

# DECC gas price projections

# DECC Gas Price Projections

## Introduction

1. This paper sets out some of the key supporting considerations used by DECC in creating a set of price assumptions for the gas market over the next 25 years. A key output for this paper is to judge if and when UK spot prices (averaged over the course of a year) may start to move away from the level implied by oil-linked gas contracts.
2. DECC has created a low, central and high price scenarios.
3. Whilst there are a large number of factors to consider, this paper focuses on three key factors which will determine the *nature* of gas prices in the coming years – these are shown in figure 1. They are interlinked because:

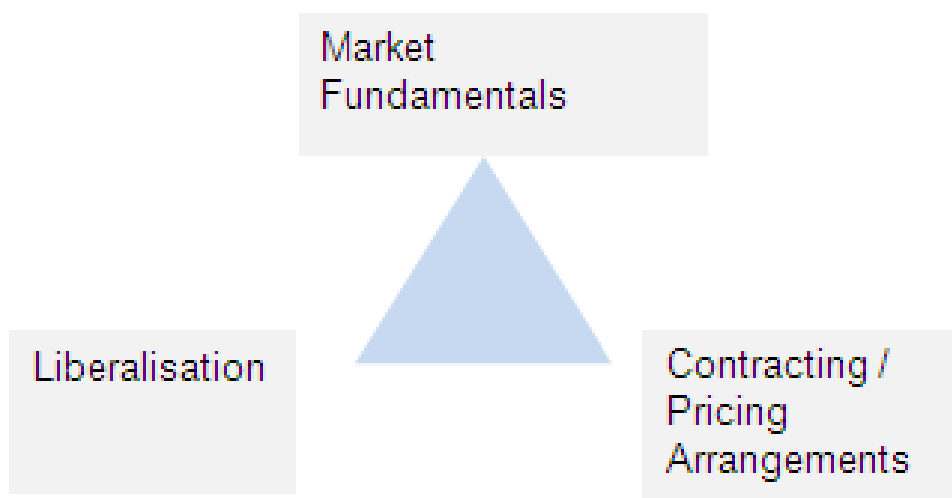
liberalisation can affect the incentives on both purchasers and producers to sign contracts that closely reflect market short-run market fundamentals or to buy gas off spot markets;

market fundamentals (and how these relate to the costs of other fuels) also has a bearing on the nature of the purchase agreements in the gas industry; and

contracting / price arrangements have a bearing on the prospects for liberalisation. Long-term contracts can hinder market entry and non-cost reflective contracts create an additional incentive to resist liberalisation.

4. This paper reflects comments from peer reviewers.

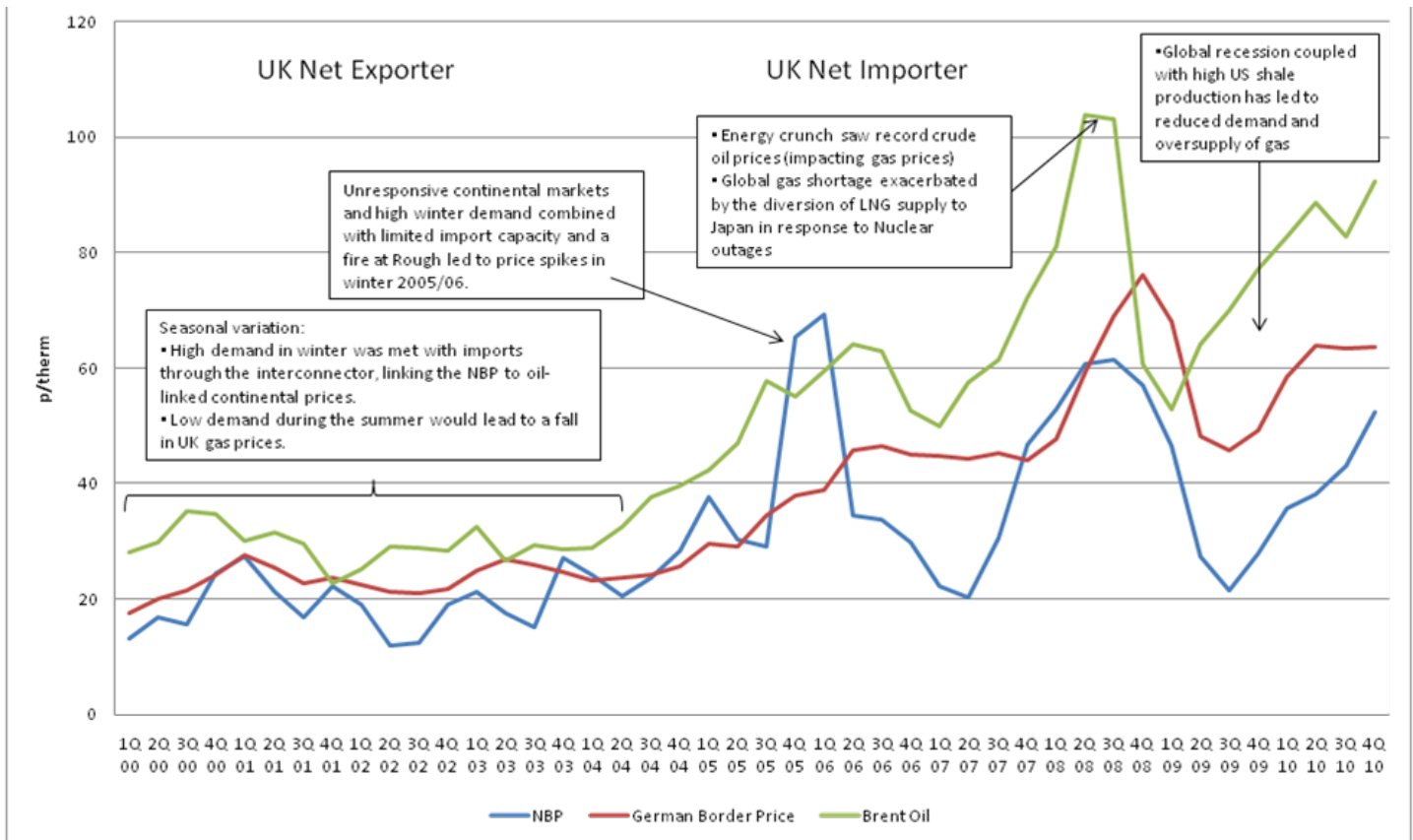
**Figure 1: Key Inter-linkages in Determining the Nature of Gas Prices**



## Background

5. It's useful to observe the historic pattern of gas prices in the UK, this is shown in the chart below. It's common to characterise UK prices into periods when they have been 'driven' by oil-linked gas prices and when they have not; for example, recently UK prices have been characterised as 'delinked'. It should be noted that this is a simplification of UK gas price movements. The UK market is liberalised and prices are determined by the cost of supplying the marginal unit of gas. As can be seen below, UK prices fluctuate over time and the UK price and German border prices (an indicator for 'oil-linked prices') often move differently. Moreover, it is also a simplification to imply that there is one 'oil-linked' price – the link between oil and gas prices will depend on the particular contract (of which there are many) and so there is not one 'oil-linked' price.
6. Nevertheless, 'oil-linked' prices have often set the cost of the marginal unit of gas in the UK, and UK gas prices have had periods when prices have not deviated too far or for too long away from a oil-linked price. Whilst acknowledging that this is a simplification, this paper uses the common characterisation of an 'oil linked' price.
7. It is also worth noting that this paper focuses on potential long-term trends not short-term price movements i.e. volatility. In the short-run prices are set by short-run marginal costs and reflects short-term fluctuations in demand (which is also seasonal), supply outages, capacity constraints at different parts of the supply chain, etc. The focus of this work is **not** on short-term price movements.

