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**Continental European Long-Term Gas  
Contracts: is a transition away from oil  
product-linked pricing inevitable and  
imminent?**

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I alone am responsible for the results.

Jonathan Stern

**September 2009**

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## Introduction

A paper published in April 2007 questioned the continued rationale of the linkage of Continental European long term contract gas prices to oil product prices.<sup>1</sup> It concluded that the logic of linking gas prices to those of (mainly) oil products had largely disappeared in the major European gas markets. In the following two years, energy and non-energy events have begun to exert substantial pressure on the oil linkage mechanism. The global economic and financial crisis, which began in late 2008, has significantly depressed European energy and gas demand. Substantial new LNG supply is coming on stream during 2009-10, some of which is seeking markets in Europe. This has caused a substantial short term supply surplus which is increasing the pressure for change in the price-setting mechanism of European long term gas contracts. This paper does not repeat the majority of the material in the 2007 study, but focuses instead on developments over the past two years and the outlook in September 2009.

## The Weakening Rationale of Oil-linked Prices

In the six major Continental European gas markets, the rationale for continued linkage of long-term contract gas prices to those of oil products is weak and analysis of the statistical data since 1985 - and on detailed year to year changes since 1998 - shows that it weakened further during the mid 2000s (see Appendix A).<sup>2</sup> Its original rationale – that end-users had a real choice between burning gas and oil products, and would switch to the latter if given a price incentive to do so – was robust when the netback market pricing mechanism (largely) based on oil products and oil product indexation was established in the 1970s (and earlier in some countries). But a combination of:

- The virtual elimination of oil products from many stationary energy sectors in these markets;
- the cost and inconvenience of maintaining oil-burning equipment and substantial stocks of oil products;
- the emergence of modern gas-burning equipment in which the use of oil products means a substantial loss of efficiency;

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<sup>1</sup> Jonathan Stern, *Is there a rationale for the continuing link to oil product prices in Continental European long term gas contracts?* April 2007, <http://www.oxfordenergy.org/pdfs/NG19.pdf> (henceforth Stern 2007).

<sup>2</sup> The position of some smaller markets, especially in South Eastern Europe, will be different as they are still burning significant quantities of oil in stationary sectors and have retained greater switchable capacity, see Kovacevic 2007 and 2009, Giamouridis 2009 forthcoming.

- tightening environmental standards in relation to emissions,

has rendered the original rationale increasingly dubious, particularly in North West Europe. There is no likely scenario in which users installing new fuel-burning equipment will choose to use oil products rather than gas in stationary uses, unless they have no access to a gas supply.<sup>3</sup>

The 2005-06 data (which have become available since the publication of my 2007 paper) are crucial to verifying these assertions because of the January 2006 Russia-Ukraine crisis, followed by a spell of extremely cold weather in February 2006 in many Continental European countries, and the February 2006 fire at the UK's Rough storage facility.<sup>4</sup> This drove NBP and Continental European spot gas prices to high levels and created conditions such that any customer able to switch to oil products would almost certainly have done so.<sup>5</sup> Or, put another way, gas users which did not switch to oil products during winter 2005-06, cannot be expected to do so in the future as a result of gas prices rising substantially above those of oil products.<sup>6</sup>

The data in Appendix A show that total gasoil demand in the six major Continental European gas markets continued its decline from 2005 to 2006 in all sectors other than power generation (Tables 1-5). They reveal the following detailed changes in gasoil demand:

- aside from Germany, all countries showed a decline in demand in 2006 (Table 1); German household (937,000 tons) and service (354,000 tons) consumption were the only significant increases in these sectors (Tables 3 and 4).
- industrial demand fell in all countries (Table 2)
- power sector demand declined in all countries aside from a spectacular increase of 1.63 million tons in Spain (Table 5).

The same data for fuel oil demand (Table 6-10) show that:

- Service and power sector demand showed a decline for all countries; in the case of the Spanish power sector this was substantial, exceeding 2.5mt (Tables 9 and 10)
- In the industrial and household sectors (Tables 7 and 8), demand increased in the majority of countries (French industry and Italian households were exceptions). The biggest increases were in German and Spanish industry

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<sup>3</sup> However, they may choose to use other alternatives to gas, particularly for power generation.

<sup>4</sup> Any one of these events on their own would probably not have caused great problems but all three occurred within a short space of weeks. An analysis by the European Commission does not indicate that the 2005-06 winter was especially cold, which overall may have been the case, but February 2006 experienced 10 exceptionally cold days. Commission Staff Working Document 2009, p.17.

<sup>5</sup> As many did in the UK, see the example of the Peterhead power station in Stern 2007.

<sup>6</sup> This judgement is certainly robust for a period of weeks and possibly months. Whether, if customers perceived that gas prices would remain substantially above those of oil products for a period of years, they would invest in fuel switching capability cannot be definitively concluded.

(646,000 and 746,000 tons respectively); and in French and Spanish households (121,000 tons each).

Although it is impossible to be certain, the difficulty of switching fuels in the household and service sectors means that increased oil demand in these customer classes is more likely to be weather-related. By contrast, increased demand in the industrial and power sectors is likely to indicate fuel switching, probably from gas. Data for recent years therefore show that the maximum gas to oil switching in the major European gas markets which could have taken place during a single year was in Germany – 1.2 million tons of gas oil (1.5 Bcm of gas), and 1.6mt of gasoil in the Spanish power sector (around 1.9 Bcm of gas) . But the change in the Spanish power sector which, in 2005-06, used 1.6 mt more gasoil and 2.5 mt less fuel oil may indicate substitution between those two products, rather than gas to oil switching.<sup>7</sup>

Appendix B shows estimates made by EU member governments of their ability to switch to another fuel in the event of a gas supply disruption. The data suggest considerably greater fuel switching potential than the actual switching observed over the past decade in respect of gas to oil switching (shown in Appendix A), but we believe that the EU figures may reflect a *force majeure*, rather than a normal commercial fuel switching, capability.<sup>8</sup> Therefore we believe this does not affect the conclusion that very limited gas to oil switching capacity remains in the major European gas markets, even under the most favourable commercial conditions.

Relative lack of switching capacity undermines the original netback market value concept – at least in respect of oil products - since, if the latter are no longer the alternative fuels with which gas competes on a day to day or at least a month to month basis, then logically they should be replaced in the price clauses of long term gas contracts by other fuels or sources of energy.<sup>9</sup> But in addition, in many sectors of Continental European countries it is becoming difficult to identify fuels which do genuinely compete with gas on a day to day, month to month basis. Where there is an obvious competitor, this tends to be electricity in the residential sector, and coal in the power sector rather than oil products. Anecdotal evidence suggests that lack of genuinely competitive fuels is causing serious problems in the operation of price clauses in long term Continental European contracts with an increase in disagreements being submitted to arbitration.

