Oxera

Celebrating 25 years

Energy market competition in the EU and G7

Preliminary 2006 rankings

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1 Introduction

The Department for Business, Enterprise and Regulatory Reform has to comply with a Public Service Agreement (PSA) target to ensure that the UK has one of the three most competitive energy markets within the EU and G7.[1] Within this context, Oxera has previously applied the methodology it developed in 2003 (the 'original methodology')[2] to compare the competitiveness of UK energy markets with that of the remainder of the EU and G7 countries from 2001 to 2005, concluding that the UK had the most competitive energy markets in each of these years. This original methodology has since been revised in order to take account of recent developments in energy markets.[3] This report adopts the revised methodology to extend the competitiveness analysis to the data that is currently available for 2006.

In undertaking this analysis, each of the countries is first subject to an initial filter of the minimum conditions, the existence of which is considered essential for competitive outcomes to arise. Detailed analysis of competitiveness is then carried out for the electricity and gas markets of the countries that pass this filter. The electricity and gas market competitiveness scores of each country are then aggregated into a single energy market score.[4]

There have been no changes in the list of eleven countries that passed the initial filter in 2005, as no new country has yet met the minimum conditions. The detailed analysis of the countries passing the filter finds that the UK achieves the PSA target with the highest-ranking energy market, and has the most competitive electricity and gas markets separately.

[1] The energy markets comprise the electricity and gas markets.

[2] The detailed methodology is set out in Oxera (2003), report prepared for the DTI, 'Energy Market Competition in the EU and G7: The Relative Extent of Energy Market Competition in the EU and G7', pp. 20–33, available at www.oxera.com

[3] Oxera (2007), 'Energy market competition in the EU and G7: Final 2005 rankings'.

[4] The detailed methodology used to calculate competitiveness scores for the energy markets according to the new methodology is set out in Oxera (2007), 'Energy market competition in the EU and G7: Final 2005 rankings', Appendix 3.

2 Applying the initial filter

According to Oxera's methodology, each of the countries within the EU and G7 is subject to an initial filter of conditions considered necessary for competition to develop. These conditions are:

– regulated third-party access to transmission;
– legal or ownership unbundling of transmission;
– full opening of the supply market.

Tables 2.1 and 2.2 list the EU 25, indicating whether they pass the filter in the electricity and gas markets.[5] A country is considered to pass the initial filter for the energy market as a whole if the filter conditions are met in either the electricity or the gas markets.

Changes in network regulation and market opening continue to take place across the EU as Member States adopt the requirements of the European Commission's Second Electricity and Gas Directives:[6]

– Ireland and Portugal have implemented transmission unbundling in the gas market.

– Finland has introduced rTPA at transmission level in gas.

– On January 1st 2006 RWE Transgas was split into RWE Transgas, which stores and trades in gas, and its subsidiary, giving start to unbundling at the transmission level in the Czech Republic.

– Since the end of 2005, the gas transmission system operator in Estonia is legally unbundled from Eesti Gaas.

– The gas TSO in Slovakia was legally separated in June 2006.

Despite these changes, in 2006 no new countries met the minimum conditions necessary to pass the initial filter. Tables 2.1 and 2.2 also show that the network-related filters are passed in more electricity markets than gas markets, indicating that the liberalisation of electricity markets is more advanced than that of gas markets in the EU Member States.

[5] The G7 countries that are not part of the EU 25 (the USA, Canada and Japan) did not pass the filter in 2006, as market opening in these markets was lower than the threshold necessary to the pass the filter.

[6] European Commission communication to the Council and the European Parliament (2007), 'Prospects for the internal gas and electricity market', January.

Table 2.1 Countries passing the initial filter: electricity

Electricity market	Degree of market opening (%)	Transmission unbundling	rTPA in transmission	Selected as relevant comparator for electricity
Countries passing the network-related filters with 100% market opening				
Austria	100	✓	✓	✓
Denmark	100	✓	✓	✓
Finland	100	✓	✓	✓
Germany	100	✓	✓	✓
Ireland	100	✓	✓	✓
Netherlands	100	✓	✓	✓
Portugal	100	✓	✓	✓
Spain	100	✓	✓	✓
Sweden	100	✓	✓	✓
UK	100	✓	✓	✓
Countries passing the network-related filters with less than 100% market opening (ranked according to degree of market opening)				
Luxembourg	84	✓	✓	×
Belgium	82.4	✓	✓	×
Italy	80	✓	✓	×
Poland	80	✓	✓	×
Slovakia	79	✓	✓	×
Slovenia	77	✓	✓	×
Latvia	76	✓	✓	×
Czech Republic	74	✓	✓	×
Greece	70	✓	✓	×
France	66	✓	✓	×
Hungary	66	✓	✓	×
US	32	✓	✓	×
Estonia	12	✓	✓	×
Countries not passing the network-related filters				
Canada	37.1	×	✓	×
Lithuania	74	×	✓	×
Countries with incomplete information				
Cyprus	Not known	✓	Not known	×
Malta	Not known	×	Not known	×
Japan	63	Not known	✓	×

Sources: 'EU Energy', 147-8, December 15th 2006; European Commission communication to the Council and the European Parliament (2007), ‘Prospects for the internal gas and electricity market’, January.