**Figure 2 Comparison of NBP Gas Prices, Brent Oil Price and German Border Gas Price 2000 to 2010**



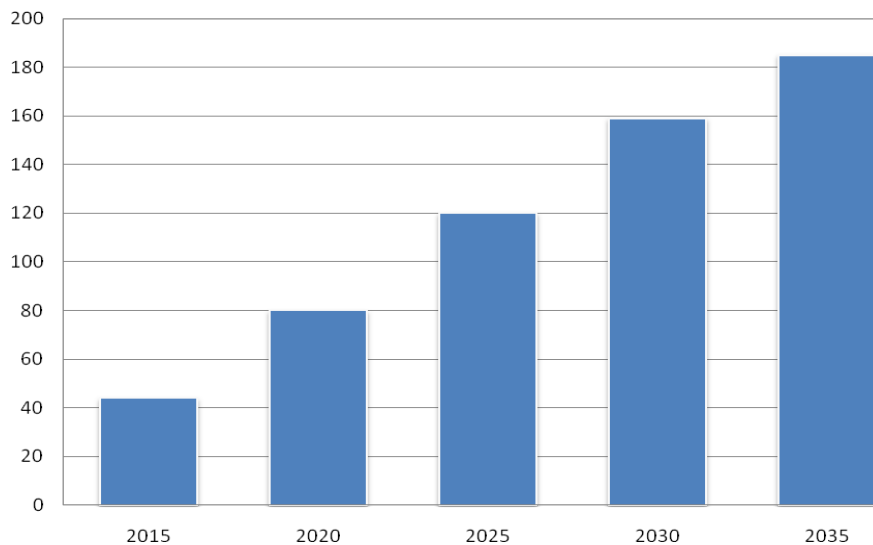
### Consideration 1: Market Fundamentals

8. In a competitive market, prices tend to reflect the marginal cost of supply (and demand), that is so-called 'market fundamentals'. Because natural gas can be transported by pipe or by tanker (when liquefied) costs in competing markets is also relevant. This section considers these issues.
9. **Data:** Historically, gas markets have tended to be either non-liberalised or regional (usually both) in nature. Consequently the need to collect and share cost data (for example, in order to inform a reliable global database) has not traditionally been present. Whilst the situation is improving as gas markets become more global and, for example, the IEA is improving their data, there is still not a comprehensive set of data and therefore estimating the long-run marginal cost of gas is difficult.
10. **A period of change:** The supply side of the gas market is going through a period of rapid change. Many existing fields are running down and producing less gas each year. Meanwhile, gas demand in the OECD has tended to be flat or slowly increasing and in non-OECD countries growing rapidly. There is then a resulting need to develop new source of gas to meet this demand – these sources are often further from the source of demand. A 'rule of thumb' is that if the transportation distances exceed 1,000 km then transporting gas by ships in the form of LNG is more economical and / or more practical than by pipeline. Distance from market has a significant impact on transportation costs; Annex 1 shows the

LNG shipping costs to the UK by source and shows that shipping costs alone from the Middle East have been around 8p / therm.

11. Europe is a particular example of a region that will become more dependent on imports (including imports in the form of LNG), as indigenous production falls. Based on WEO 2010 numbers, DECC has calculated the change in net import demand for the EU over the next 20 years. This is shown in figure 2. Clearly, there are uncertainties around these numbers which will be dependent on a number of factors.

**Figure 3: Projected Additional Net Import Requirement for the EU, bcm**

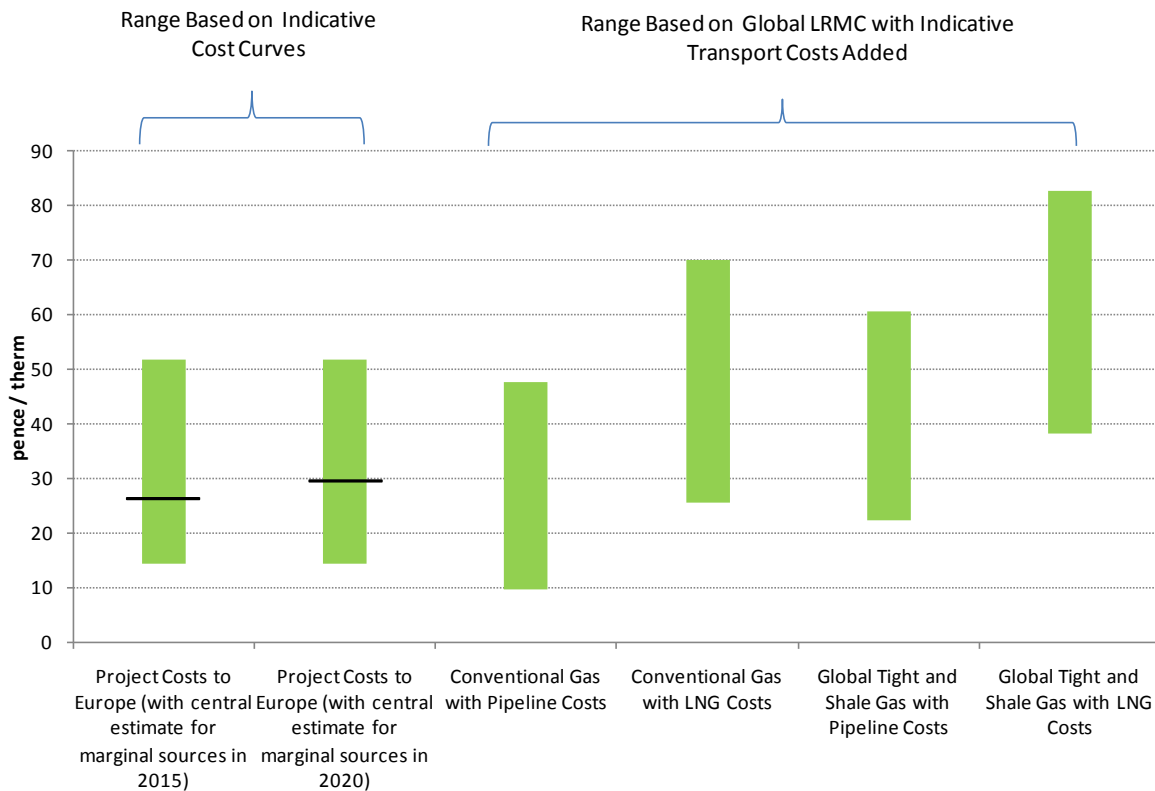


12.

Source: WEO 2010 (new policies scenario), DECC analysis

13. If prices, on average, reflect the long-run marginal cost of supply then it is salient to ask what the break-even price of bringing these additional volumes of gas to market would be. Figure 3 shows two categories of cost data. The first two green bars show the cheapest and most expensive source of additional gas to the UK, based on figure A2.1 in Annex 2. Within this, the black lines show the estimated marginal costs of gas based on the estimated additional need for gas by combining the information in figure 3 with that in figure A2.1 i.e. it shows that the estimated marginal cost of gas is around 27p/therm in 2015 and 30p/therm in 2020.
14. The remaining set of green bars shows the range of cheapest to most expensive sources of gas (either conventional or shale / tight gas) and adds indicative transport costs (either pipeline or LNG), based on figure A2.2 in Annex 2. These act as a useful cross-check. Whilst these cost ranges are very wide, they usefully indicate that a range of between 30 and 70 p/therm should be sufficient to bring forward enough gas for the foreseeable future (at least in the absence of other factors to prevent this gas being produced).

**Figure 4: Range of Potential Costs of Bringing Gas to the UK<sup>1</sup>**



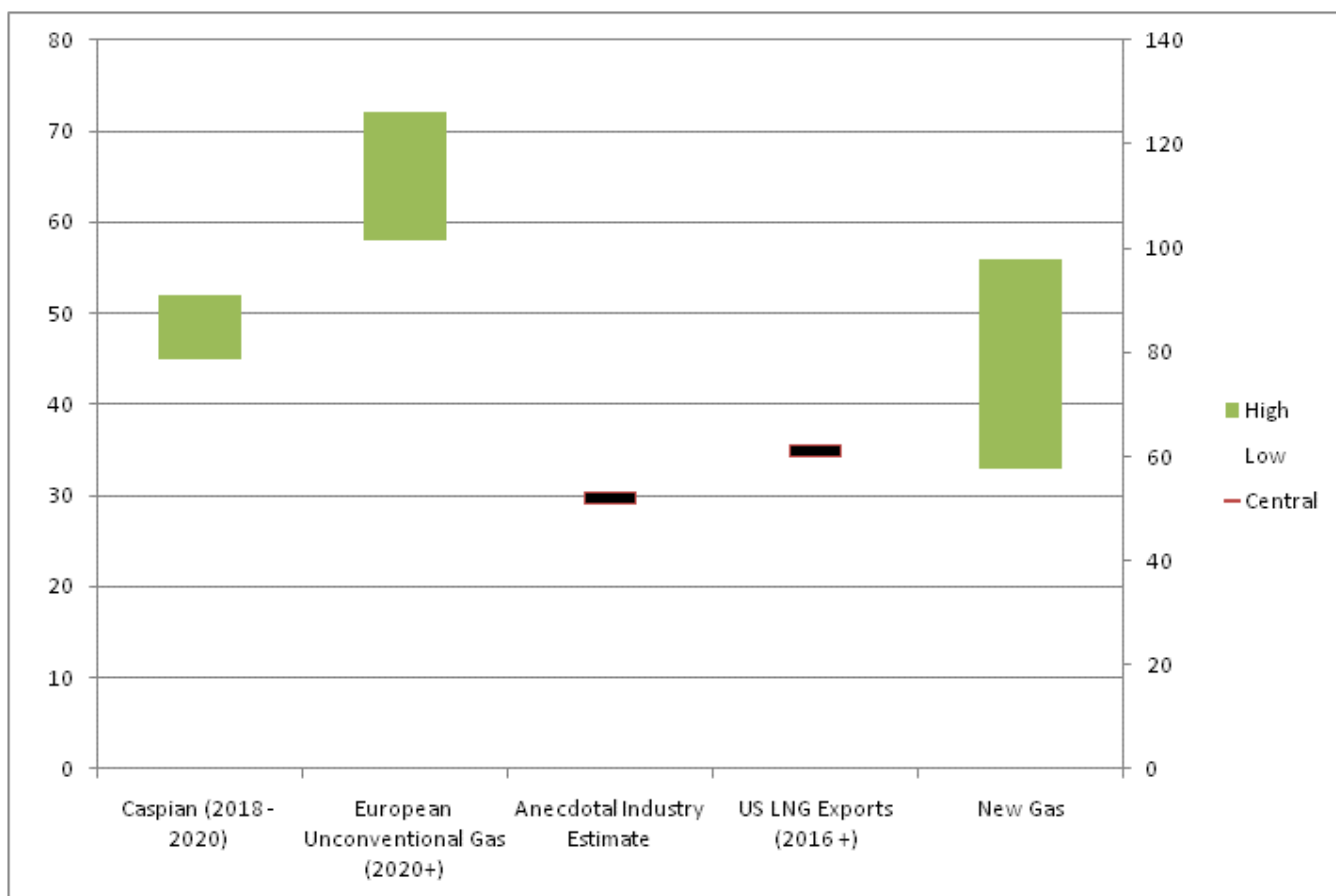
15.

