</sup> The UK was the only

<sup>2</sup> The EU Commission has issued four Benchmarking Reports on implementation of regulatory measures to ensure competition in the electricity and gas markets of member states.

<sup>3</sup> These included degree of market opening, unbundling in transmission and distribution, whether tariffs are regulated ex-ante or checked only ex-post, transmission tariff structure, overall network tariffs, capacity booking procedure, balancing conditions and degree of concentration in wholesale market.

<sup>4</sup> In 1992, competition was opened up for industrial and commercial customers using between 2,500 and 25,000 thermal units of gas per annum.

<sup>5</sup> All the companies had established marketing and retail sales companies in the UK before 1992. Statoil and Hydro entered the market in a consortium with BP (through the Alliance Gas Company, established in 1991). The same year, Total set up the UK subsidiary Total Gas Marketing. Shell and Exxon had established the joint UK gas trading company Quadrant Gas back in 1989.

European market that actually attracted downstream investments by all the companies studied, although Exxon and Hydro later opted to leave (Hydro returned again in 2004).

At the other end of the scale, the European Commission reported France and Germany among the laggards in installing competition and removing entry barriers. By 2003, France had opened only 28% of its gas market to competition, with plans for a cautious 33% opening by 2008 but no timetable for full opening. Entry barriers on the supply side included absence of access capacity at four of five entry points due to long-term take-or-pay contracts. Adding to entry problems was the system of distance-related transmission tariffs, which allowed no real competition for customers outside the area near the sole available entry point in northeastern France. Even in this area, the EU found limited competition because, the reports suggest, the dominant incumbent company Gaz de France (GdF: vertically integrated, controlling more than 90% of gas sales in France) had reduced prices to industrial consumers in the area to frighten off competitors (DRI-WEFA 2001). The fact that, among the upstream companies studied, only French Total had managed by 2004 to take a substantial part of the downstream market in France lends further corroboration to the barrier thesis. BP Northern Europe Gas & Power reported setting up an office in France in early 2005, without any flagging of business success. Concerns voiced by prospective grid users in France indicated that upstream companies serving the dominant company GdF on long-term contracts had been reluctant to start up their own downstream business, for fear of destroying business relations with a major customer (ibid: 38).

On paper, Germany took the first legal steps towards complete opening of its electricity and gas markets in 1998. A 2001 European Commission report, however, concluded that a significant proportion of new potential players had experienced barriers to accessing the grid, and that the amount of eligible volume switched to new suppliers was low (DRI-WEFA 2001). Upstream companies studied reported similar constraints. In 2003, BP Energie Deutschland pointed to lack of competition as the reason why the company had signed deals with only five major industrial gas customers.<sup>6</sup> Statoil and Hydro reported reluctance in setting up downstream businesses competing with the major German gas companies, important long-term customers in the wholesale market. Although Total Gas & Power North Europe reported sales of natural gas to commercial and industrial customers in Germany through its Brussels office, Germany was not, like the UK, France and Spain, mentioned as one of its primary markets. Only Shell and Exxon reported Germany as one of their major downstream markets in Europe. The two companies conducted gas sales jointly until 2004 through the vertically-integrated company BEB, 50% owned by each of them.

Table 3 shows that the European Commission reported Italy, Spain and the Netherlands in a middle position in terms of implementing the gas market directive. The Netherlands recorded considerable impediments to a perfect market, but had formally opened parts of the market (industrial and commercial customers) in 2000 and the entire market in 2003. Despite imperfect competition, Statoil was the only company that by 2004 did not report downstream natural gas marketing and sales in the Netherlands. Shell and Exxon

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<sup>6</sup> See *Alexander's Gas & Oil Connections*, Vol 8, No. 20, 17 October 2003

reported major downstream natural gas activities conducted through the dominant gas transmission company Gasunie, in which each company held a 25% share. In 1999, BP established an office in the Netherlands for direct marketing of gas to Benelux industrial and commercial customers, part of the 'Gas and Power' marketing unit 'BP Energy' established the same year. By 2004, Total Gas & Power North Europe reported sales of natural gas to commercial and industrial customers in the Benelux countries through its Brussels office. Hydro chose the Dutch market as major target for its downstream natural gas strategy in the late 1990s. Operations in the Netherlands were extended in 2003 by the acquisition of US Duke Energy Europe Northwest's Dutch gas trading business and access agreements to transport and gas storage facilities (which Duke Energy had acquired from Exxon in 2000).<sup>7</sup>