### **The Market Power Argument and a Possible “Gas OPEC”**

During the late 2000s, the rationale for retaining oil-linked gas pricing changed from an argument that this was the most appropriate mechanism, to an argument that no other mechanism is available; and also to the argument that abandoning oil-linked

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<sup>7</sup> It may also indicate development in the use of oil products in the Balearic and Canary Islands which have no access to gas supplies.

<sup>8</sup> Meaning that continuity of fuel supplies to customers is prioritised irrespective of cost and profitability.

<sup>9</sup> For a description of netback market value contracts based on oil product indexation see Stern 2007.

prices could lead to gas market domination by a handful of major suppliers – specifically Gazprom – with the establishment of a “Gas-Opec”.<sup>10</sup>

The early history of the Gas Exporting Countries Forum (GECF) and the efforts of many commentators to imagine that the Forum has or could become an export price or volume-setting organisation, met with a sceptical response principally because:<sup>11</sup>

- Leading gas and LNG exporters – such as Netherlands, Canada and Australia – have played no part in the Forum;
- Other major players – such as Norway and South East Asian LNG exporters have had only marginal involvement;
- The members of the Forum which most vociferously support the idea of a price-setting organisation – Iran and Venezuela – are marginal gas exporters and are unlikely to become substantially more influential in global gas trade over the next decade.

But events since 2007 give at least some cause to reassess these sceptical views, principally:

- The much more serious engagement of Russia in the Forum starting in 2007 and continuing at the Moscow meeting of December 2008;
- The fact that the December 2008 meeting apparently saw the signing of the Forum’s Charter document.<sup>12</sup>
- The creation of the “Gas Troika” between Russia, Qatar and Iran in 2008.<sup>13</sup>

But the June 2009 meeting of the Forum was a low-key affair which attracted very little publicity. The fact that several previous members – Brunei, Malaysia, Indonesia and UAE – had disappeared from the membership; compensated only by Equatorial Guinea (which had converted from observer to full member) and Kazakhstan, which had become an observer, went almost unnoticed.<sup>14</sup> One of the few press reports to emerge noted only that the meeting had failed to appoint a secretary general, apparently because the Russian government failed to make a nomination.<sup>15</sup>

Nevertheless, it is important to reassess the potential role of the GECF because the fall in (oil and therefore) gas prices, and also the fall in export volumes, since mid-

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<sup>10</sup> The market power argument is well made in Finon 2008.

<sup>11</sup> Hallouche: 2006, Stern 2007a.

<sup>12</sup> This document is not in the public domain.

<sup>13</sup> *Results from the Trilateral Meeting of Delegations from Gazprom, Iran and Qatar*, Gazprom Press Release, October 21, 2008.

<sup>14</sup> <http://www.gecforum.org/>

<sup>15</sup> Anatole Medetsky, Russia fails to offer gas candidate, *Moscow Times*, July 1, 2009. Russia is expected to make this appointment at the next meeting in late 2009.

2008 has caused financial discomfort for many exporting countries. If the current oil-linkage changes to a mechanism which causes gas prices to fall significantly, even for a short time, this could create an incentive for the Forum to propose its own price mechanism.<sup>16</sup>

Part of the market power argument simply reflects the fact that the dominant commercial parties – producers, exporters and incumbent importers – are comfortable with oil product indexation, and have sufficient market power to maintain it if they fear that any new mechanism will reduce their revenues. Another part is a very understandable fear that at a time of oversupply, gas prices could drop sharply below parity with oil product prices, if crude oil prices remain at or above \$50/bbl for a protracted period of time.

### **Expectations of Decoupling Gas and Oil Prices: a Minority View**

The view that price provisions in European gas contracts might decouple from oil is a minority one. Polls taken at successive FLAME conferences (Table 1) show that an increasing proportion of gas industry executives (44% in 2009) believe that gas prices will remain linked to oil until at least 2015 and a further 32% believe they will never decouple, making more than 75% of responders deeply sceptical about the prospects for immediate change.<sup>17</sup> In March 2009, less than 4% of respondents believed that prices would decouple from oil prior to the end of 2010.

**Table 1: When do you expect European long term contract gas prices will become decoupled from oil and determined by spot and futures prices? (% of total)**

YEAR OF CONFERENCE POLL:	2004	2005	2008	2009
Before end 2010	24	15	8.7	3.8
Before end 2015	36	15	22.1	20.3
Later than 2015	15	39	42.5	44.3
Never	24	31	28.8	31.6

Source: FLAME Conference for respective years

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<sup>16</sup> This is because cartels tend to form when commodity prices are low, threatening not only profits of producers but their ability to cover short run marginal costs from new production and exports.

<sup>17</sup> FLAME is one of the biggest gas conferences in Europe, held every year in Amsterdam by ICBI.

## **Changing Supply/Demand Dynamics in 2009-10: Falling Demand Combined with Increasing LNG Supply**

The impact of economic crisis on European gas demand has been relatively dramatic. While there are significant differences between countries, gas demand fell by around 7% during the first half of 2009 in comparison with the corresponding period of the previous year<sup>18</sup>; in some countries (e.g. Spain), the fall in demand was much greater. If this trend continues through 2009 and into 2010, some European gas buyers may have problems in taking the minimum quantities of gas under their contracts and may run into financial problems in relation to paying for these minimum quantities at oil-linked prices in excess of \$50/bbl. Producers and exporters, whose revenues fell significantly as a result of the fall in oil prices since mid-2008, and are struggling with their own financial problems, will hardly be inclined to be sympathetic to the problems of their customers.

On top of these problems comes a wave of new LNG supplies in 2009-10. Producers of these new supplies will be looking for markets in Europe for several reasons:

- Lack of markets in the Pacific due to significant demand reduction.<sup>19</sup>
- The fall in North American Henry Hub prices below \$4/MMbtu in the second quarter of 2009 due to increased supplies of domestic unconventional gas and reduced demand.
- The opening up of new regasification capacity principally, but not exclusively, in the UK which – as a liquid market – can be expected to import as much LNG as suppliers are willing to deliver. But this would result in consequent downward pressure on NBP prices, and likely re-export of volumes to higher priced Continental European markets, adding to price and take or pay pressure.

Meanwhile, by 2009, trade at European gas hubs had become larger and more developed.