16. Source: WEO 2009 and 2010 data, DECC analysis

17. Comments by Howard Rogers of the OIES suggested that LRMC would depend on the source but might typically be between 52p/therm to 58p/therm, although there is a wide range of estimates as shown below in figure 4.

<sup>1</sup> Beyond 2020 Europe is expected to need more than 80 bcm of gas and the IEA has not presented cost data on other projects that might help contribute to this.

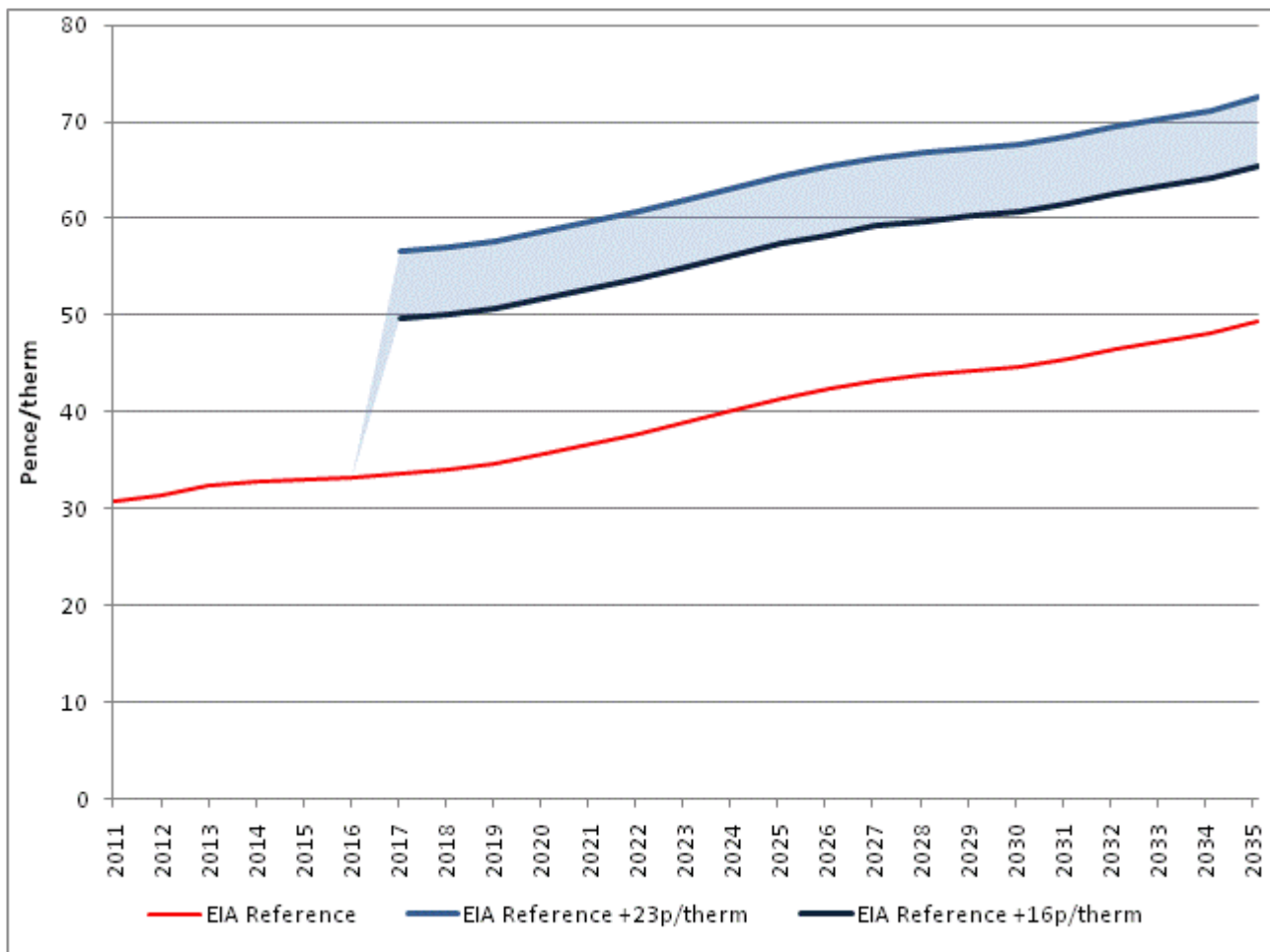
**Figure 5: Range of Estimates for LRMC Quoted in Howard Roger’s Peer Review Comments, p/therm**



Source: Howard Rogers (summarised by DECC)

18. DECC has also put together a graph which shows where the export of gas from the US might become profitable – this is based on current IEA gas price projections and a range of costs of exporting the gas (these were also informed by information from Howard Rogers and others). This is shown in figure 6

**Figure 6: Range of UK Prices at which Export from the US Might Become Profitable**



Source: EIA, various

19. This estimate of a breakeven export-price from the US in figure 5 is useful but doesn't itself provide an adequate guide for UK prices because a) this doesn't factor in any risk premium required to undertake expensive liquefaction investment b) there may be limits to how much US gas may be exported, c) some gas might go to Asia and d) the US price might rise as much as European price falls.

20. There are a large number of caveats to using even this limited supply cost information:

Technological progress is uncertain, in particular the true economics and likelihood of bringing unconventional gas to market;

Costs to developing projects can change significantly from year to year, reflecting changes in the oil, materials and labour costs;

The location and geology of gas reserves is often uncertain. When liquids are associated with the gas this can reduce the gas price needed to extract the gas significantly (as gas is often a 'joint product'); and

Competition from Asia or other markets will have a large bearing on where LNG (and some other) supplies are directed and therefore what the marginal source of gas to the UK will be.