Also Italy had also opened up 100% of its gas market to competition by 2003 (65% was opened up in 2000). Important supply-side barriers had been removed already in 1991, with third-party access to the grid being implemented. By 2000, 16% of gas sales were made on this basis (DRI-WEFA 2001: 65). Nevertheless, important barriers persisted, notably lack of grid capacity and a highly concentrated gas market structure of the vertically-integrated company ENI (which had control over the upstream company Agip, the midstream company SNAM, which had a monopoly in transmission, storage and import, and the downstream distribution company Italgas). As clear indicators of barriers: by 2000 relatively few eligible customers had changed suppliers, few new entrants had made inroads into the Italian market, and few upstream companies had implemented their downstream strategies in Italy (DRI-WEFA 2001: 73). By 2005, only BP Energy had set up a gas sales office in Italy, due less to success and more to plans for a LNG terminal to enable future expansion in downstream gas operations.

By 2000, Spain had opened up 72% of its gas market to competition; three years later, it gave all consumers the opportunity to choose suppliers. Lack of capacity at entry points into Spain constituted the main barrier to new entrants; failure to give companies access to the grid was not considered a serious barrier. By 2000, five new gas suppliers had noted success in accessing the grid. Two of these were BP and Shell. BP Energy was the first foreign company in the Spanish market in 2000, serving 10% of the commercial and industrial market segment by 2002. By 2005, BP was vertically integrated in the Spanish natural gas supply chain: it shipped in LNG from Oman operations, selling directly to major consumers and indirectly as gas-fired electricity generated at a BP power station near Bilbao.<sup>8</sup> Spain became one of the primary areas for Total's downstream natural gas strategy, conducted through CEPSA, the major private gas company that Total acquired as part of its merger with Elf Aquitaine in 2000<sup>9</sup>. By 2003, CEPSA was operating as a vertically-integrated company (with gas exploration in Algeria right down to retail marketing and sales of natural gas in Spain), planning for a 10% share of the domestic natural gas market. As with BP, LNG activities were an important part of Total's gas supply activities in Spain.

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<sup>7</sup> This expanded Hydro's market share for long-term gas deliveries in the Netherlands from 6% to 8% (Hydro Press Release, 16 January, 2004)

<sup>8</sup> By 2005, the company highlighted Spain as a major European downstream area in which BP offered 'integrated energy' to large business customers – including oil products, lubricants, gas, power and solar power.

To sum up, there are clear indications that member-state failure in implementing the EU gas market directive and additional barriers to entry caused by high market concentration had an impact on overall implementation of the natural gas strategies of upstream oil and gas companies in Europe. We see this in the substantial correlation between geographical variation in downstream strategy implementation in core European markets and asymmetries in the speed and extent to which governments translated EU-level natural gas policies into action. Further support comes from the non-core Danish market, where Shell and Statoil's late investments (Shell by 2003 and Statoil by 2004)<sup>10</sup> reflect the relatively slow political reform efforts<sup>11</sup> and the transmission monopoly maintained by the vertically-integrated state-owned company DONG.

In its 2001 Benchmarking Report, the EU Commission concluded that asymmetrical implementation of the Electricity and Gas Directives had created different market conditions across member states in Europe, affecting both energy consumers and energy companies. Concerns had not abated in the 2003 Benchmarking Report, where additional barriers to entry were noted, in particular the *high degree of market concentration* in many national gas and electricity industries. In 2003, various amendments were made to speed up the liberalisation of electricity and gas markets.<sup>12</sup> These amendments would, *if implemented*, remove serious barriers to entry in core European gas markets and facilitate entry for independent companies. However, since vital national interests continue to cause asymmetrical implementation, these amendments do not represent any automatic guarantee that the problem will disappear in the short run. They certainly do not remove the problem of market concentration that deterred independent companies, upstream companies included, from going downstream in important European gas markets.

## **Explaining variation in company implementation strength with variation in business opportunities**

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<sup>9</sup> Elf Aquitaine had acquired 45% of the shares in CEPSA during the 1990s.

<sup>10</sup> Statoil entered the market by joining one of the major existing retail suppliers, Naturgas Fyn, to establish the retail gas marketing and sales company Statoil Gazelle. It supplied 30,000 households and 1,200 commercial and industrial customers, accounting for about 7% of the Danish market, and planned increased to 20% once the market was fully liberalised. Supply was to take place through the pipeline system connecting Denmark to Germany, due to the lack of pipelines between Norway and Denmark.