### **A Transition to Prices set at European Hubs?**

The idea that spot gas pricing at market hubs could set the long term contract price in Europe is neither new nor radical. But apart from in the UK, liberalisation, gas to gas competition and acceptably liquid trading hubs have been slow to emerge in Europe. The European Commission's liberalisation agenda which, by 2009, had progressed to a Third Package, is aimed at addressing these problems.<sup>20</sup>

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<sup>18</sup> This data, compiled by Anouk Honore and Howard Rogers of the OIES Programme using different methodologies, is on a non-temperature corrected basis; correcting for temperature the fall was closer to 10%.

<sup>19</sup> Exceptions in the Pacific may be Chinese and Indian buyers, but both countries currently have limited regasification capacity although more will be commissioned around 2011-12.

<sup>20</sup> For a detailed account of this agenda see Klop 2009 and Honore 2009 forthcoming.

**Table 2: Traded Volumes, Physical Volumes and Churn Rates at Major European Gas Hubs 2003-2008 (Bcm)**

HUBS*	NBP	ZEE	TTF	PSV	PEGs	BEB	CEGH	NCG
Year of start-up	1996	2000	2003	2003	2004	2004	2005	2006
Traded Volume:								
2003	611.0	38.6	2.3	0.1				
2004	551.9	41.1	6.2	1.1	0.3	0		
2005	500.1	41.7	11.6	2.6	4.0	0.4	0.8	
2006	615.2	45.1	19.1	7.1	7.0	1.2	8.9	0.2
2007	902.6	40.2	27.3	11.5	11.1	4.8	17.7	6.6
2008	960.8	45.4	60.2	15.6	16.5	9.7	14.9	25.3
Physical Volume:								
2003	52.5	10.2	1.3	n/a				
2004	53.2	10.6	2.3	n/a	n/a	n/a		
2005	53.7	8.4	3.8	n/a	n/a	n/a	n/a	
2006	60.6	8.6	5.9	n/a	n/a	n/a	n/a	0.1
2007	66.8	7.9	7.4	6.8	n/a	n/a	6.9	4.1
2008	66.6	9.1	18.7	7.7	n/a	n/a	5.2	14.4
Churn Ratio**								
2003	8.6	3.8						
2004	9.6	3.9						
2005	10.7	5.0	3.1					
2006	10.2	5.2	3.2					
2007	13.5	5.1	3.7	1.7			2.6	
2008	14.4	5.0	5.2	2.0			2.9	1.8

\*the hubs are NBP (UK) ZEE (Zeebrugge, Belgium), TTF (Netherlands), PSV (Italy), PEGs (France), CEGH (Austria), BEB (Germany – this hub is changing its name to GASPOOL) and NCG – the EON trading point formerly known as EGT (Germany); \*\*ratio of physical to traded volumes – only hubs with a traded volume in excess of 10 Bcm are scored. Source: IEA, *Natural Gas Market Review 2009*, Table 1, p.30.

Until the late 2000s, there has been a consensus that none of the Continental European hubs could be considered as being based on an acceptably deep and liquid market for reliable price indexation. Doubts continued to be expressed about whether the NBP – which most stakeholders consider has acceptable depth and liquidity – could serve as the gas index for the whole of the European market, or even for North West Europe.

While the progress made by European gas hubs in the period 2003-08 should not be overstated, and some setbacks have been observed, the trend is generally towards greater depth and liquidity (Table 2). The proliferation of hubs raises the question as to whether concentration of trade at a single European hub – akin to Henry Hub in the US – might not produce more rapid results. The fact that this has not yet happened is perhaps a consequence of the problems of third party access, and hence the inability to create ‘basis’ prices at different locations, in many Continental European countries. Yet this is beginning to change. Of special interest is the rapid development of the NCG (formerly EGT) hub in Germany based on progress towards greater ease of access and trading.<sup>21</sup> There is also anecdotal evidence that traders are selling gas in southern Europe on “NBP+basis” prices.

LNG is also having a greater influence on European gas prices via the NBP and Zeebrugge (and possibly other) hubs. In the extremely tight market conditions of 2006-2008, where no additional pipeline gas was available in Europe and buyers were forced to compete for LNG cargoes with the US or Asia, LNG played a role in forcing spot prices up. Conversely, during 2009 when US (Henry Hub) prices fell below prices at the European hubs, spot LNG supplies began to exert downward pressure on European price levels.<sup>22</sup>

In the majority of European countries, where pipeline gas is the dominant element of supply, the next few years could see a transition to price indexation at one or more market hubs. This transition might take as long as 5 years - although an index comprising some combination of NBP, TTF, ZEE and NCG prices could be established much sooner. For as long as supply surplus continues, hub prices – which are discussed in more detail below - would probably remain significantly below the oil product equivalent of a crude oil price of \$50/bbl.<sup>23</sup> But even if such events occur two consequences, often cited by those opposing such a development, should be kept in mind:

- *this would not necessarily mean the end of existing (or future) long term contracts*, only a change in the price provisions in those contracts;
- the abolition of *formal contractual linkage* to oil prices would not necessarily mean the end of *a relationship between gas prices and oil prices*.

This latter point is extremely important and needs some further elaboration.

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<sup>21</sup> For an account of the NetConnect Germany (NCG) hub and general development towards competition in the German gas market post 2005, see Lohmann 2009 forthcoming.

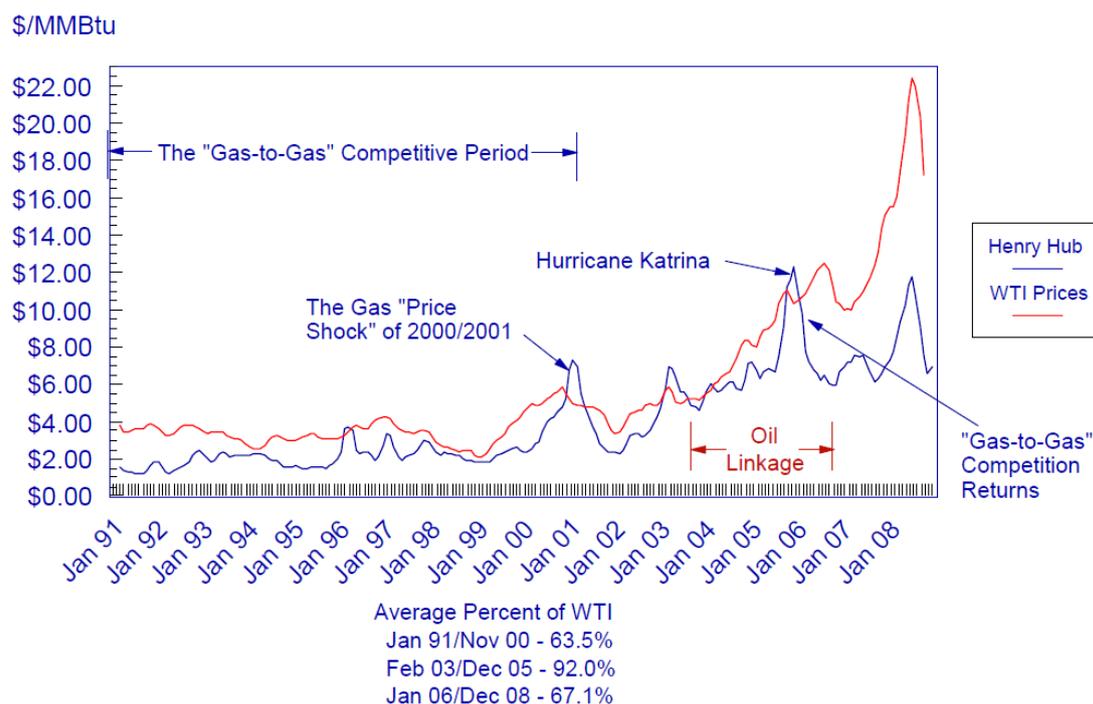
<sup>22</sup> These mechanisms are explored in detail in Rogers 2009: forthcoming.