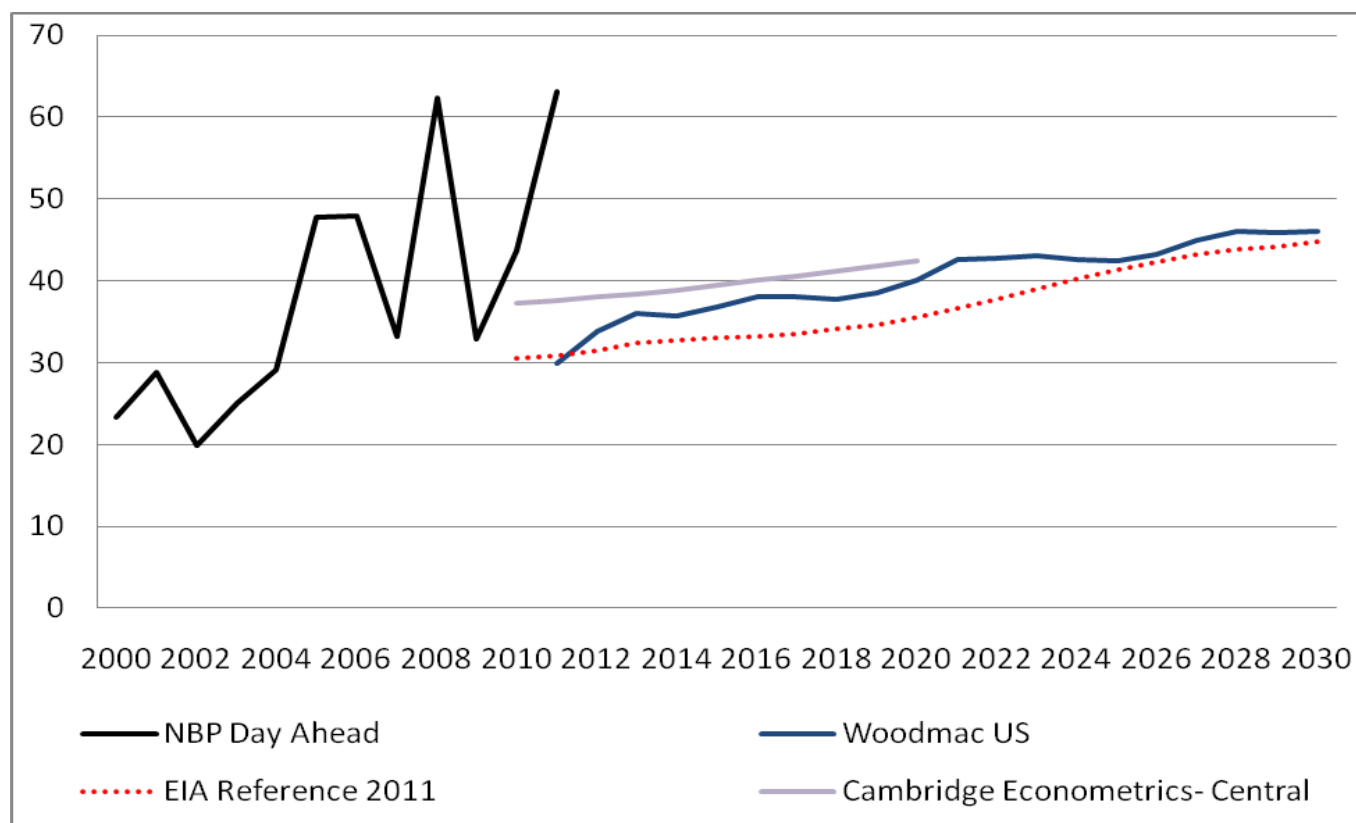
21. It is also worth reminding ourselves that the exercise is to estimate wholesale gas prices. These prices will also need to reflect costs such as regasification costs, entry costs to the UK network etc. These costs will generally not be included the estimates above.
22. **Delinked UK Projections:** It is also useful to look at the projections from forecasters who do **not** assume a long-term linking of gas prices to oil, since implicitly these will need to factor in the marginal costs of gas. Cambridge Econometrics' view is that gas and oil prices will tend to be delinked in the coming years – this sees prices rising from around 35p/therm to 40p/therm from 2010 to 2020<sup>2</sup>.
23. **US Prices:** The US market is a fully liberalised market. US prices reflect gas-on-gas competition and generally short-run marginal costs<sup>3</sup>. The US has become largely self-sufficient in gas since the recent boom in shale gas. US prices can be seen as setting a price floor for UK gas prices since if UK prices fall below US prices LNG cargoes could divert to the US. See figure 6 for details.

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<sup>2</sup> It should be noted that these projections would have been undertaken before the rise in UK prices seen in the second half of 2010.

<sup>3</sup> **NB** As in other markets, contracts will also affect the amount of gas bought and sold.

**Figure 7: Possible Delinked Projections for US and UK Markets to Inform the Assessment of UK Gas Market Fundamentals, 2011**



Source: Cambridge Econometrics (May 2011), Wood Mackenzie (2011 H1 – Henry Hub Projections); EIA (AEO 2011 Early Release – Reference Scenario, Henry Hub Prices).

24. **NB:** The US prices sit within the range of LRMC estimates and are reasonably close the estimate of the marginal source of gas to Europe in 2015 and 2020. US prices are therefore a good candidate for the ‘low price scenario’.

## Consideration 2: Liberalisation

25. Gas-on-gas competition whilst well established in the US has been a more recent phenomenon elsewhere. The process of privatisation began in the UK in 1986, but some argue that the gas market has only been truly competitive since around 1999. In the rest of EU, the process of liberalisation started in 1998 with the first energy package although European markets and some argue that they be considered truly competitive yet. For example, in terms of the state of actual market competition in the EU in 2008<sup>4</sup>:

- 16 countries still had price controls for household consumers (including France, Northern Ireland and the Netherlands) and of these 13 also have controls for industrial customers (including Italy); and

<sup>4</sup> Report on progress in creating the internal gas and electricity market 2009. Technical Annex.

- There was high concentration in a number of European countries, for example, in 7 countries have only 1 company with availability to gas (including The Netherlands) and in 5 countries with only 1 retailer of gas.
26. Further progress is expected as a result of continued efforts by regulators and governments – the Third Energy Package (which will fully come into force in 2013) will also have a major impact. However, it is not clear when Europe will be ‘truly’ liberalised since:
- There is uncertainty around how quickly all elements will be effectively implemented and enforced in a way that meets the intended objectives of the Third Package;
  - There is likely to be a period of time between the moment a competitive framework is introduced and actual competition taking place. For example, in agreeing access to the necessary infrastructure, gaining a significant customer base or developing new sources of gas; and
  - Incumbents are likely to act to defend their market shares.
27. Annex 3 summarises the history of liberalisation in the UK and EU.
28. There are a range of factors/definitions as to what makes a ‘competitive’ market, for example free price formation, a number of competitors, low entry costs, the degree of liquidity on spot markets, etc. In reality, there is a spectrum of how competitive a market is. This paper does not attempt to set a formal definition of when the EU market is deemed to be fully liberalised or competitive. The important consideration for this paper is at what point the market arrangements or market structure in the EU reaches a point where considerable pressure is placed upon the existing market arrangements (notably the prevalence or nature of oil-linked contracts) and market become more reflective or market fundamentals.
29. The low scenario assumes that the Third Package is effective and liberalisation is rapid<sup>5</sup>. The central price scenario assumes that it takes time for reforms to lead to significant pressure on existing market arrangements. The high scenario takes a pessimistic view – that implementation does not lead to significant pressure to alter existing market arrangements in the short-term<sup>6</sup>.

### Consideration 3: Gas Pricing

30. Linked to the question of liberalisation is the pricing / contracting for gas. In continental Europe, oil-linked contracts are the dominant form for gas purchases. These contracts tend to have long durations, and many (at present, especially producers) support the continued

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<sup>5</sup> We are already seeing large changes in the important German market.

<sup>6</sup> If this were to occur then in practice we might assume further legislation or interventions in the market, but judging the nature and timing of such policy interventions is difficult.

use of these types of contracts. A similar situation exists in some Asian markets (for example, Japan).

31. Data from Wood Mackenzie provided to DECC shows that import contracts for gas into Europe are over-whelming oil-linked. The data does not reveal the nature of the contracts for 'indigenous' gas production, nor does it make any assumptions on what contracts may be signed in future. An interesting observation in the data is that most of large volumes of gas could be bought under existing oil-linked contracts to 2020 and beyond.
32. **Renegotiation of contracts:** These contract terms are not set in stone and there are periodic renegotiations of the contracts. Presently, buyers wish to see their contracts more closely link to gas spot prices (as spot prices are currently relatively low); the degree to which sellers will allow such changes will depend on a number of factors such as the contractual terms but may also be linked to the degree of liberalisation in the buyer's market (as this will influence the likelihood of default if new entrants can undercut incumbents by sourcing cheaper gas from other sources).
33. **New contracts:** The further into the future we look the more important will be the nature of as-yet-unsigned agreed gas purchase arrangements.
34. Annex 4 sets out the known arguments for signing oil-linked contracts. The conclusions from this are:
  - There may be good reasons for signing long-term contracts or even contracts priced to other commodities in the absence of a liquid gas market.
  - The rationale for oil-linked contracts in the European market will continue to diminish over time if the substitutability of gas for oil with gas in various uses falls. The IEA's WEO 2009 (see Annex 5 for more details) suggests that the substitutability of oil and gas will diminish significantly over the next two decades.
  - The successful liberalisation of European gas markets would further seriously weaken the rationale for oil-linked contracts, and
  - The contractual driver of a gas-oil link is likely to continue, albeit it may weaken in future or the nature of the link may change
35. However, due to "irrational", herding, or strategic behaviour (and because Asian buyers may still favour these contracts) the rapid end to oil-linked contracts is not a foregone conclusion and is still a matter of debate. For example, Annex 5 shows the results of a poll at a major gas industry conference – this shows that one quarter of voters believe the link to oil would "never" end.
36. The uncertainty surrounding the on-going role of oil-linked contracts is underlined by Figure 8 which sets out the varying assumptions made by DECC previously and other organisations. There is little consensus on this issue.