Table 2.2 Countries passing the initial filter: gas

Gas market	Degree of market opening (%)	Transmission unbundling	rTPA	Selected as relevant comparator for gas
Countries passing the network-related filters with 100% market opening				
Austria	100	✓	✓	✓
Denmark	100	✓	✓	✓
Germany	100	✓	✓	✓
Italy	100	✓	✓	✓
Netherlands	100	✓	Hybrid (rTPA at the regional level and negotiated TPA at the national level)	✓
Spain	100	✓	✓	✓
UK	100	✓	✓	✓
Countries passing the network-related filters with less than 100% market opening (ranked according to degree of market opening)				
Estonia	95	✓	✓	×
Sweden	95	✓	✓	×
Belgium	91.5	✓	✓	×
Slovenia	90.4	✓	✓	×
Ireland	85	✓	✓	×
France	70	✓	✓	×
Hungary	67	✓	✓	×
Poland	72	✓	✓	×
US	71	✓	✓	×
Czech Republic	28	✓	✓	×
Countries not passing the network-related filters				
Lithuania	90	×	✓	×
Luxembourg	80	×	✓	×
Slovakia	72	✓	×	×
Derogations				
Finland	–	–	✓	–
Greece	–	–	–	–
Latvia	–	–	–	–
Portugal	–	✓	–	–
Information not available				
Cyprus	–	–	–	–
Malta	–	–	–	–
Canada	95.2	Not known	✓	×
Japan	44.1	Not known	✓	×

Sources: 'EU Energy', **147-8**, December 15th 2006; European Commission communication to the Council and the European Parliament (2007), 'Prospects for the internal gas and electricity market', January.

Countries that have introduced regulated third-party access and transmission unbundling, but that do not have full market opening in either the electricity or the gas market, can also pass the initial filter under certain conditions. This occurs when the average degree of market opening in their energy markets is greater than that of the country with the lowest average degree of market opening among the countries that have passed the filter in either the electricity or the gas market (excluding those that have been granted a derogation from the implementation of the European Commission Directives). With an average degree of market opening of 90%, Ireland is found to hold this minimum threshold. However, none of the countries that pass the network-related filters (and that do not have full market opening in either of the markets) have an average energy market opening greater than 90% (see Table 2.3). Therefore, no countries pass the filter on the minimum threshold basis.

Table 2.3 Average degree of energy market opening

Country	Degree of market opening (%) Electricity	Gas	Gas consumption (TWh)	Electricity consumption (TWh)	Relative weight of gas market	Average degree of market opening	
Austria	100	100	93.9	68.5	0.58	100	✓
Belgium	82.4	91.5	190.4	92.5	0.67	89	×
Czech Republic	74	28	97.8	69.9	0.58	47	×
Cyprus	Not known	Not known					×
Denmark	100	100	50.2	38.2	0.57	100	✓
Estonia	12	95	9.9	6.0	0.62	64	×
Finland	100	Derogation	50.2	87.5	0.36	64	✓
France	66	70	511	515.0	0.50	68	×
Germany	100	100	980.6	614.4	0.61	100	✓
Greece	70	Derogation	35.1	63.9	0.35	45	×
Hungary	66	67	150.6	42.0	0.78	67	×
Ireland	100	85	50	28.1	0.64	90	✓
Italy	80	100	893.5	351.5	0.72	94	✓
Latvia	76	Derogation	18.6	5.7	0.77	18	×
Lithuania	74	90	31.9	7.9	0.80	87	×
Luxembourg	84	80	15.9	7.4	0.68	81	×
Malta	Not known	Not known					×
Netherlands	100	100	444.5	118.5	0.79	100	✓
Poland	80	72	157.9	145.8	0.52	76	×
Portugal	100	Derogation	45.9	53.4	0.46	54	✓
Slovakia	79	72	64.4	27.6	0.70	74	×
Slovenia	77	90.4	11.6	12.7	0.48	83	×
Spain	100	100	391.4	293.5	0.57	100	✓
Sweden	100	95	11.2	151.6	0.07	100	✓
UK	100	100	961.1	407.8	0.70	100	✓

Note: no figures available for Malta and Cyprus

Sources: *EU Energy,* **147-8**, December 15th 2006; Eurogas Press Release (2007), 'Evolution of Natural Gas Consumption in 2006', February; IEA Electricity Information 2006. (Data is for 2005, which is the latest available, except for Estonia, Latvia, Lithuania and Slovenia with data from Eurostat, 'Supply, transformation and consumption of electricity').

On the basis of the above analysis, the same 11 countries are found to pass the initial filter in 2006 as did in 2005. These are subject to detailed examination through the remainder of the report:

– Austria;
– Denmark;
– Finland;
– Germany;
– Ireland;
– Italy;
– Netherlands;
– Portugal;
– Spain;
– Sweden;
– UK.