<sup>23</sup> Assuming a crude oil price above \$50/bbl.

## The Lack of Formal Contractual Linkage Does Not Mean That Oil Prices Become Irrelevant to Gas Prices

The 2007 paper collected evidence from both sides of the Atlantic about the relationship between oil and gas prices in the absence of contractual indexation.<sup>24</sup> In respect of the US, we cited Foss' work which suggested that a significant correlation had existed in the past, but that this was expected to weaken substantially.<sup>25</sup>

**Chart 1: Relationship of Henry Hub to WTI prices 1991-2008**



Source: Jensen Associates from ECT 2009, Figure 19, p. 25.

More recent research shows that this did indeed take place. Work by Jensen for the Energy Charter Secretariat explains this in terms of gas supply and demand and, with reference to the period 1991-2008, identifies periods of gas-to-gas competition and periods of oil linkage in the fully liberalised markets of the US and the UK.<sup>26</sup> Jensen argues that the early part of this period created the expectation that gas prices would decouple from oil prices. However, supply shortage led to recoupling, with both markets experiencing short periods where gas prices rose above oil. As supply surplus returned to both markets – at different times and for different reasons – so decoupling returned. During the periods of decoupling, Henry Hub averaged 64-67% of WTI prices, while during the oil-linked period of 2003-2005 it averaged 92% (Chart 1). Academic modelling research finds multi-causality in the relationship between US oil

<sup>24</sup> Stern 2007, pp. 25-30.

<sup>25</sup> See Foss 2007 for the reasoning behind these expectations.

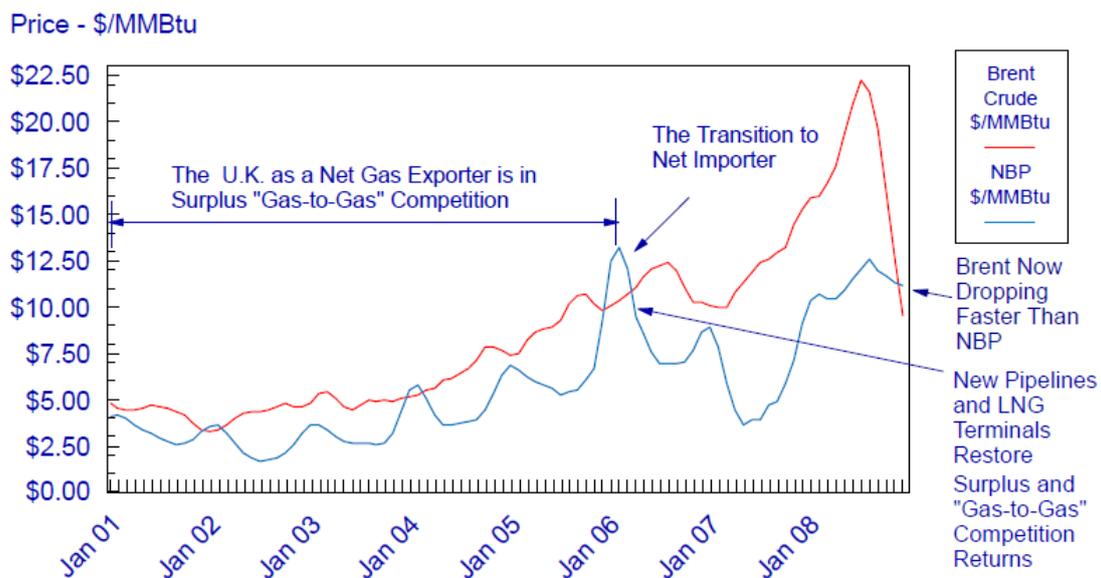
<sup>26</sup> Energy Charter Secretariat 2009, pp. 24-26.

and gas prices including: continued competition between gas and residual fuel oil, movements in international crude oil prices, short term seasonal factors and changes in power generation technology.<sup>27</sup>

The comparison of the US and UK situations is not easy because, since the late 1990s when the UK ceased to be a “gas island”, it has tended to “import” oil product-linked Continental European prices. Hence although the generalisation of gas-to-gas competition in the UK during 2001-05 in Chart 2 is correct, it is not comparable to the US situation. Jensen’s general point in Chart 2, that the opening of new pipeline and LNG facilities in the UK post-2006 combined with supply surplus restored conditions of gas to gas competition is correct, but became substantially more important following the opening of the South Hook and Dragon LNG terminals in 2009.

The message for Continental European gas markets is that gas and oil prices may decouple and then recouple depending on market conditions. The difference is that *if* they recouple, this will happen because of supply and demand conditions rather than formal contractual linkage.