<sup>11</sup> By 2000, Denmark had opened up only 30% of its gas market for competition, but it reported full opening by late 2003.

<sup>12</sup> The Commission's proposals for amending the directives and additional regulations for matters still unregulated were adopted by the Council in June 2003. The amended directives required full electricity and gas market opening for non-household consumers by July 2004 and for all consumers by July 2007. The amendments also required *legal unbundling* of network activities, i.e. organisational separation of units operating transmission activities from units operating generation and supply activities. Moreover, it mandated the establishment of a regulator in all member states with well-defined regulatory functions, and contained a requirement that network tariffs be published. The scope of EU regulations was broadened by additional, separate rules for cross-border trade in gas and electricity. A regulatory committee will decide on guidelines for compensation of transit flows, on harmonisation of national transmission tariffs and on allocation of cross-border interconnection capacity.

Table 2 shows that some companies were more active implementers than others, despite the overall weak implementation of downstream strategies. BP, Total and Shell were in the vanguard, with Exxon and the smaller Norwegian companies Hydro and Statoil trailing behind. Either the companies did not face *equal* business opportunities, or internal company variables must have decided strategy implementation. The latter will be discussed more thoroughly in the next section.

Business opportunities can be assumed to be greater in geographical market areas in which the companies already do business. We call them ‘home markets’ and ‘wider business spheres’. A company’s home market will generally be in its country of origin. Here, companies have their core market base and customer treatment systems that can be activated when establishing new business lines (to more easily exploit economies of scope in diversification).<sup>13</sup> The ‘wider business sphere’ covers geographical areas outside the home market where companies have particularly strong business lines and opportunities to exploit economies of scope. For upstream oil and gas companies, their home markets and wider business spheres will be where the company already has a large market shares in existing product lines, first and foremost in natural gas chain activities but also in manufacturing, marketing and sales of various oil products.

It is fair to assume that a company’s implementation potential will increase, the broader its existing geographical business sphere is, the greater the spatial overlap of business sphere and core gas markets, and the fewer barriers there are to gas market entry in this sphere. Table 4 shows, for upstream companies, their home market bases and historically established business spheres in Europe in the 1990s. Table 5 summarises data on geographical spread of company oil-product service stations in Europe by 2005, one of the variables applied in outlining the wider business spheres of the companies.

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<sup>13</sup> Moreover, the home market hosts the company’s headquarters and a large share of the company’s employee base, giving it political clout for negotiating favourable deals with the government and business partners.