**Figure 8: A Review of Recent Gas Price Assumptions Regarding the Influence of Oil-linked Prices**

Organisation	Determined by Oil Prices?	Notes
National Grid	<b>Yes (though noting risks to this assumption).</b>	Out until 2020. Based on NG view and consultation with industry.
Ofgem	<b>Yes</b> – in all scenarios	Projections end in 2025
European Commission (Primes / Prometheus Model)	Effectively Yes	Projections until 2030. No explicit assumption is made about the oil-gas contractual link – but the projections track each other.
WEO 2010	Effectively Yes	Argue that oil-linkage may weaken over time but this would be balanced out by higher transport costs.
Woodmac	Yes	Projections until 2030
Cambridge Econometrics	Yes in the very short-term. No in the long-term.	Projections until 2020.
Barclays	No	Although Barclays have only detailed projections for gas up to around one year head.
Pöyry	<b>Depends.</b> Prices are an output from the model, they depend on the marginal source. <b>NB</b> close relationship between inter-regional prices.	Projections until 2050.

Source: Various, Summary by DECC

## Conclusion

37. This paper has reviewed the prospects and timing for liberalisation, market fundamentals and the influence of oil-linked contracts. A key output in order to inform DECC's gas price assumptions is when gas prices may start to move away from the traditional level of linkage to oil prices; this can occur in two ways – firstly, oil-linkage may continue but the relationship between the price may change (i.e. the formula is set differently), secondly, the basis for trading gas might change (e.g. to spot based trades) and spot prices might be determined by traditional oil-linked prices less frequently (e.g. only in the winter when demand is high) meaning that average prices over the year would change.
38. Whilst there may be disagreement as to when gas prices may sustainably move away from traditional oil-linked contract prices, it seems reasonable to assume that this will occur in the medium-term. In this scenario, it would be assumed that liberalisation leads to new sources of gas entering the EU market which are priced in a way that is more reflective of gas market fundamentals. This is also likely to lead to a renegotiation and weakening of oil-linked contracts in a way that brings them closer to gas market fundamentals.
39. Figure 9 sets out the assumed dates where oil-linked contracts start to cease to be a guide to long-term UK spot prices (although they may still have some influence) and gas market fundamentals become more prominent.

**Figure 9: Range of assumed dates when traditional oil linked contracts do not dominate long term UK spot prices**

Low Price Scenario	Central Prices Scenario	High Prices Scenario
2014-2016 (although the present gas glut means spot prices stay below oil-linked prices)	<b>2016-2020</b>	2020-2025

## Low Scenario

40. Earlier this paper sets out estimates for the long-run marginal cost for gas, the price in the US market and projections from forecasters that do not assume a long-term link between oil and gas.
41. Each of these are candidates for a price floor for UK gas prices as:
- long-run marginal costs determines the price that that must prevail in the long-term to incentivise investments in gas infrastructure,
  - at least in the short-term, the UK price must equal or exceed the US price in order to attract LNG supplies away from the US market, and

- Forecasts based on delinked prices which should already factor-in, amongst other things, the above two issues.
42. For the low price scenario, it is assumed that UK prices will fall and that the US price will set the effective floor for the UK's spot price by 2013. LRMC is tricky to determine accurately and there are a wide set of estimates. The Cambridge Econometrics' price projection was close to the US price that the EIA were projecting in AEO 2010, before the EIA revised down its price expectations significantly in December in the light of a yet more bullish view on shale gas reserves. The AEO 2011 view is now judged to be the most up-to-date and appropriate source for US prices. Table 1 sets out the assumed price level that will occur in this scenario.
43. This scenario could come about as a result of over-investment, low economic growth, liberalisation in Europe and lack of effective strategic protection of prices by producers all of which could mean that UK prices follow US prices.

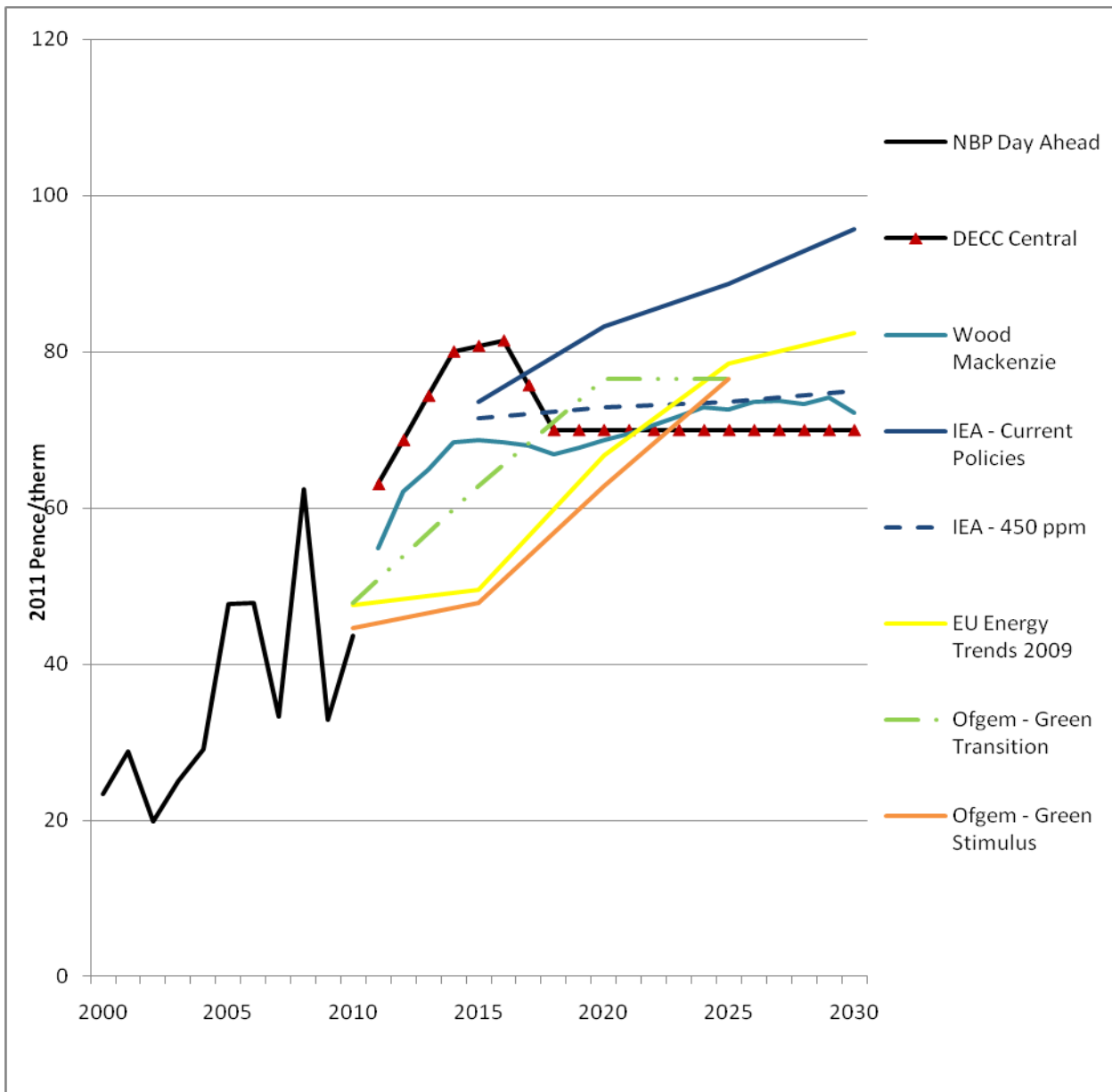
**Figure 11: Low Price Projections, 2011 Prices**

	Low Scenario p/therm
2015	33
2020	36
2025	41
2030	45

### Central Scenario

44. The central scenario assumes a relinking of gas to oil-linked prices (based on the proposed new oil price assumptions) in 2014 as the 'gas glut' erodes. However, due to liberalisation and bringing forward of further gas supply projects it is assumed that from 2017 the oil-linkage begins to weaken significantly and it is assumed that the gas price plateaus at 70p/therm.
45. This results in DECC's central gas price projection being close to other projections – particularly more recent projections – but slightly below other projections in the long-term to reflect peer review comments which generally suggested the long-term prices ought to be somewhat more reflective of LRMC.