3 Preliminary 2006 rankings

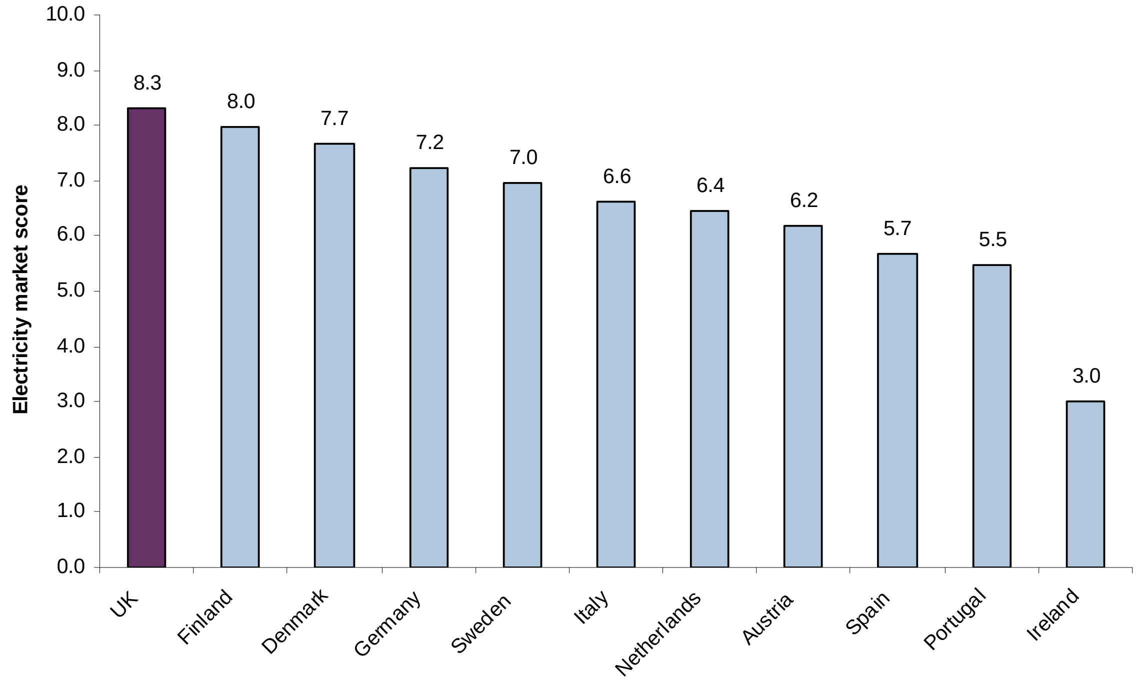
This section evaluates the electricity and gas market competitiveness of the 11 countries that pass the initial filter according to the new methodology developed by Oxera.[7] In general, the competitiveness levels in the electricity markets are higher than those in the gas markets. This may result from electricity markets being liberalised before gas markets, or may be due to factors inherent in gas markets that make them less competitive.

The separate electricity and gas competitiveness scores are then rebased by assigning a score of 10 to the country having the highest score in each of the markets, and changing the scores of the other countries in proportion to this. These 'cardinally rebased' scores are then averaged into a single energy market score, with the relative sizes of these markets used as weights. The UK is found to have the highest scores of 8.3 and 8.5 in the electricity and gas markets respectively. Since the UK retains its top-ranking position in both electricity and gas markets, it receives a score of 10 in both on the 'cardinally rebased' scores, resulting in a combined score of 10 in energy markets in aggregate.

3.1 Electricity market rankings

As set out in Figure 3.1, with a score of 8.3, the UK has retained the position of the most competitive electricity market within the EU and G7. It is closely followed by Finland, which scores 8.0, and Denmark, which scores 7.7.

Figure 3.1 Overall competitiveness scores for electricity markets (preliminary 2006)



Source (for this and subsequent figures and tables in sections 3 and 4): Oxera calculations.

[7] The detailed methodology used to calculate competitiveness scores for the energy markets according to the new methodology is set out in Oxera (2007), report prepared for the BERR, 'Energy market competition in the EU and G7: Final 2005 rankings'..

Table 3.1 details the market and network area components of the electricity market scores of the 11 countries analysed. Major differences across countries lie in their market areas, but due to the transposition of the European Commission Directives into national law, the spread of network area scores is narrower. Other than Austria, Germany and Ireland, where legal unbundling of distribution networks has not taken place, the remainder of the comparator group has implemented either legal or ownership unbundling. None of the countries has ownership unbundled both the transmission and the distribution network operators in the electricity market, hence none has achieved a score of 10.