**Chart 2: Relationship of Brent Crude to NBP prices 2001-2008**

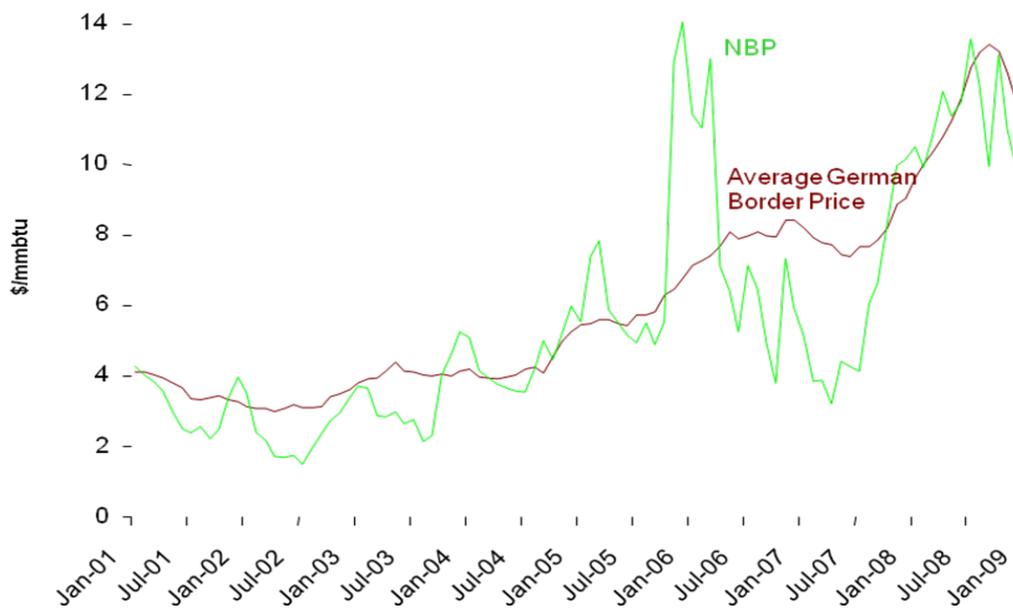


Source: Jensen Associates from ECT 2009, Figure 20, p. 26.

Chart 3 shows a comparison of UK NBP prices and average German border prices – which are a good proxy for Continental European oil product-linked prices – for the period January 2001-09. Until 2005, NBP was generally below the German border price, but as the UK experienced winter supply problems NBP moved substantially above the Continental European price in the first half of 2006. The position then reversed for the rest of 2006 and 2007, as UK supply problems resolved and (driven by oil prices) Continental European gas prices began their steep climb to mid 2008.

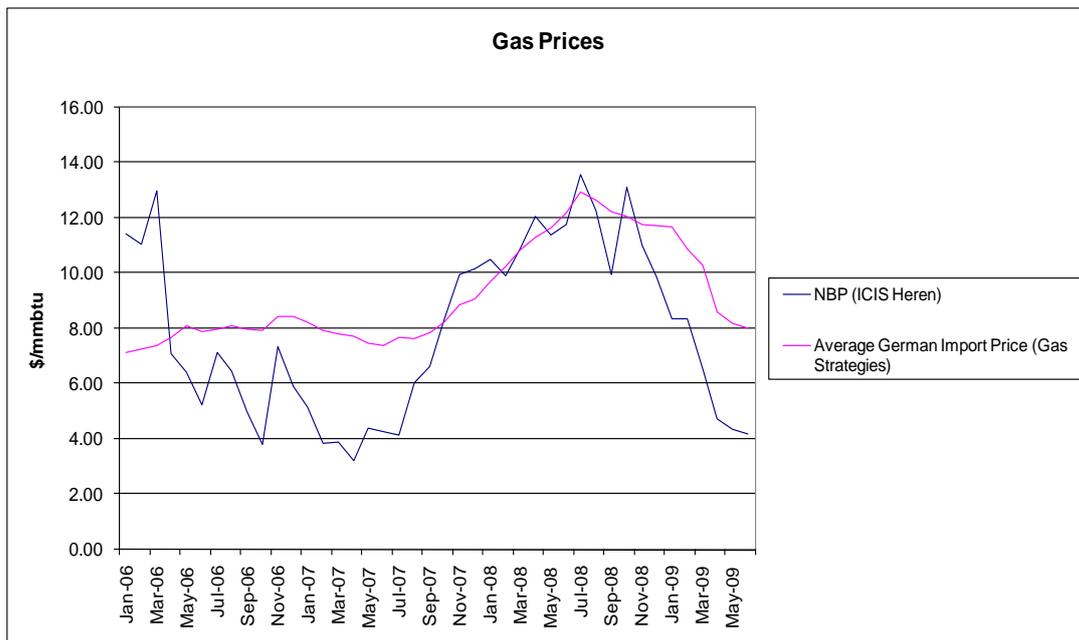
<sup>27</sup> Hartley et al 2008.

**Chart 3: NBP and Average German Border Prices, 2001-09**



Source: Rogers forthcoming 2009, derived from Gas Strategies and ICIS-Heren data

**Chart 4: NBP and Average German Border Prices, 2006-09**



Source: Rogers forthcoming 2009, derived from Gas Strategies and ICIS-Heren data

For most of 2008, the two prices were similar, but NBP fell well below the Continental European price as recession hit demand hard in the 4<sup>th</sup> quarter of 2008, and the lag in long term contracts meant that falling oil prices were much slower to feed through into gas prices.

Chart 4 provides the same data for the period January 2006 to May 2009 but in more detail, in particular the gap which opened up between NBP and German prices in the first half of 2009. As is clear from this chart, this meant that by mid-2009, NBP prices – which were reflected in prices at hubs across continental Europe – were around half the long term contract oil-linked price. Chart 4 shows that the period November 2006-July 2007 saw a similar gap, which was not enough to encourage buyers and sellers to overturn oil product price linkage in their contracts. It is logical to ask why 2009-2010 may be different.

### **Why Might the 2009-10 Period see a Decoupling of Long Term Contract Gas Prices from Oil Product Prices?**

The conclusion of this paper is that a transition away from formal contractual oil product price linkage is inevitable and arguably has already begun with a great degree of spot gas pricing indexation in some long term contracts. The conclusion of inevitability arises from the diminishing rationale of the price linkage with oil, as the markets into which oil products and gas are sold have diverged substantially. The conclusion that formal contractual decoupling is imminent in 2009-10 arises from market conditions in which oil-linked contract prices have become untenable in the face of a surplus of gas supply which has seen short term prices at market hubs at around half of oil-linked levels for several months in 2009. These supply surplus conditions seem likely to remain for at least 1-2 years (and arguably longer).

This conclusion can reasonably be questioned, since such predictions have been made before (including by this author) and proved to be at best premature and at worst wrong. In response to the question as to why the current situation may be different, my answer would be that although – as shown in the previous paper and repeated here – the logic of oil-linked pricing disappeared some years ago, pressure for change in 2007 was not sufficient given a relatively tight supply/demand balance and the opposition of the majority of dominant players (buyers and sellers).

In 2009-10, the pressure for change has become much greater for two reasons:

- economic recession, which has reduced demand, just at the time when LNG supply availability has increased significantly;
- international crude oil prices at levels in excess of \$50/bbl – around \$70/bbl as this paper is being completed in September 2009 - with an expectation of future increases.