**Figure 12: Comparison of DECC Central Scenario to a selection of other projections, 2011 prices**



Source: Wood Mackenzie (2011 H1), Ofgem, IEA WEO 2010, EU Energy Trends 2009, DECC.

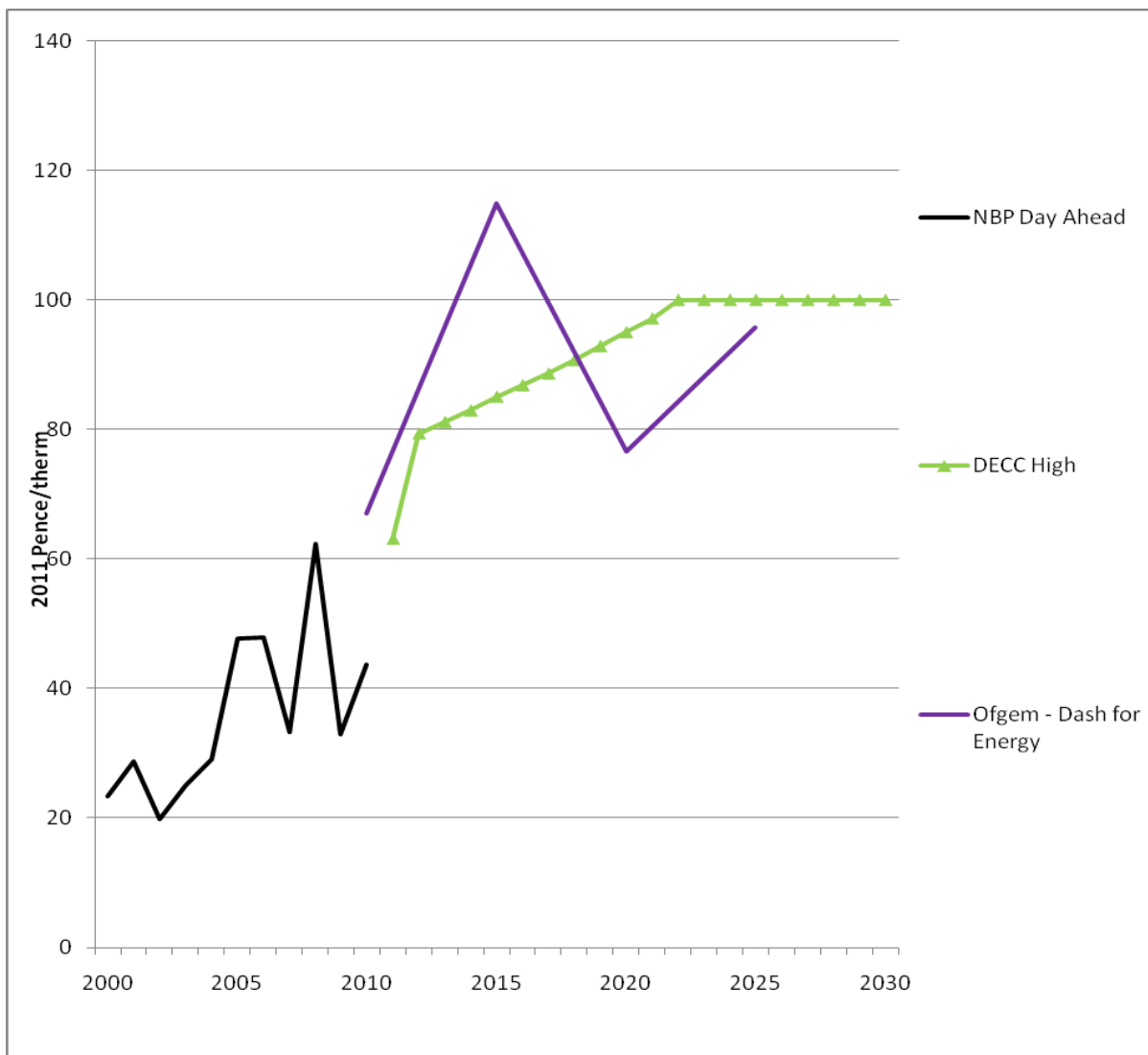
**Figure 13: Central Price Projections**

	Central Scenario p/therm
2015	81
2020	70
2025	70
2030	70

## High Scenario

46. The high scenario assumes a relinking of gas to oil-linked prices in 2011 and a sustained linkage until around 2022 when prices are assumed to plateau at 100p/therm. This might come about by either hub prices moving away from oil-linked gas contract prices or the linkage in oil-linked gas contracts being altered downwards. This scenario partly reflects comments from peer reviewers that tended to suggest that, even in a high price scenario, traditional oil-linkage could not continue if it implied prices that too different from LRMC.
47. This is shown in figure 3 which also shows Ofgem's Dash for Energy scenario, which be considered a comparable 'high' price scenario. Referring back to Figure 2, it can be seen that these are above those of other forecasters (although these others would generally be 'central' projections) although the IEA's 'Current Policies' scenario in WEO 2010 rises up close to 100p/therm by 2030.

**Figure 14: Projections to Inform the Assessment of DECC High Scenario, 2011 Prices**



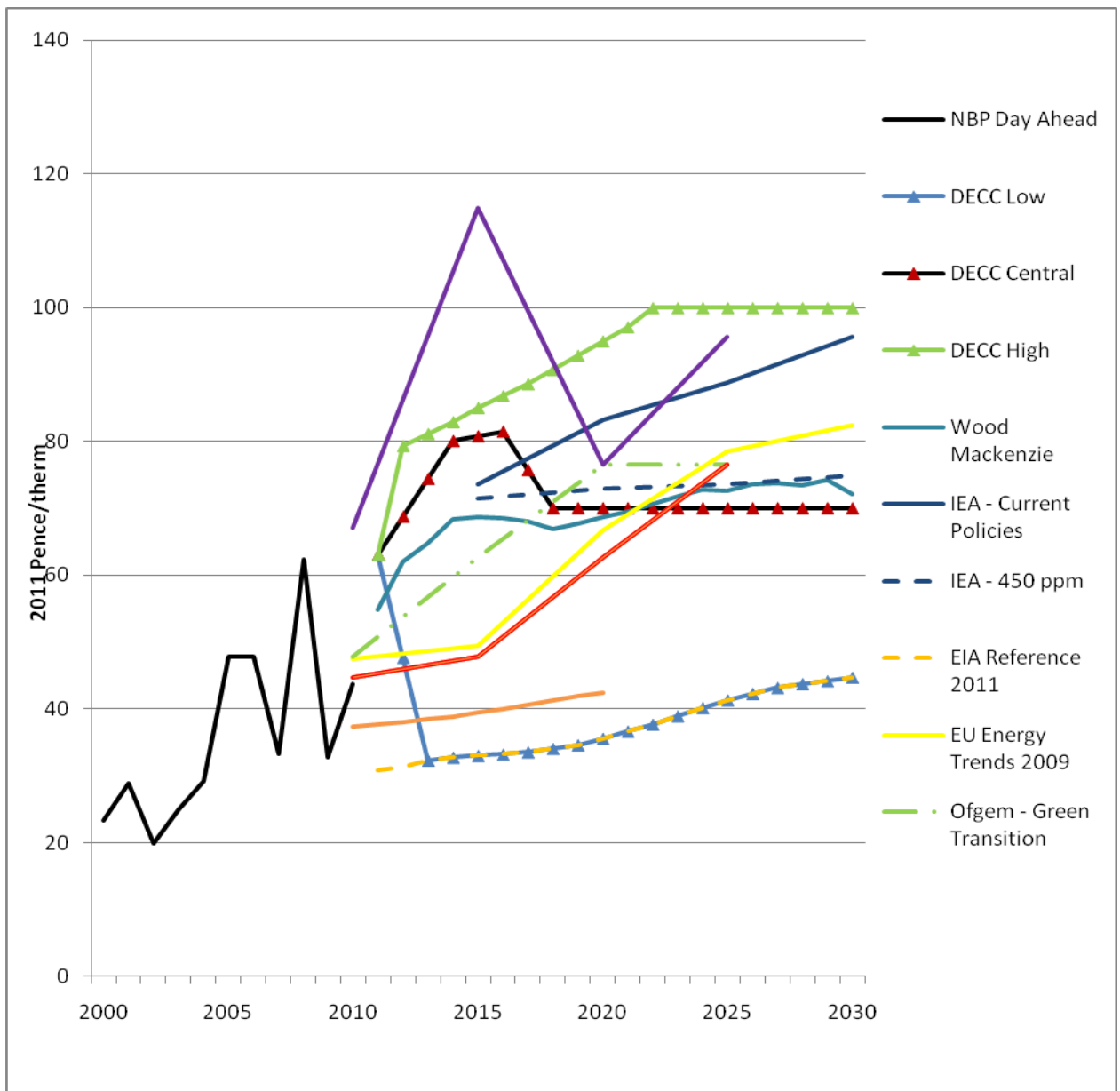
Source: Ofgem, DECC

**Figure 15: High Price Scenario**

	Central Scenario p/therm
2015	85
2020	95
2025	100
2030	100

## Summary

Figure 16: Comparison of DECC Projections against All Other Projections



Source: Wood Mackenzie (2011 H1), Ofgem, IEA WEO 2010, EIA, EU Energy Trends 2009, DECC.