Table 3.1 Disaggregated scores for selected EU electricity markets (preliminary 2006)

	Austria	Denmark	Finland	Italy	Netherlands	Portugal	Spain	Sweden	UK	Germany	Ireland
Upstream market	6.7	4.9	7.5	5.5	7.6	3.9	3.5	4.1	8.3	5.9	1.6
Wholesale market	5.4	7.3	7.3	5.6	4.6	5.8	5.8	7.3	6.4	7.4	0.0
Downstream supply	5.4	8.8	8.8	5.3	3.5	1.8	3.1	6.5	9.1	8.8	2.2
Score—all market areas	5.8	6.9	7.8	5.4	5.2	3.8	4.1	5.9	7.8	7.3	1.2
Score—network area	7.1	9.4	8.5	9.4	9.4	9.4	9.4	9.4	9.4	7.1	7.1
Overall electricity score	6.2	7.7	8.0	6.6	6.4	5.5	5.7	7.0	8.3	7.2	3.0

Table 3.2 shows that some countries have seen changes in their electricity market competitiveness between 2005 and 2006. Portugal, Austria and Italy have seen marked increases in competitiveness, by 1.5, 0.9 and 0.8 points respectively, while Spain and Finland have undergone only a minor increase. All the other countries apart from the UK and Ireland have seen decreases in competitiveness. The only major decrease has been in the Netherlands' score from 7.3 to 6.4. (See section 4.2 below for a discussion of the changes in scores).

Table 3.2 Comparison of final 2005 and preliminary 2006 scores for electricity, both calculated according to the new methodology

Country	Final 2005 score	Preliminary 2006 score	Change in score
UK	8.3	8.3	0.0
Finland	7.9	8.0	+0.1
Denmark	7.9	7.7	–0.2
Germany	7.4	7.2	–0.2
Sweden	7.0	7.0	–0.1
Netherlands	7.3	6.4	–0.8
Italy	5.8	6.6	+0.8
Austria	5.3	6.2	+0.9
Spain	5.5	5.7	+0.2
Portugal	4.0	5.5	+1.5
Ireland	3.0	3.0	0.0

Note: Due to rounding, the differences between the preliminary 2006 and final 2005 scores may not equal the changes in scores shown in the table.

3.2 Gas market rankings

As with the electricity market, the UK has the most competitive gas market within the comparator group. However, its relative positioning differs from that of the electricity market, in that, with a score of 8.5, the UK scores significantly above its closest rival, Spain, which scores 6.5, as shown in Figure 3.2.

Although the network areas score as being more in-line with a competitive outcome than the market areas in all countries, the highest possible score of 10 in the network areas has been obtained only in the UK (see Table 3.3), as none of the other countries has implemented ownership unbundling at both the transmission and the distribution level. In the market areas, the upstream (gas shipper) market is highly concentrated in all countries other than the UK, Spain and Ireland. The downstream market remains quite concentrated in all countries, with the UK achieving the highest score with 7.2.

Figure 3.2 Overall competitiveness scores for gas markets (preliminary 2006)

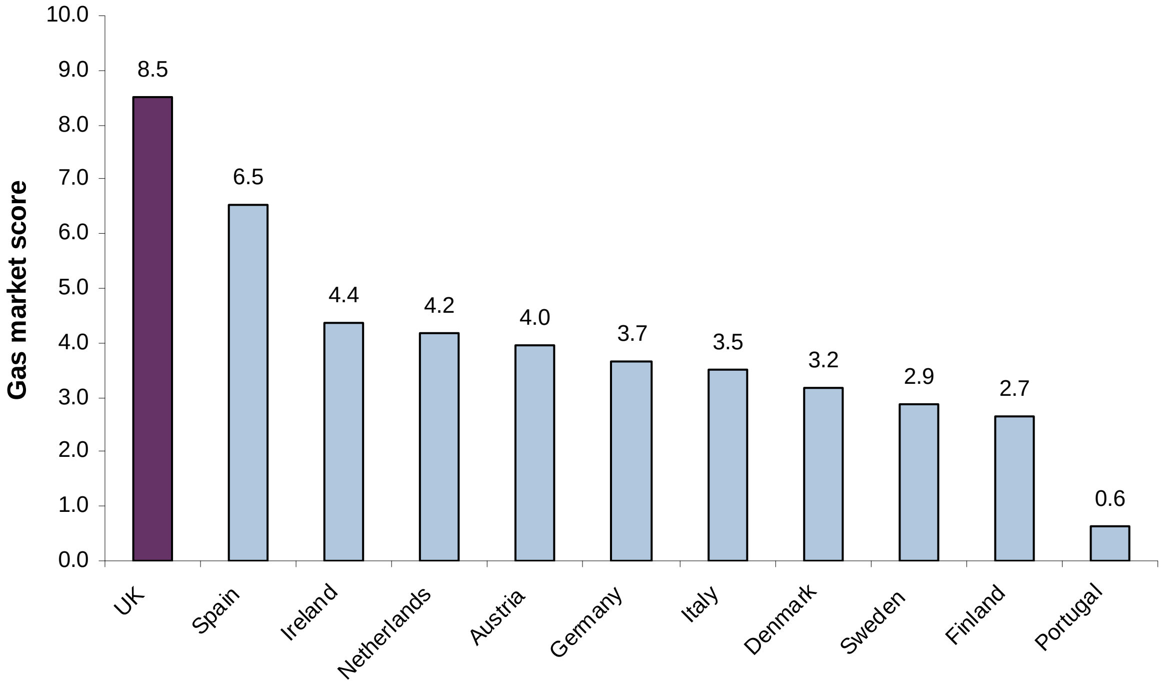


Table 3.3 Disaggregated scores for selected EU gas markets (preliminary 2006)