**Table 4 Home markets and wider business spheres in Europe, 1990s**

	<b>'Home market'</b>	<b>Wider European business sphere</b>
<b>BP</b>	<b>UK</b> (headquarters, number one upstream agent, refineries and a large network of oil product service stations.)	<p><b>Germany</b> (oil product market leader, refinery capacity and former involvement in gas transmission, second largest employee base in Europe with 9000 employees)</p> <p><b>France</b> (refining and extensive network of service stations)</p> <p><b>Benelux</b> (upstream, refinery and large network of service stations in the <b>Netherlands</b>, 3 chemical plants in Belgium, service stations in Luxembourg)</p> <p><b>Spain and Turkey</b> (large network of service stations)</p> <p><b>Austria</b> (leading oil product marketer, refinery capacity and large network of service stations)</p> <p><b>Switzerland</b> (large network of service stations)</p> <p><b>Portugal</b> (30% of LPG market and large network of service stations)</p> <p><b>Greece</b> (largest private company with extensive network of service stations)</p>
<b>Exxon</b>	<b>US</b> , (headquarter)	<p><b>The Netherlands</b> (upstream, refinery and several chemical plants, large downstream oil product network)</p> <p><b>Germany</b> (upstream, refineries, chemical plants and a large network of service stations, ownership in up- and midstream natural gas company, staff of around 2,700)</p> <p><b>Italy</b> (refineries, chemical plants and Exxon's largest network of service stations in Europe, employing a staff of around 3000)</p> <p><b>France</b> (refineries, chemical plants and large network of service stations, large employee base of 4000 staff)</p> <p><b>UK</b> (large network of service stations)</p> <p><b>Benelux</b> (refinery, chemical plant and service stations in Belgium, service stations in Luxembourg)</p> <p><b>Norway</b> (upstream and large network of service stations)</p> <p><b>Finland, Ireland, Austria, Switzerland</b> (large networks of service stations)</p>
<b>Hydro</b>	<b>Norway</b> (headquarter, upstream, large network of service stations, other industrial activities)	<p>Other <b>Scandinavia</b> (large networks of service stations in Sweden and Denmark, refinery in Sweden sold out in 2003).</p> <p>Hydro operated as a major European fertiliser and light metal producer and therefore as a major energy consumer in the <b>Netherlands, Germany, Italy and France</b> (where industrial production facilities were located). This entailed that the company's business sphere in energy products also included these areas</p>
<b>Shell</b>	<b>The Netherlands</b> (upstream and midstream natural gas, refinery, chemical plants and service stations, employing a staff of around 11,000), <b>the UK</b> (upstream, refineries, chemical plants network of service stations, employing a staff of 15,000 including subsidiaries)	<p><b>Germany</b> (upstream, midstream natural gas, refineries, chemical plants, extensive network of service stations)</p> <p><b>Benelux</b> (midstream natural gas in Belgium, network of service stations in Belgium and Luxembourg).</p> <p><b>France</b> (refinery and large network of service stations)</p> <p><b>Italy</b> (refinery and large network of service stations)</p> <p><b>Turkey</b> (refinery and large network of service stations)</p> <p><b>Spain</b> (network of service stations)</p> <p><b>Austria and Switzerland</b> (network of service stations)</p> <p><b>Scandinavia</b> (upstream, refineries and large networks of service stations in Norway and Denmark, refineries and large network of service stations in Sweden)</p>
<b>Statoil</b>	<b>Norway</b> (headquarter, upstream, refineries, extensive network of service stations)	<p><b>Scandinavia</b> (refinery and network of service stations in Denmark, network of service stations in Sweden)</p> <p><b>Ireland</b> (network of service stations)</p> <p><b>Baltic</b> (network of service stations)</p>
<b>Total</b>	<b>France</b> (headquarter, refineries, chemical plants, other industrial activities, gas transmission)	<p><b>Belgium</b> (refinery, chemical plant, market leader in fuel distribution through a large network of service stations, other industrial activities)</p> <p><b>UK</b> (refineries and large network of service stations)</p> <p><b>Germany</b> (refinery and large network of service stations)</p> <p><b>Spain</b> (refineries, chemical plants and a large network of service stations)</p> <p><b>Italy</b> (refinery and large network of service stations)</p> <p><b>The Netherlands</b> (refinery, network of service stations)</p> <p><b>Turkey</b> (network of service stations)</p> <p><b>Portugal</b> (network of service stations)</p>

**Table 5 Oil-product service stations in selected OECD European countries, 2005**

	BP	Exxon	Hydro	Shell	Statoil	Total
UK	n.a.	1,200 <sup>b</sup>	0	1,000	0	1,400
GER	2,700	1,350	0	2,200	0	1,200
NET	400	350	0	680	0	600
BEL	0	300	0	330	0	500
LUX	50	30	0	40	0	30
FRA	575	780	0	1,000	0	4,500 <sup>c</sup>
ITA	0 <sup>a</sup>	3,000	0	1,200	0	1,400
SPA	600	80	0	314	0	1,740 <sup>d</sup>
TUR	550	0	0	600	0	500
GRE	1,600	0	0	n.a.	0	n.a.
POR	300	65	0	0	0	200 <sup>e</sup>
IRE	0	350	0	n.a.	180	0
NOR	0	350	400	400	560	0
SWE	0	0	600	727	600	0
DEN	0	0	350	230	260	0
FIN	0	200	0	n.a.	0	0
AUS	560	160	0	350	0	0
SWI	420	270	0	450	0	0

Sources: Company annual reports and web sites

a) BP had 300 sales agents for marketing of lubricants, marine and aviation fuels and chemicals in Italy.

b) Exxon figures in the UK in the range 1,100-1,300 according to various sources.