**Figure 17: DECC Assumed Gas Prices, 2011 Prices**

<b>2011 Prices</b>	<b>Low</b>	<b>Central</b>	<b>High</b>
2010	44	44	44
2011	63	63	63
2012	48	69	79
2013	32	74	81
2014	33	80	83
2015	33	81	85
2016	33	81	87
2017	34	76	89
2018	34	70	91
2019	35	70	93
2020	36	70	95
2021	37	70	97
2022	38	70	100
2023	39	70	100
2024	40	70	100
2025	41	70	100
2026	42	70	100
2027	43	70	100
2028	44	70	100
2029	44	70	100
2030	45	70	100

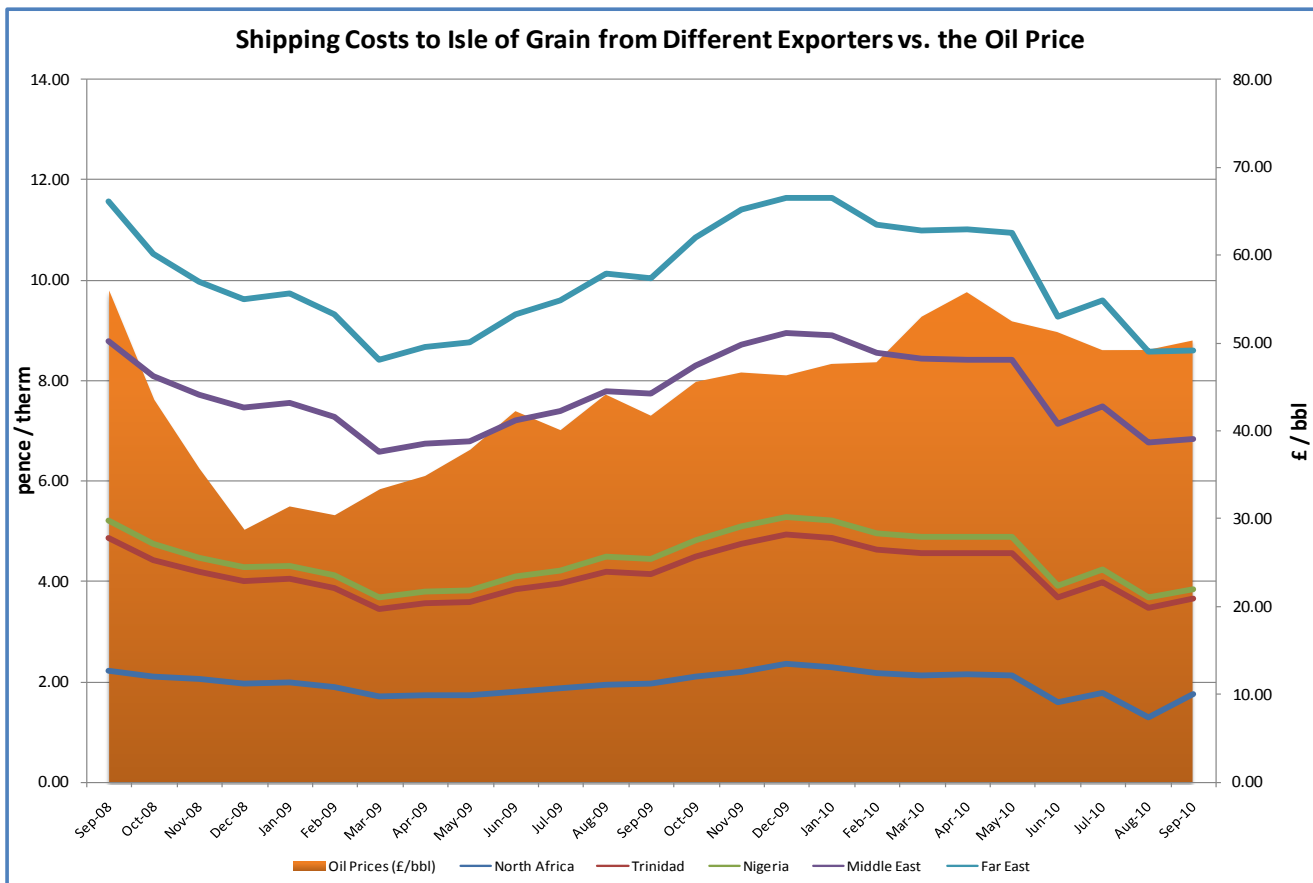
## Annex 1: Historic LNG Shipping costs

The table below shows the profile of shipping costs over the last two years. The graph shows that shipping costs are largely driven by the distance from the exporter to the UK.

Oil prices (in £/bbl) are also plotted though the relationship to shipping costs appears weak – this is presumably because the fleet tends to use natural gas to power them<sup>7</sup>.

The key drivers of changes in shipping costs over time are assumed to be:

- technological change;
- construction costs – presumably driven by changes in labour and material costs; and
- in the short-term, the over or under capacity of the fleet compared with demand.



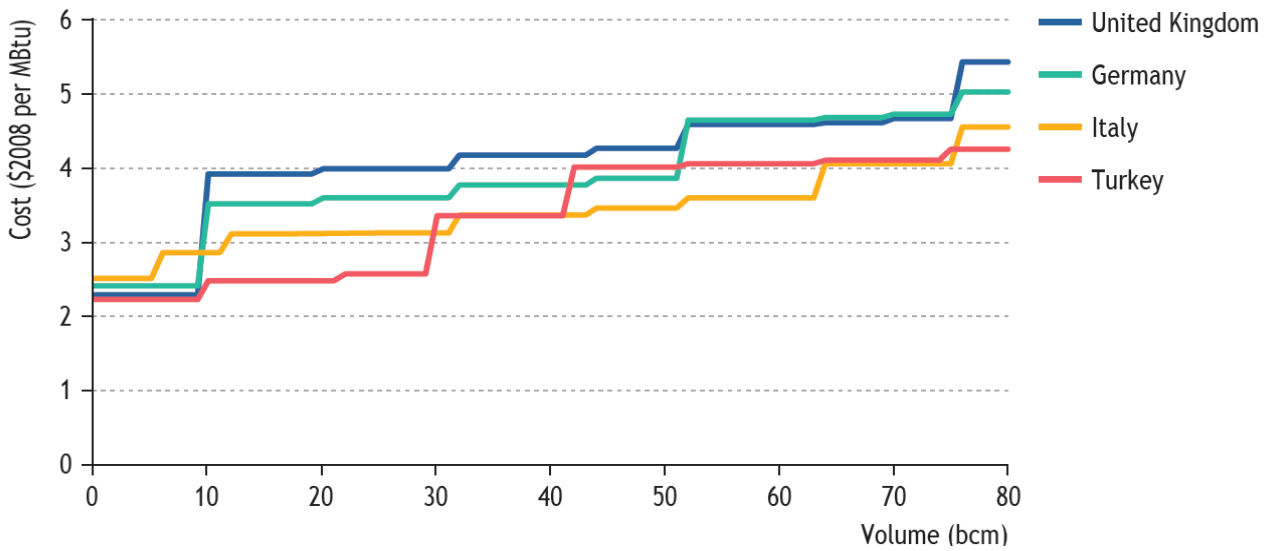
Source: Heren data, DECC Analysis

<sup>7</sup> The relationship between oil in dollar terms, or the gas price in p/therm also appears to be weak.