The crude oil price point requires some further elaboration. In late August/early September 2009, the short term (Day+1) price at the four most important north west

European hubs (NBP, TTF, NCG and ZEE) shown in Table 3 was around half of the long term contract price of Euros/MWh 17-2-18.6.<sup>28</sup>

**Table 3: Traded Ranges for Key European Gas Contracts 23 August-September 11 2009**

Euro/MWh

	DAY+1		MONTH+1		WINTER 2009		SUMMER 2010	
	Low	High	Low	High	Low	High	Low	High
NBP	5.5	9.0	8.4	10.9	12.7	15.7	12.9	15.8
ZEE	5.9	9.1	8.6	11.0	12.7	15.4	13.4	15.9
TTF	7.0	10.3	9.2	11.5	13.1	15.8	13.2	16.5
NCG	6.9	10.2	9.3	11.8	13.6	15.0	13.5	16.7

Source: *European Gas Markets*, 14 September 2009, p.16

Slow economic recovery in 2009-10 combined with significant new LNG supplies suggests little likelihood of a tightening supply/demand balance, and crude oil prices in the range of \$50-70/bbl for the second and third quarters of 2009, which set long term gas prices for late 2009/early 2010 roughly equate to long term European contract gas prices in the range of \$6.8-9.5/MMbtu or around Euros 16-22/MWh.<sup>29</sup> This goes some way towards explaining the high end of the price range of Euros 15-17/MWh in Table 3 and, unless the gas supply/demand balance changes significantly, pushing hub prices up from Day+1/Month+1 levels of Euros 6-12/MWh, would leave a significant and continuing gap.

From Table 3 it might be concluded that the problem of the gap between spot and long term contract prices could be temporary, with prices rising significantly by the end of 2009 and into 2010. Thus it might be argued that if European buyers can “sweat it out” until summer 2010, the problem will disappear, as happened in 2006-07 when a similar gap between spot and long term contract prices in late 2006 and the early part of 2007 disappeared within a few months. But this depends on how the Winter 2009/Summer 2010 price data should be interpreted. Do they reflect a conviction that changes in the supply/demand fundamentals will have caused prices to double within 6-12 months. Do they simply reflect an expectation that long term contract prices will be at approximately these levels during that period and that the current gap between spot and long term prices cannot be maintained? Or do they reflect the positions of players which have hedged their prices 6-9 months ahead?

It is possible that such a wide gap between spot and long term prices can continue for a limited period of time as it did in 2007-08. But if the current surplus of gas, and

<sup>28</sup> Long term contract prices are from *European Gas Markets*, 14 September 2009, p.16.

<sup>29</sup> These figures are rough generalisations incorporating the assumptions that gas prices (based on oil products) equate to roughly 80% of crude oil parity and that \$1/MMbtu = Euros 2.3/MWh. The intention is to indicate “order of magnitude” prices.

international oil price levels above \$50/bbl continue for one or more years, this will mean that:

- buyers will have to take – or pay for if they cannot take – at least minimum quantities of gas under their contracts, at prices which could be roughly double those for gas purchased at market hubs and spot cargoes of LNG<sup>30</sup>;
- as a consequence hubs will attract more participants and increase substantially in depth and liquidity, therefore becoming more credible as price reference locations.

The oil-linked price and minimum purchase commitments in long term gas contracts may become increasingly unmanageable as buyers are forced to take volumes at much higher prices than their competitors. This might have been tenable while the major Continental European buyers largely controlled their national markets and could use their market power to exclude competitors from their captive customer base. But in 2009, their market power is more limited. The key point may be that to retain the present degree of oil price linkage in long term gas contracts, European buyers must have a reasonable degree of confidence that the gap between spot and long term prices will close substantially before the first, and certainly the second, quarter of 2010. In other words that the period which they would need to “sweat out” price competition can be measured in quarters rather than years.

*What could overturn these conclusions?*

It is possible that all of these parameters will be less dramatic or less imminent than has been suggested here. But in order for this to be the case, one or more of the following needs to become reality in 2009 and the first half of 2010:

- European recession needs to be quickly reversed with energy and gas demand returning rapidly to 2007 levels which would absorb the supply surplus;
- US Henry Hub prices need to rise significantly above NBP prices – possibly as a result of falling domestic production – which will direct surplus LNG towards the US and away from Europe;
- Asian LNG demand – specifically from China and India – needs to rise significantly again diverting LNG away from Europe<sup>31</sup>;
- The anticipated surge of LNG supplies in 2009-10 needs to be delayed by technical or political problems;

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<sup>30</sup> While buyers can “carry over” volumes which they have not taken in the current year to future years, this is of limited benefit if market conditions remain similar in following years.

<sup>31</sup> A development which seems unlikely given the problems of LNG pricing based on the Japan crude cocktail which have similarities to the problems described in this paper. See Miyamoto and Ishiguro 2009.

- International crude oil prices need to fall below \$50/bbl and remain there for a period of time which would close the gap between spot and long term gas prices to manageable proportions;
- A combination of lack of third party access, insufficient liquidity at market hubs, and the market power of dominant suppliers and buyers must be adequate to maintain the contractual status quo despite current market conditions.

The fall in demand in the second half of 2009 may be less severe than in the November 2008-February 2009 period, and therefore the corresponding surplus of supply and take or pay problems may be less. International oil prices may fall to around \$20-30/bbl, which would close the gap between spot and oil linked gas prices. But should the supply surplus continue, and oil prices remain above \$50/bbl, then pressure on oil-linked prices in long term contracts may become unmanageable.

### **What Kind of Transition and Over How Long a Period?**

Those unfamiliar with the conservative culture of European gas markets may not appreciate that to suggest a transition away from oil-linked pricing for some 300 Bcm of European gas supplies in long term gas contracts is equivalent to proposing a revolution in the industry. Acceptance of pricing gas at a European gas market hub (or hubs) will not happen overnight, and both the end-point and the length of the transition are uncertain. One suggestion is that current pricing formulae could “coexist” with hub-based pricing with the majority of deliveries remaining oil-linked, and the proportion of the buyers’ market share considered to be “at risk” from competition – say 20-30% - priced at the hubs. But a dual-pricing system seems unlikely to be manageable over a long period. Anecdotal evidence from Germany suggests some utilities are agreeing one year contracts with their major customers which include base prices reflecting market hub levels, but with traditional oil product indexation over the (one year) term of the contract. Whether this is a widespread practice is impossible to judge. But it would need to be matched by similar pricing arrangements between exporters and the major utility buyers. This could retain the oil linkage element of the traditional system, while moving base price down to levels which reduce the incentive for customers to switch to suppliers offering gas at spot prices.