c) 2003 figures. The number was down from 5300 in 2001, indicating strong rationalisation

d) Of which 1,700 were CEPSA service stations

e) Of which 150 were CEPSA service stations

As Table 4 shows, BP's home market and wider business sphere in Europe in the 1990s included all the countries that hosted Europe's core gas markets, except for Italy. Here, BP had but a modest presence in oil product marketing and sales. BP held a particularly strong position for downstream natural gas activities in Germany, where it was already familiar with the gas market through shareholdings in Ruhrgas, terminated in 2003. Beyond the core gas markets, BP's business sphere extended to Austria and Switzerland in Central Europe, Norway in the far north and Greece in the south, where in 2005 it was the country's largest private company. Exxon's business sphere in Europe in the 1990s was concentrated in northern Europe, with major gas market areas like Germany, the UK, Italy, the Benelux and France. Spain and Turkey were not within the company's primary business sphere. Exxon held a particularly strong position in the Netherlands and Germany, where the company enjoyed strong co-ownership positions with Shell in upstream and midstream natural gas companies (NAM and the former monopoly transmission company Gasunie in the Netherlands, BEB in Germany). The close relationship between Exxon and Shell in Europe evolved over several decades. Up to 2003, the two companies also held shares in German Ruhrgas and Thyssengas, and cooperated in licence application for upstream activities in the UK and Norway. Beyond core gas market areas, a host of northern European countries were

included in the Exxon business sphere (Ireland, Switzerland, Austria, Norway and Finland). In 2005, *The Royal Dutch/Shell Group* was the geographically most extensively diversified downstream oil supply company in Europe, with home markets (the Netherlands and the UK)<sup>14</sup> as well as a business sphere covering all the countries that hosted core European gas markets. As noted above, Shell's joint ownership of natural gas assets with Exxon gave it a particularly strong position for downstream integration in the Netherlands and Germany. Shell also owned part of the former Belgian monopoly gas transmission company *Distrigaz*. Outside these core areas, Shell's business sphere included Austria, Switzerland and Scandinavia (Norway, Denmark and Sweden). The business sphere of French *Total* extended during the 1990s across all core natural gas markets in Europe. Beyond France, Total's position was strong in Belgium, after its acquisition of *Fina* in 1999. Total was particularly well positioned for downstream operations in Spain: it acquired *Elf Aquitaine* in 2000 and with it, major interests in the vertically-integrated Spanish petroleum company *CEPSA*. Outside core European gas market areas, Portugal was included in Total's European business sphere. By comparison, the business sphere of Norway's *Statoil* was far less extensive in the early 1990s. Statoil did not operate downstream petroleum activities in any areas hosting Europe's core natural gas markets. Its major downstream business sphere was the greater Scandinavian area, extended in the 1990s into the Baltic area, Poland/Russia and Ireland. Also *Hydro's* downstream oil marketing operations were limited to the Scandinavian countries. However, as one of the world's leading producers of fertilisers and light metals, the company was also among Europe's biggest energy consumers, with main industrial plants located in the Netherlands, Germany, France and Italy, extending the company's business sphere to some of Europe's core gas markets.

Comparing the business sphere patterns (summarised in Table 3) with patterns of company downstream natural gas strategy implementation (summarised in Table 2), we find considerable spatial overlap. Companies that historically held midstream natural gas assets (ownership in transmission grids) in a country also appeared to be able to extend their business activities downstream more easily. This indicates that barriers to entry became an asset for those companies who were already 'insiders', i.e. were not really operating as true independents. Barriers to market entry in France seemed to benefit Total, the only company with substantial downstream sales in France in 2004. Total's forward integration in France was eased when the company in 1997 made an agreement with *Gaz de France (GdF)* to swap interests in a North Sea permit against 15% of the shares in *Compagnie Française du Méthane*. Total's merger with *Elf Aquitaine* in 2000 increased its ownership share to 45%, since the latter had owned another 30% of the company. From *Elf Aquitaine*, Total also took over 70% of a pipeline system in southwestern France through the company *Gaz du Sud-Ouest*, in which *GdF* held a 30% share. In 2003, Total and *Gaz de France* decided to separate their cross-shareholdings in *Gaz du Sud-Ouest (GSO)* and *Compagnie Française du Méthane*

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<sup>14</sup> Shell produced 20% of Britain's crude oil, 17% of its gas and 15% of its petrochemicals. The UK figured as the base for global Shell businesses such as Oil Products, Chemicals, Renewables, Gas and Power, Aviation, Marine Products and Shell Services International (SSI). The trading and shipping arm of the Oil Products business, *Shell International Trading and Shipping Company (STASCO)*, was also based in London.