	Austria	Denmark	Finland	Italy	Netherlands	Portugal	Spain	Sweden	UK	Germany	Ireland
Upstream market[1]	0.0	0.0	0.0	0.0	0.0	0.0	6.5	0.0	10.0	0.0	7.0
Wholesale market	1.0	1.0	5.7	0.0	5.3	0.0	5.2	0.0	6.6	5.4	0.0
Downstream supply	5.0	1.6	0.0	3.9	5.6	0.0	4.2	0.0	7.2	1.8	1.9
Score—all market areas	2.0	0.8	1.9	1.3	3.6	0.0	5.2	0.0	7.9	2.4	2.9
Score—network area	8.7	8.6	4.5	8.7	5.6	2.1	9.6	9.6	10.0	6.6	7.7
Overall gas score	4.0	3.2	2.7	3.5	4.2	0.6	6.5	2.9	8.5	3.7	4.4

Note: The countries scoring 0 in their upstream markets all have market concentrations of greater than or equal to 70% as measured according to Oxera's new methodology, where market concentration equals (market share of the largest supplier + market share of the two largest suppliers + market share of the three largest suppliers)/3.

As shown in Table 3.4, Ireland, Spain and Portugal have seen a major increase in competitiveness, by 1.6, 1.2 and 0.6 points respectively, with the UK and Sweden exhibiting only a moderate increase. Germany and Italy show a marked decrease, of 0.9 and 0.8 points respectively, while the Netherlands shows only a minor decrease, of 0.1. The scores for the remainder of the comparator group have remained the same as in 2005. More information on the factors driving these changes is given in section 4.

Table 3.4 Comparison of final 2005 and preliminary 2006 scores for gas, both calculated according to the new methodology

Country	Final 2005 score	Preliminary 2006 score	Adjustment in score
UK	8.2	8.5	+0.3
Spain	5.3	6.5	+1.2
Ireland	2.8	4.4	+1.6
Netherlands	4.3	4.2	–0.1
Austria	4.0	4.0	0.0
Germany	4.5	3.7	–0.9
Italy	4.3	3.5	–0.8
Denmark	3.2	3.2	0.0
Sweden	2.6	2.9	+0.3
Finland	2.7	2.7	0.0
Portugal	0.0	0.6	+0.6

3.3 Energy market rankings

As shown in Figure 3.3, the UK is the most competitive of the energy markets, and achieves a score of 10, as it ranks first in both its electricity and gas market.[8] Sweden comes in at second place with a score of 8.1—a position it has held since Oxera first analysed the competitiveness of the EU energy markets in 2001. Its low score of 2.9 in the gas market (3.4 when rebased) is compensated for by its high electricity market score (7.0, 8.4 when rebased), in combination with a large electricity market relative to its gas market (see Table 3.5).

[8] The ranking has been estimated according to the 'rebased cardinal approach' described in Oxera (2007), 'Energy Market Competition in the EU and G7: Final 2005 rankings'. Essentially, the electricity and gas market scores are rebased, such that the score of the highest-ranking country is 10 and those of the remaining countries are measured relative to that of the highest ranking country. These rebased scores are then averaged with the relative sizes of the electricity and gas markets as weights.

Figure 3.3 Overall competitiveness scores for energy markets (preliminary 2006)