Over how long a period such a transition might take place is equally uncertain. In markets more exposed to competition it might be as rapid as two years; elsewhere it might depend on how quickly an acceptably liquid hub based price takes to emerge. However, this is unlikely to be a smooth and predictable journey with a well-defined end point. It is likely that there will be discontinuities before a hub price emerges which will be accepted in a large number of European markets. This is why a combination of prices from different hubs may be – at least initially – more acceptable than pricing at a single hub where participants may be concerned about undue influence of a dominant national incumbent.

In addition, the current supply surplus will not last forever. The “best guess” of current research in the OIES gas programme is that supply and demand could tighten up, causing prices to rise, as early as 2012; and that by 2015 relatively tight market conditions are likely. But this in turn will depend on how prices evolve: if dominant market players insist on – and are successful in maintaining - gas prices linked to oil

prices in excess of \$50/bbl this will further depress demand and continue to bring forward new supplies. Thus a continuation of the present pricing regime will prolong the current surplus of supply over demand. By contrast, if gas prices are adjusted to levels reflecting short term supply/demand conditions, then demand may recover more quickly and additional supply may be discouraged. If new gas-fired power generation projects – projected to account for around two thirds of incremental gas demand in Europe up to 2020 – are to be successfully promoted, it will be very important that gas prices show some adjustment to more market-oriented levels.

### **Contractual Decoupling from Oil Prices: a Natural and Overdue Evolution for European Gas Markets**

One of the most frequent questions asked in discussions of this subject is whether it will lead to a “better” price regime than netback market prices with oil product indexation. Certainly there will be consequences which will be viewed as negative by certain groups (and perhaps all groups) of market players. Aside from a blizzard of contract renegotiations, and possible flurries of litigation, the immediate consequences of decoupling are likely to be seen in discussions between exporting countries about creating a new price mechanism, possibly via the GECF. As noted above, the immediate impact of contractual price decoupling will be a significant downward shift in prices for as long as supply surplus persists. The severity of this downward price shift will determine the degree of solidarity between exporters to attempt to improve their position. While a rapid shift towards a price or volume setting export cartel is highly unlikely, discussions about a greater degree of coordination between exporters can be expected. But to have a substantial and immediate impact, the support of the major LNG exporters will be needed.

Another consequence of decoupling will be greater price volatility. This will be hailed by some as demonstrating that oil-linked prices were somehow “better” because they were more predictable than prices set by gas to gas competition. Such judgements should be resisted. Stakeholders in other energy and gas markets have developed mechanisms and skills to hedge risk; most Continental European companies participate actively in the British gas market and are familiar with the North American market where such practice is commonplace.

What is certain is that contractual decoupling will be an unwelcome development for the majority of major Continental European market players, both buyers and sellers and some part of the responses in Table 1 probably reflect this antipathy. Contractual decoupling of gas prices from oil product prices should not be regarded as either better or worse than oil linked pricing. A gas price mechanism which more closely reflects the balance of supply and demand for the commodity should be regarded as a natural and overdue evolution for an industry which accounts for around a quarter of European energy demand.

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**APPENDIX A: YEAR TO YEAR CHANGES IN GASOIL AND FUEL OIL CONSUMPTION IN EUROPE 1985-2006\***

Table 1. Year to Year Changes in Consumption of Gas/Diesel Oil by All Stationary Sectors (thousand tons)

	<b>1999-1998</b>	<b>2000-1999</b>	<b>2001-2000</b>	<b>2002-2001</b>	<b>2003-2002</b>	<b>2004-2003</b>	<b>2005-2004</b>	<b>2006-2005</b>
Germany	-4995	-1780	3932	-3383	-485	-2606	-121	1196
France	-682	-1361	2123	-1581	764	44	-121	-1072
Netherlands	219	-935	-18	-31	63	-28	114	-30
Belgium	-453	-420	343	-619	479	-64	44	-638
Italy	409	32	-219	-309	-292	-376	-101	-430
Spain	249	619	681	-104	383	48	206	-118
TOTAL	-5253	-3845	6842	-6027	912	-2982	-21	-1092

Table 2: Year to Year Changes in Consumption of Gas/Diesel Oil by Industry (thousand tons)

	<b>1985-1990</b>	<b>1990-1995</b>	<b>1995-2000</b>	<b>1999-1998</b>	<b>2000-1999</b>	<b>2001-2000</b>	<b>2002-2001</b>	<b>2003-2002</b>	<b>2004-2003</b>	<b>2005-2004</b>	<b>2006-2005</b>
Germany	-188	157	-1360	-241	-344	-56	41	-55	119	43	-58
France	-1442	662	-444	-573	366	-9	-420	213	360	172	-65
Netherlands	69	-158	-35	19	-33	-5	-24	11	6	-13	-8
Belgium	-31	155	-5	-101	-91	338	-355	-102	-12	-9	-50
Italy	-45	257	31	-17	71	-294	312	-287	44	-43	-106
Spain	58	52	642	50	211	72	-24	134	187	195	-909
TOTAL	-1579	1125	-1171	-863	180	46	-470	-86	704	345	-1196

\*NOTE: TABLES 1-10 SHOW THE CHANGE IN THE CONSUMPTION OF THE PRODUCT COMPARED WITH THE PREVIOUS YEAR; WHERE A RANGE OF YEARS ARE SHOWN, THE FIGURE IS THE CHANGE IN THE CONSUMPTION OF THE PRODUCT OVER THIS PERIOD. NUMBERS IN RED ARE REVISIONS OF THE DATA WHICH WAS PRESENTED IN THE CORRESPONDING TABLES IN STERN 2007. The data in these tables are from 'IEA Oil Data' (see bibliography).

Table 3: Year to Year Changes in Consumption of Gas/Diesel Oil by Households  
(thousand tons)

	1985-1990	1990-1995	1995-2000	1999-1998	2000-1999	2001-2000	2002-2001	2003-2002	2004-2003	2005-2004	2006-2005
Germany	-6121	3897	-2810	-3482	-407	2685	-2439	-344	-1896	-136	937
France	8320	-556	-362	161	-1040	1458	-730	220	-60	-290	-710
Netherlands	-107	-70	-73	-3	-28	1	-1	2	0	12	14
Belgium	-351	320	47	-270	-27	-25	-511	432	-37	20	-434
Italy	-3245	-2287	-717	20	-526	436	-558	-669	274	-49	-355
Spain	259	390	406	55	201	-1	-40	224	318	-57	-460
TOTAL	-1245	1694	-3509	-3519	-1827	4554	-4279	-135	-1401	-500	-1008

Table 4: Year to Year Changes in Consumption of Gas/Diesel Oil by Service  
(Commercial) Sector (thousand tons)