(CFM). Total became sole shareholder in GSO while Gaz de France took over CFM, minus parts of the company's trading operations. The deal also included the transfer of one third of GdF's interest in the Fos Cavaou LNG terminal project to Total.

Barriers to entry in Germany and the Netherlands seem to have benefited Shell and Exxon. In the Netherlands, the companies enjoyed full monopoly position in gas transmission through their joint ownership of Gasunie. In Germany, their joint ownership in various German gas companies went back several decades. Shell and Exxon had full control over BEB, the major upstream-based company with substantial control over parts of Germany's pipelines. By 2003, Shell and Exxon had sold out their interests in Ruhrgas and Thyssengas but retained full control over BEB, which had been transformed into a completely vertically-integrated gas company that accounted for around 20% of total gas sales in Germany. BEB, like the other major German companies, was accused of denying access to pipelines to competitors. The case went right up to the EU Commission.<sup>15</sup> None of the other upstream companies enjoyed a similarly favourable position in the German gas market. BP held a passive 25% shareholding in Ruhrgas until 2002, when the company swapped these shares with E.ON in return for downstream oil product assets. As noted above, BP was one of the companies that reported on access problems for its downstream natural gas operations in Germany.

We also see that the companies that enjoyed the most extensive business spheres more generally in oil product marketing (BP, Shell and Total) reported the strongest implementation of their downstream natural gas strategies in Europe. Exxon and Hydro, with a more limited downstream business sphere, reported weaker implementation, as did Statoil, which had no downstream oil product marketing activities in countries hosting core gas markets. This pattern lends support to the theory that sees variation among the companies concerning opportunities to exploit economies of scope in retail marketing of natural gas as an explanation of the variation in implementation of their downstream strategies for natural gas in Europe. Additional factors must be included to explain the lack of implementation in the two Norwegian companies Statoil and Hydro, however. Both were highly restricted in implementation efforts in that their immediate home market, Norway, had not developed any onshore natural gas infrastructure whatsoever.<sup>16</sup> Also another important part of their business sphere, Sweden, was characterised by a poorly developed gas market.<sup>17</sup> Denmark was the

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<sup>15</sup> In 2004, Shell and Exxon decided to discontinue gas marketing and retail sales within the BEB Company and to set up separate gas trading businesses in Germany – Shell Energy Deutschland and ExxonMobil Gas Marketing Deutschland GmbH. The latter merged Exxon's part of downstream gas activities split from the BEB with the gas marketing business of Mobil Erdgas-Erdöl GmbH. By 2005, the new company had a staff of 50 people.

<sup>16</sup> In addition, plans to create a natural gas market in Norway through the construction of gas-fired power plants evolved into one of the country's most contentious political issues. Since Norway generates 100% of its electricity from hydropower, and has a good track record on climate change emissions from the power sector, construction of gas-driven power plants would pose problems in meeting international obligations to cut greenhouse gases. By contrast, in continental Europe and the UK, where power has historically come from coal, natural gas has rescued politicians eager to cut greenhouse gas emissions.

<sup>17</sup> In Sweden, Statoil acquired in 1997 14.5% of the monopoly transmission and wholesale company Vattenfall Naturgas AB and increased its share to 30% in 2001, when the company was renamed Nova Naturgas. In 2004, the company was split to comply with EU requirements. Statkraft sold out its shares in downstream supply activities to the Danish DONG.

only Scandinavian country with a substantial domestic market. Moreover, Norwegian companies were politically inhibited from pursuing downstream natural gas policies also outside Norway in the 1990s. In the mid-1980s, the Norwegian state set up by statute a Gas Negotiation Committee to handle all long-term contracts with major European customers, prohibiting sale of North Sea gas by individual companies.<sup>18</sup> The system was intended to harmonise the development of gas fields in the North Sea. While the system affected all companies operating in Norway, it seriously inhibited downstream integration of Norwegian companies which depended most on gas from the Norwegian Continental Shelf. In 2001, the system was abolished on the advice of the European Commission, leaving Statoil and Hydro free to sell and export gas. Statoil's move into the Danish downstream market and Hydro's return to the UK downstream market in 2004 (in a joint venture with Wingas) illustrate responses to this new freedom.<sup>19</sup>

### **Explaining variation in implementation strength with internal company variables**

Unequal business opportunities cannot, however, explain all variation observed in translating strategy into practice. They fail, for instance, to explain Exxon's low-key implementation profile in Europe. By early 2005, Exxon's implementation remained confined to the Dutch and German gas markets, areas where Exxon's joint ownership with Shell of major gas transmission companies and pipeline systems offered a very favourable business climate. The Exxon case is best illustrated by benchmarking its behaviour in markets characterised by relatively few barriers to entry – Britain and the Netherlands, against the behaviour of the other major companies.