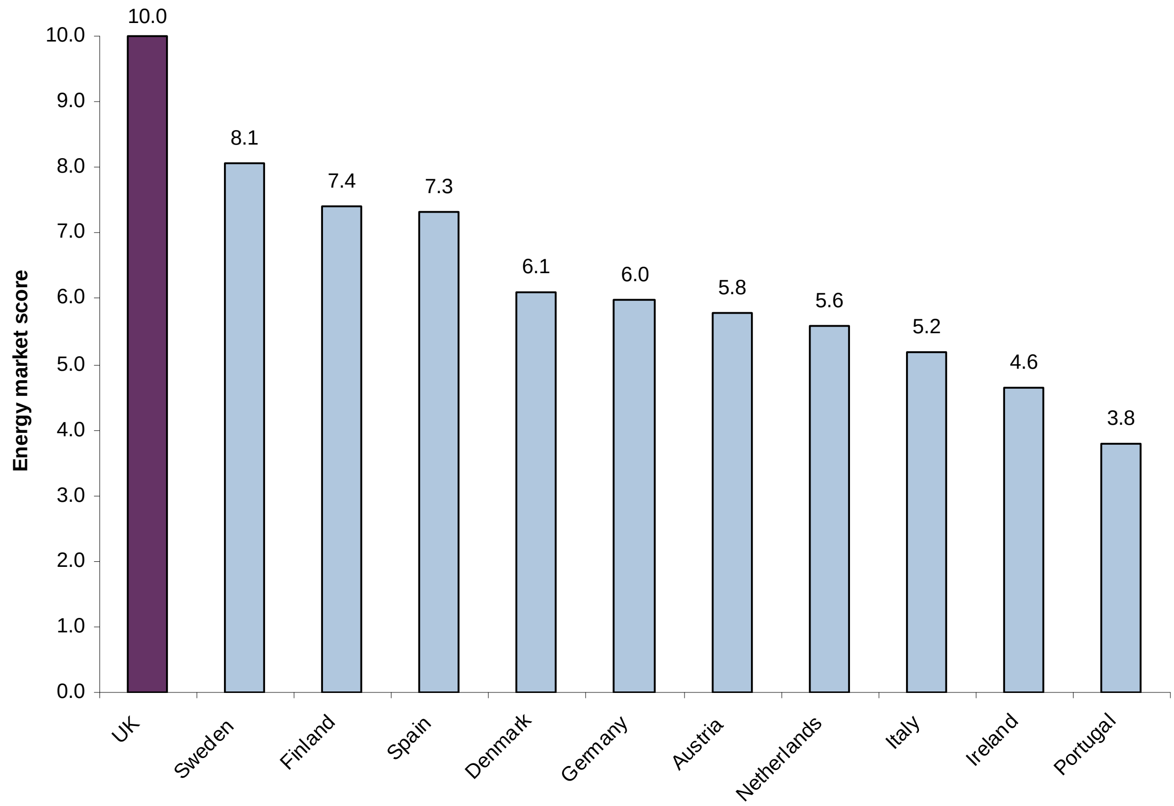


Table 3.5 Preliminary 2006 results

	Electricity market score	Gas market score	Rebased electricity market score	Rebased gas market score	Ratio of electricity to gas market size	Weighted energy market score
Austria	6.2	4.0	7.5	4.7	40:60	5.8
Denmark	7.7	3.2	9.2	3.7	43:57	6.1
Finland	8.0	2.7	9.6	3.1	66:34	7.4
Italy	6.6	3.5	8.0	4.1	28:72	5.2
Netherlands	6.4	4.2	7.8	4.9	21:79	5.5
Portugal	5.5	0.6	6.6	0.7	52:48	3.8
Spain	5.7	6.5	6.8	7.7	42:58	7.3
Sweden	7.0	2.9	8.4	3.4	93:7	8.1
UK	8.3	8.5	10.0	10.0	28:72	10.0
Germany	7.2	3.7	8.7	4.3	39:61	6.0
Ireland	3.0	4.4	3.6	5.1	38:62	4.6

As set out in Table 3.6, with a worsening in both its electricity and its gas market competitiveness, Germany's overall energy market score has decreased from 6.8 to 6.0, resulting in a loss of two positions in the rankings. The drop in the Netherlands' and Italy's competitiveness has also resulted in their falling one place each. According to the energy market aggregation rules used, decreases in scores do not necessarily mean that the country has worsened its competitiveness in absolute terms, but mean rather that the country has become less competitive relative to the top ranked country, i.e. the UK.

In the opposite direction, Austria's 0.3 increase in its electricity market score has gained the country two positions. Spain, with its increase in energy market score from 6.5 to 7.3, and Denmark, despite its decrease in energy market score from 6.3 to 6.1, have also seen their rankings improve, from fifth to fourth, and from sixth to fifth respectively.

No change in relative competitiveness score has taken place at the very top of the rankings, where Sweden maintains a score of 8.1 and holds its second position behind the UK. Only a marginal increase in Finland's score in the third position is registered.

Table 3.6 Comparison of final 2005 and preliminary 2006 energy scores, both calculated according to the new methodology

	Final 2005 score	Final 2005 rank	Preliminary 2006 score	Preliminary 2006 rank	Change in rank
UK	10.0	1	10.0	1	no change
Sweden	8.1	2	8.1	2	no change
Finland	7.3	3	7.4	3	no change
Spain	6.5	5	7.3	4	+1
Denmark	6.3	6	6.1	5	+1
Germany	6.8	4	6.0	6	–2
Austria	5.5	9	5.8	7	+2
Netherlands	6.0	7	5.5	8	–1
Italy	5.7	8	5.2	9	–1
Ireland	3.5	10	4.6	10	no change
Portugal	2.6	11	3.8	11	no change

4 Detailed country-by-country analysis: preliminary 2006 results

This section analyses the summary results presented in section 3, detailing the key characteristics of the energy markets of the 11 countries that passed the initial filter, and the major changes in competitiveness indicators in each of the countries.

4.1 Austria

4.1.1 Electricity

Significant developments have taken place in the Austrian electricity market in relation to market concentration. At the upstream level, 2006 Annual Reports by the largest generators have highlighted a decrease in market concentration from 62% to 49%. In the downstream supply market, a decrease in market concentration from 60% to 52% has been registered.