	1985-1990	1990-1995	1995-2000	1999-1998	2000-1999	2001-2000	2002-2001	2003-2002	2004-2003	2005-2004	2006-2005
Germany	-304	-470	-2671	-1196	-928	1313	-920	-130	-715	-52	354
France	-10920	81	-639	-283	-722	672	-393	323	-40	-60	-245
Netherlands	497	-497	199	199	-871	-14	-11	51	-32	107	-33
Belgium	65	107	-285	-89	-292	28	256	150	-14	6	-144
Italy	-486	-304	285	0	285	-45	67	559	-488	2	46
Spain	26	100	410	100	240	150	-25	140	199	68	-377
TOTAL	-11122	-983	-2701	-1269	-2288	2104	-1026	1093	-1090	71	-399

Table 5: Year to Year Changes in Consumption of Gas/Diesel Oil by Power Sector  
(thousand tons)

	<b>1990- 2002</b>	<b>1999- 1998</b>	<b>2000- 1999</b>	<b>2001- 2000</b>	<b>2002- 2001</b>	<b>2003- 2002</b>	<b>2004- 2003</b>	<b>2005- 2004</b>	<b>2006- 2005</b>
Germany	-370	-76	-101	-10	-65	44	-114	24	-37
France	24	13	35	2	-38	8	24	57	-52
Netherlands	-8	4	-3	0	5	-1	-2	8	-3
Belgium	4	7	-10	2	-9	-1	-1	27	-10
Italy	13	406	202	-316	-130	105	-206	-11	-15
Spain	628	44	-33	460	-15	-115	-656	-	1628e
TOTAL	291	398	90	138	-252	40	-955	105	1511

Table 6. Year to Year Changes in Consumption of Fuel Oil by All Stationary Sectors  
(thousand tons)

	<b>1999- 1998</b>	<b>2000- 1999</b>	<b>2001- 2000</b>	<b>2002- 2001</b>	<b>2003- 2002</b>	<b>2004- 2003</b>	<b>2005- 2004</b>	<b>2006- 2005</b>
Germany	-749	792	508	-58	-343	-170	-316	244
France	-890	-593	-291	-452	178	-277	280	-157
Netherlands	-10	-10	47	-78	28	8	-7	-16
Belgium	-193	-367	309	-456	542	-77	-65	-78
Italy	-2395	-1367	-2003	1448	-1092	-4961	-2752	194
Spain	1019	-674	62	932	-903	-245	-14	-1786
TOTAL	-3218	-2219	-1368	1336	-1590	-5722	-2874	-1599

Table 7: Year to Year Changes in Consumption of Residual Fuel Oil by Industry  
(thousand tons)

	1985-1990	1990-1995	1995-2000	1999-1998	2000-1999	2001-2000	2002-2001	2003-2002	2004-2003	2005-2004	2006-2005
Germany	-2840	-400	-256	-627	1665	246	399	-523	-469	-676	646
France	-1435	-549	-996	-504	15	67	-40	-154	-63	-181	-55
Netherlands	-453	-74	-63	-16	-3	3	-38	15	-2	-1	4
Belgium	-257	-249	-334	-67	-216	202	-378	356	-153	-45	19
Italy	-2702	-1327	350	974	-399	-454	275	175	-151	-203	80
Spain	-1415	361	-2387	-740	-119	-94	96	-10	-650	-375	746
TOTAL	-9102	-2238	-3686	-980	943	-30	314	-141	-1488	-1481	1440

Table 8: Year to Year Changes in Consumption of Residual Fuel Oil by Households  
(thousand tons)

	1985-1990	1990-1995	1995-2000	1999-1998	2000-1999	2001-2000	2002-2001	2003-2002	2004-2003	2005-2004	2006-2005
Germany	-592	0		0	0	0	0	0	0	0	0
France	984	-451		12	-40	-40	-211	75	-137	120	121
Netherlands	0	0		0	0	0	0	0	0	0	0
Belgium	-30	-8		0	0	0	0	0	0	0	0
Italy	-983	-315		141	-35	20	-15	-7	-69	-9	-90
Spain	-10	25		61	-3	0	15	20	-59	-20	121
TOTAL	-631	-749		214	-78	-20	-211	88	-265	91	152

Table 9: Year to Year Changes in Consumption of Residual Fuel Oil by Service (Commercial) Sector (thousand tons)

	<b>1985-1990</b>	<b>1990-1995</b>	<b>1995-2000</b>	<b>1999-1998</b>	<b>2000-1999</b>	<b>2001-2000</b>	<b>2002-2001</b>	<b>2003-2002</b>	<b>2004-2003</b>	<b>2005-2004</b>	<b>2006-2005</b>
Germany	-316	-82	-149	79	-204	0	0	0	0	0	0
France	-1167	-290	44	14	-63	-10	-126	26	10	-58	-55
Netherlands	32	-32	2	0	2	25	-27	0	21	1	-19
Belgium	45	-30	-69	0	-45	8	17	88	-107	31	-18
Italy	-450	0	0	0	0	0	0	0	0	0	0
Spain	-5	288	-203	-32	-23	-19	-8	16	-47	-46	-105
TOTAL	-1861	-146	-375	61	-333	4	-144	130	-123	-72	-197

Table 10: Year to Year Changes in Consumption of Residual Fuel Oil by Power Sector (thousand tons)

	<b>1990-2002</b>	<b>1999-1998</b>	<b>2000-1999</b>	<b>2001-2000</b>	<b>2002-2001</b>	<b>2003-2002</b>	<b>2004-2003</b>	<b>2005-2004</b>	<b>2006-2005</b>
Germany	-1946	-201	-669	262	-457	180	299	360	-402
France	-847	-412	-505	-308	-75	231	-87	561	-168
Netherlands	-261	6	-9	19	-13	13	-11	-7	-1
Belgium	-88	-126	-106	99	-95	98	183	-51	-79
Italy	-4470	-3510	-933	-1569	1188	-1260	-4741	-2540	204
Spain	3183	1730	-529	175	829	-929	511	427	-2548
TOTAL	-4429	-2513	-2751	-1322	1377	-1667	-3846	-1250	-2994

APPENDIX B. ABILITY TO SWITCH TO ALTERNATIVE FUELS IN THE EVENT OF A GAS SUPPLY DISRUPTION

	FUEL SWITCH*	INTERRUPTIBLE CONTRACTS
GERMANY	10-15% of consumption	10% industry, 25% power generation
FRANCE	6% of consumption	25% industry, 25% power generation
NETHERLANDS	n/a	25% power generation from H gas
BELGIUM	15% of industry	30% of industry
ITALY	9% of consumption	1% power, 10% industry
SPAIN	n/a	5% industry, 25% power generation

\*source does not record the alternative fuel but this is likely to be oil products in all cases aside from Germany where a share could be coal.

Source: Commission Staff Working Document 2009, Annex 4, p.61.