When the joint UK downstream venture between Shell and Exxon was split in 1997, Exxon withdrew from British downstream natural gas operations and sold out its activities to Shell, which continued operations in the company Shell Gas Direct. In 2003, Exxon sold out also the portfolio of industrial and commercial gas customers acquired from Mobil as part of the 1998 merger between the companies. Against this weak implementation profile in the British market, Exxon's long-term business partner Shell continued to expand downstream in the UK gas market after the split in 1997. In 1998, Shell acquired Texaco's UK industrial and commercial gas business and a portfolio of small and medium-sized industrial and commercial customers from Total. Despite this sell-off, Total expanded in the British market. In 2001, it acquired the portfolio of medium-sized gas customers from Statoil. The merger with Elf in 2000 brought together the downstream gas business of the two companies in the UK,<sup>20</sup> and in 2003, it was Total that acquired Exxon Mobil's UK industrial and commercial

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<sup>18</sup> Upstream companies operated as extractors and were paid according to their licensed share of the field included in the deal.

<sup>19</sup> Other motives behind this recent move by Hydro include the new opportunities for natural gas exports from the Norwegian Continental Shelf to the UK due to the future prospects of the new Ormen Lange field operated by the company, and the new gas pipeline, Langed, that will connect the UK to this field.

<sup>20</sup> Elf Aquitaine had been present in the downstream UK market through shares in the company Agas, which in 1987 became the first independent supplier to contract gas for direct sales to the UK market.

gas marketing business, giving it a total 20% share of the UK industrial and commercial gas market segment by 2004. Also BP UK marketed itself by 2005 as a major downstream player, as number one in wholesale natural gas and number two in gas sales to industrial and commercial customers. The smaller Norwegian company Hydro followed Exxon's suit and withdrew from the UK market in 1996, when the Alliance Gas Company was split (but re-entered the market in 2004)<sup>21</sup>. Statoil continued its downstream gas sales in the commercial and industrial market segment without reporting any mergers taken to increase its activities.

Exxon's behaviour in the Netherlands is also illustrative of a relatively weak implementation programme. The Netherlands constituted a market where Exxon and Shell enjoyed a particularly advantageous position through their historically acquired 50% ownership each of the transmission company Gasunie, which until 2000 enjoyed a wholesale monopoly position in the country. A merger with Mobil in 1998 gave Exxon the largest independent gas trading and marketing company in the Netherlands, Mobil Europe Gas. Exxon thereafter had several opportunities to expand in the Netherlands as Gasunie lost market shares between 1998 and 2002.<sup>22</sup> However, Exxon did not choose that path, and sold Mobil Europe Gas to Duke Energy International in 2000. Shell, on the other hand, sought downstream operations outside the Gasunie consortium, utilising its home market experience. In 1998, Shell and Eneco, a major Dutch retail supplier, formed a new energy trading company, EnecoShell Energy. It was initially quite successful in winning industrial contracts before the alliance fell apart in 2001. Even the other companies, minus Statoil, became active in the Dutch market. Hydro used its Dutch-based fertiliser plant, conveniently located close to the Belgian border, the Interconnector and the Zeebrugge terminal, to which Hydro had secured access, as a springboard, soon becoming the first industrial company to import British natural gas to the European Continent through the Interconnector. This paved the way for further expansion in retail marketing and sale of surplus gas from its industrial interests.

*Internal company explanations* may account for Exxon's weak implementation relative to BP, Shell and Total, even in gas markets located in the company's major business sphere and in markets characterised by few barriers to entry. The 'black box' of internal company variables is large; here, we will briefly discuss only one theory often invoked to explain behavioural differences: the *principal-agent theory*. The theory predicts that companies in which shareholders control the management (principals are in control of agents) will tend to invest in activities where short-term rate of returns are generally considered highest whereas management-controlled firms (where the agent has asymmetrical and superior information to the principal) will tend to maximise growth and management prestige rather than shareholder interests, and demand less from short-term returns (Pratt & Zeckhauser 1991). All the companies formulated strategic intentions to integrate forward in the gas supply chain. However, as strategy implementation requires more of a company's

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<sup>21</sup> In light of projections of falling outputs from the UK North Sea sector, Norwegian gas is expected to take over a larger part of the large UK market, benefiting downstream natural gas strategy implementation for the Norwegian companies Statoil and Hydro.