There was little merger and acquisition activity in the market in 2006. Upper Austria's Energie AG and Linz AG utilities have pulled out of EnergieAllianz, whose consolidation proposal of supply and wholesale activities with Verbund have come to a standstill. The Verbund has been negotiating over possible acquisition of a shareholding in Energie AG to form its own version of Energie Austria without the Allianz as a partner. [9]

Customer switching is still fairly limited at the domestic supply level (equalling 0.04%). More transparency in pricing and billing information introduced by new regulations are expected to encourage switching and competition.[10]

Table 4.1a Austrian electricity: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	4.2	6.7
Wholesale market	5.4	5.4
Downstream supply	4.1	5.4
Score—all market areas	4.5	5.8
Score—network area	7.1	7.1
Overall electricity score	5.3	6.2

4.1.2 Gas

No significant change has been highlighted in 2006 as regards Austrian market competitiveness in the gas market. The only minor improvement in competitiveness relates to market concentration in the I&C downstream supply market, which has decreased from 88% to 84%, as calculated from data in Econtrol Market Report 2006.[11]

[9] *EU Energy,* **128**, March 10th 2006, *Power in Europe,* **483**, September 11th 2006

[10] *EU Energy,* **147-148**, December 15th 2006

[11] There has been no consequent adjustment in its score, since the market concentration already lay in the 70–100% band that has a standardised score of 0.

Little merger and acquisition activity has taken place, with the merger project between the oil and gas concern OMV and the federal power utility Verbund having collapsed.[12]

In the supply market, two major developments have taken place: Russia's Gazprom and OMV have agreed to extend all of their gas supply contracts, covering some 7 billion cubic meters annually, until 2027.[13]

The Austrian domestic market is divided into nine roughly equal historical regions, where the incumbent gas company has a share of over 90%, with several companies making up the remaining 10%. On this basis, along the same lines as in 2005 analysis, it is assumed in the preliminary 2006 analysis that the market share of the largest three suppliers in the national market is 10% each. This is clearly an overestimate of the degree of competitiveness in Austria, due to the existence of a high degree of concentration in regional areas within the country. However, to maintain consistency across countries such as the UK and Germany, where companies maintain high market shares in their regions of incumbency, national, rather than regional, market shares have been used.

Table 4.1b Austrian gas: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	0.0	0.0
Wholesale market	1.0	1.0
Downstream supply	5.0	5.0
Score—all market areas	2.0	2.0
Score—network area	8.7	8.7
Overall gas score	4.0	4.0

4.2 Denmark

4.2.1 Electricity

The upstream market score for Denmark has decreased due to an increase in market concentration from 57% to 62%, calculated from new data made available in the Danish Energy Regulatory Authority DERA's report to the European Commission. Furthermore, a decrease of degree of technical openness of the market from 50% to 42% has been registered.

It has not been possible to update data on market concentration in the supply market from the 2005 to the 2006 levels using publicly available data.

The electricity market is divided into Eastern and Western markets, with no physical link between the two, while the wholesale market is integrated with the Nordic power market, raising concerns around whether the electricity market should be considered Nordic or national.[14]

[12] *EU Energy*, **134**, June 2nd 2006

[13] *International Gas Report*, **558**, October 6th 2006

[14] European Commission (2006), Energy Internal Market Fact Sheet.

Table 4.2a Danish electricity: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	5.8	4.9
Wholesale market	7.3	7.3
Downstream supply	8.8	8.8
Score—all market areas	7.2	6.9
Score—network area	9.4	9.4
Overall electricity score	7.9	7.7

4.2.2 Gas

No changes have taken place in any of the gas market data from 2005 to 2006, despite more of the data having been updated to 2006 levels.

The gas market remains highly concentrated, with DONG energy, a state-owned entity, dominating the market[15]. DONG's takeover of regional power generators Elsam and Energi E2, and of suppliers Copenhagen Energy and Frederiksberg Elnet has been conditionally approved by the European Commission. As part of the deal, Swedish state-owned electricity incumbent Vattenfall, who is to transfer its 35% stake in Elsam and its 40% interest in 540 MW Avedore 2 to DONG, is to get about 2.4 GW of power station capacity, thus acquiring about 24% of total Danish energy production.[16]

In the wholesale market, Gazprom of Russia has contracted the supply of gas to DONG for 20 years starting from 2011. And DONG has agreed to release gas supplier HNG Midt-Nord Salg from part of a long-term sales contract.[17]

Table 4.2b Danish Gas: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	0.0	0.0
Wholesale market	1.0	1.0
Downstream supply	1.6	1.6
Score—all market areas	0.8	0.8
Score—network area	8.6	8.6
Overall gas score	3.2	3.2

4.3 Finland

4.3.1 Electricity

The Finnish electricity generation sector has remained highly concentrated with PVO and Fortum the main players, with a combined market share of around 54%. As a result of an adjustment in the upstream market concentration, the upstream score has increased from 7.3 to 7.5. With no major changes taking place in the remainder of the Finnish market, a 0.1 increase in the overall electricity market competitiveness score takes place (7.9 to 8.0).