## Annex 2: Gas Supply Costs, Additional Data

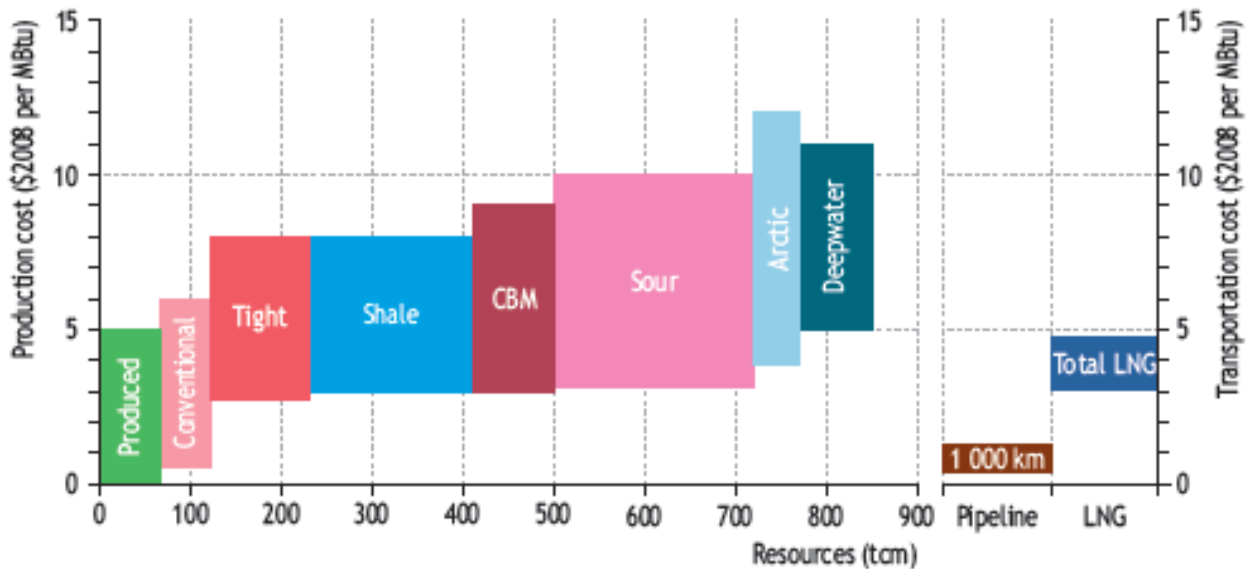
The WEO also builds up a picture of indicative cost curves for new supplies to the European gas market. Costs to the UK market are somewhat higher than to the other markets shown reflecting higher transportation costs.

**Figure A2.1: Indicative Costs Curves for new supplies to selected European gas Markets**



Source: WEO 2009, figure 13.16.

**Figure A2.2: Long term gas supply cost curve**



Source: WEO 2009, figure 11.15

### Annex 3: Summary of the Development of Competition in the UK and EU Gas Markets

It can be seen from Table 1 that the process of liberalisation in the UK took a significant amount of time and concerted effort from regulators and government.

**Table A3.1: History of GB Liberalisation**

	Policy Developments	Market Developments
1982	BG's right of first refusal to buy gas removed.	
1986	BG Privatised. Competition for Large gas users.	
1988	BG market share for new gas contract capped at 90% based on MMC inquiry.	
1991	OfT Enquiry recommends fall in BG's market share.	A number of market players enter the market. Dash for Gas.
1992	Competition for medium sized gas users introduced.	Dash for Gas.
1994	Due to recommendations a year before, BG is forced to unbundle.	Beginning of OCM market.
1995	Gas Act sets timetable for competition.	"Trading Circle" expands in expectation of competition. Enron and others are active.
1996	Network code introduced.	"Flexibility mechanism" (OCM) comes into being. Around this time, spot prices are below contract prices – putting pressure on status quo.
1998		Interconnector with Continent.
1999	Full retail competition introduced. Liberalisation of market "complete".	

It can be seen from Table 2, that the development of the EU gas market is at least 10 years behind that of the UK gas market in terms of putting in place the necessary policy drivers for liberalisation.

**Table A3.2: Policy Drivers of Development of EU Market**

Policy Developments	
1998	First Gas Directive. Accounting unbundling, third-party access etc.
2003	Second Gas Directive. Legal Unbundling, sectoral regulators
2007	Full retail competition introduced. Sectoral enquiry finds competition lacking and names range of barriers
2009	Third Package Agreed: More robust set of rules and separation for competition.
2013	Third Package comes fully into force.

## Annex 4: Is there a Continuing Rational for Oil-linked Contracts

**Table A4: Assessment of Common Arguments to Explain the Attraction of Oil-linked Contracts**

That hold in uncompetitive gas markets. However the arguments could apply to fuels other than oil	That hold in a competitive market. However, the arguments could apply to fuels other than oil.	That are specific to oil	
<p><b>Hold-up problem:</b> Both buyers and sellers get some degree of protection from the ‘hold-up’ problem, allowing sunk investments.</p>	<p><b>Liquidity:</b> Oil markets are global and more deep and liquid. This allows greater transparency and hedging of risk.</p>	<p><b>‘Irrational’/Psychological Reasons:</b> This has been the ‘tried and tested’ / historical approach, the industry understands these contracts, seen as ‘fair’ or good starting point for negotiations.</p>	<p><b>Inter-regional Competition:</b> Asian buyers are still prepared to sign oil-linked contracts. As Europe becomes more import dependant it will have to offer attract contracts in order to secure supply.</p>
<p><b>Reduced Cost-Pressure:</b> High gas prices often imply high electricity prices and some multi-utility firms may even gain if gas prices rise.</p>	<p><b>Volatility:</b> Oil prices tend to be less volatile than gas prices [This reflects greater liquidity, cheaper store costs, and the influence of OPEC. NB: Exposure to gas price volatility could be reduced by using financial products]</p>	<p><b>Herding:</b> If competitors have oil-linked contracts then agreeing a oil-linked contract will not expose business to different costs than their competitors. <i>Source: DECC</i></p>	<p><b>Strategic:</b> Oil-linked prices tend to be higher than gas-on-gas prices, producers therefore prefer them.</p>
<p><b>Strategic:</b> Producers wishing to discourage gas-on-gas competition and open markets.</p>	<p><b>Correlation</b><sup>8</sup>: i) Oil and gas are affected by similar shocks ii) The ‘investment model’ approach which states that majors will tend to investment more in</p>	<p><b>Portfolio management:</b> Producers state gas prices linked to oil makes production management easier. <i>Source: Producers</i></p>	<p><b>GTL Arbitrage:</b> Gas can be converted to (diesel) oil. However, in practice the GTL industry is small and costly.</p>

<sup>8</sup> NB: Oil prices also impact coal prices – through transportation costs. See WEO 2009, page 67.

That hold in uncompetitive gas markets. However the arguments could apply to fuels other than oil	That hold in a competitive market. However, the arguments could apply to fuels other than oil.	That are specific to oil	
	the fuel with the highest return iii) Oil and gas are often joint-products		
	<b>Substitutability:</b> Oil is still a substitute in some markets. Oil has ceased to be used in electricity generation, but fuel oil and gas oil is still used by industry and households in continental Europe		

Source: DECC

Table A4 summaries the key arguments that are typically voiced to explain why gas market participants sign oil-linked contracts.

The assessment suggests that many of the traditional arguments:

- i) have no place in a competitive markets;
- ii) are weakening over time; and
- iii) Could apply to other fuels (i.e. why not 'coal' linked contracts?)

Nevertheless, there still appears to be some arguments to explain the attraction of oil-linked contracts. Regardless of the lack of rationality of these contracts, it is an empirical fact that oil-linked contracts continue to survive and prove attractive.

The future of oil-linked contracts in Europe will depend on the progress of market liberalisation in Europe and other factors that might make oil the closest substitute for gas (i.e. the impact of environmental policy, technological changes etc.).

Even if the rationale for oil-linked contracts may reduce, the impact of oil may continue due to:

- i) the continuing role of oil-linked contracts in the Asian market setting an effective import/export price of LNG to travel between the Atlantic and European markets; and

- 
- ii) via more flexible oil-linked contracts which are renegotiated more often have lower take-or-pay provisions.

## References

<http://www.energypolicyblog.com/2008/06/29/why-would-oil-indexation-in-gas-contracts-survive-in-europe/>

[www.emeraldinsight.com/journals.htm?articleid=1621829&show=pdf](http://www.emeraldinsight.com/journals.htm?articleid=1621829&show=pdf)

## Annex 5: Additional Information Informing the Prospects for oil-linked contracts.

**Table A5.1: Share of Oil in Different Uses**

	Power Generation		Industry	
	2007	2030	2007	2030
US	2	1	11	7
EU	4	1	15	11
OECD Pacific	10	3	24	18
Japan	13	4	30	22
Non OECD Asia	8	3	10	7
Middle East	37	19	41	34

Source: Taken from WEO 2009 Annex

**Table A5.2: “When do you expect European long-term contract prices will be decoupled from oil and determined by spot/futures prices?”**

	2004	2005	2008	2009	2010
Before end-2010	24	15	8.7	3.8	4
Before end-2015	36	15	22.1	20.3	29
Later than 2015	15	39	42.5	44.3	51
Never	24	31	26.8	31.6	25

Source: Flame Conference for respective years. Presentation by Professor Jon Stern.

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