<sup>22</sup> *Oil & Gas Today*, 9 April 2002, (<http://news.ogtoday.com/archives/0204/020704/020904b21.html>). According to the Net-based journal *Oil and Gas Today*, Gasunie lost 35% of its market share in the Netherlands in the period 1998–2002.

scarce resources than the strategic goal formulation, a classical trade-off situation will occur when a choice crops up between investing in a well-established business line (further specialisation in core activities) and branching out into new business areas, which may involve more uncertain costs and revenues than investments in core activities (Porter 1994).

Since downstream natural gas investments represented ‘going outside core activities’ for upstream-based oil and gas companies, variation in forward integration between the companies might well be interpreted as variation in shareholder demand for short-term rates of return. Additional company investment data lend support to such an explanation, in that the most active implementers of forward integration in European gas markets (BP, Shell and Total) were also the most eager to invest in downstream natural gas in other geographical areas, as well as in diversification into other energy supply chains. Exxon was, on the other hand, far more reluctant to invest outside its core businesses (Eikeland et al. 2004.) Hence, by 2004, BP was marketing itself as among the top five in gas marketing and top ten in electricity trading in the US market. Gas marketing ventures were announced in Latin American and Asian countries. The Shell subsidiary Coral Energy was among the top ten retail energy marketers in North America (gas and electricity) in 2004, when the Shell Gas & Power Division announced projects in 35 countries around the world. Total became a major downstream natural gas player in Latin America, after first expanding its upstream gas business. Exxon, on the other hand, despite its standing as a leading global upstream natural gas company involved in LNG system development for transporting natural gas to the wholesale market, did not report large-scale retail market investments. The smaller Norwegian companies did not report on downstream natural gas activities outside Europe. If we look at differentiation into other energy sources and carriers, the pattern is largely the same (See Eikeland et al. 2004.) Although Shell, BP and Exxon divested themselves of all or most of their coal mining activities, only Shell and BP replaced them with substantial investments in renewable energy sources. Exxon claimed that such investments were not feasible in terms of the company’s rate-of-return demands. Total, Statoil and Hydro had modest renewable energy investments. In the electricity supply chain, Shell became a major investor in independent electricity generation projects during the 1990s. BP’s investment in electricity generation was smaller and mostly tied to installation of co-generation at its industrial premises, a pattern also found in Exxon. Unlike Exxon, however, BP became substantially engaged in electricity trading activities. Total made substantial investments in electricity generation in the period. Statoil and Hydro realised a few electricity generation projects and were only modestly engaged in electricity trading activities.

A general pattern emerged: the keenest implementers of downstream natural gas strategies in Europe were also those most eager in energy diversification more generally – although it should be stressed that all companies put most of their investment capital into core upstream activities.<sup>23</sup> This supports the hypothesis of variable shareholder control over short-term rates of returns on investments.

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<sup>23</sup> Most conspicuous were the global-scale horizontal mega-mergers between the oil majors (Exxon and Mobil; Total with Fina and Elf Aquitaine; BP with Amoco and Arco), which created a different market structure

## Conclusions

The liberalisation of Europe's gas markets in the 1990s raised expectations that independent companies would start competing with incumbent gas companies for direct end-user gas sales. Major upstream oil and gas companies in Europe formulated downstream marketing and sales strategies. By early 2005, however, these strategies had not generally been pursued in practice. There is little doubt that regulatory failure to remove barriers to entry can explain much of this shortfall in implementation. Beyond grid access problems, the most problematic barrier was the dominant incumbents with long-term contracts with upstream agents, deterring the latter from setting up competing downstream businesses. Among the companies studied here, however, substantial variation in implementation strength was recorded. Variation in prior market position in core gas markets can explain some of this variation, as can company position in retail oil product marketing and sales. Variations in shareholder control over short-term rate of returns on investments may also help to explain variations in implementation strength. While the companies employed broadly similar rhetoric about investing in downstream integration, their actual practice differed widely.

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*among* the upstream companies and strengthening core competencies. Moreover, all the companies were highly visible in announcing their successes in new upstream explorations.

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