[15] European Commission (2006), Energy Internal Market Fact Sheet.
[16] *Power in Europe*, **468**, January 30th 2006; *EU Energy*, **129**,March 24th 2006
[17] *UK Gas report*, **312**, June 26th 2006; *EU Energy*, **136**, June 30th 2006

Table 4.3a Finnish electricity: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	7.3	7.5
Wholesale market	7.3	7.3
Downstream supply	8.8	8.8
Score—all market areas	7.7	7.8
Score—network area	8.5	8.5
Overall electricity score	7.9	8.0

4.3.2 Gas

The isolation of the small Finnish gas market has continued with Russia being the sole exporter to Finland. Gasum is the only importer and is also the wholesale supplier, in addition to owning and operating the transmission network.[18] The continued derogation from the conditions of the Second Gas Directive given that it does not have a direct connection with another Member State has meant that the competitiveness of the Finish gas market remains low, with a score of 2.7.

Table 4.3b Finnish gas: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	0.0	0.0
Wholesale market	5.7	5.7
Downstream supply	0.0	0.0
Score—all market areas	1.9	1.9
Score—network area	4.5	4.5
Overall gas score	2.7	2.7

4.4 Italy

4.4.1 Electricity

The electricity market score has increased from 5.8 to 6.6 as a result of a combination of factors.

– An increase has been registered in the interconnector capacity (7,150 MW to 7,966 MW).

– In the wholesale market, the share of daily volume traded covered by price reporting has increased from 44% to 60%.

– The supply market has been fully opened to competition. In addition, while the 2005 data separately covered I&C market concentration (23%) and domestic market concentration (90%), the 2006 data is an average figure across the I&C and domestic markets (49%).

[18] Finland Internal Market Fact Sheet, January 2007.

Table 4.4a Italian electricity: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	4.7	5.5
Wholesale market	4.3	5.6
Downstream supply	4.0	5.3
Score—all market areas	4.3	5.4
Score—network area	9.4	9.4
Overall electricity score	5.8	6.6

4.4.2 Gas

The change in the Italian gas market competitiveness, with the score declining from 4.3 to 3.5 has resulted from changes in the downstream supply market. The 2005 results implied an I&C market concentration of 58% and a domestic market concentration of 37%. The low domestic market concentration may reflect the fragmented nature of the Italian gas market. However, the available 2006 figures required an update to a combined I&C and domestic market concentration figure of 61%.

Further concerns have been raised in the downstream market, by the regulator AEEG, which found in a probe involving 14m customers that even when customers were free to switch suppliers, they encountered difficulties in doing so, facing a lack of transparency in competing offers.[19] The regulator added that the supply market was fragmented with growth based on M&A activity rather than organic customer acquisition.

Table 4.4b Italian gas: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	0.0	0.0
Wholesale market	0.0	0.0
Downstream supply	6.3	3.9
Score—all market areas	2.1	1.3
Score—network area	9.6	8.7
Overall gas score	4.3	3.5

4.5 Netherlands

4.5.1 Electricity

In the Dutch electricity market in 2006, generation market concentration has increased from 43% to 46%, the liquidity indicator has increased from 15% to 17%, and the downstream market concentration has increased from 55% to 68%. In combination, these factors resulted in a decline in the Dutch electricity market score from 7.3 to 6.4.

On the wholesale market front, a key event was the launch of Trilateral Market Coupling covering the Dutch, Belgian and French markets on November 21st 2006.[20]

[19] *EU Energy*, ***146***, December 1st 2006.
[20] *EU Energy*, **139**, August 11th 2006.

Table 4.5a Dutch electricity market: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	8.3	7.6
Wholesale market	4.5	4.6
Downstream supply	6.3	3.5
Score—all market areas	6.3	5.2
Score—network area	9.4	9.4
Overall electricity score	7.3	6.4

4.5.2 Gas

A minor increase in average supply market concentration (57% to 58%) along with a small decline in switching rates (6% to 5%) have led to a 0.1 decrease in the Dutch gas market score (4.3 to 4.2).

Table 4.5b Dutch gas market: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	0.0	0.0
Wholesale market	5.5	5.3
Downstream supply	6.0	5.6
Score—all market areas	3.8	3.6
Score—network area	5.6	5.6
Overall gas score	4.3	4.2

4.6 Portugal

4.6.1 Electricity

In the Portuguese electricity market, there was a small increase in concentration from 2005 to 2006 (62% to 64%) and the advent of price reporting in the wholesale market, which resulted in an increase in the competitiveness score from 4.0 to 5.5.

The introduction of Mibel is likely to have a positive impact on Portuguese electricity market competitiveness, both in terms of improved liquidity and reduced market concentration.

Table 4.6a Portuguese electricity market: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	3.2	3.9
Wholesale market	0.0	5.8
Downstream supply	1.8	1.8
Score—all market areas	1.7	3.8
Score—network area	9.4	9.4
Overall electricity score	4.0	5.5

4.6.2 Gas

The introduction of legal unbundling of gas transmission has been the only competitive development in an otherwise uncompetitive market, resulting in Portugal receiving a score of 0.6 in 2006 as compared to a score of 0 in 2005.

The regulator ERSE ran consultations on the introduction of rTPA to networks in 2006, in preparation for the lifting of the derogation from the Gas Directive in 2007.[21]

Table 4.6b Portuguese gas market: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	0.0	0.0
Wholesale market	0.0	0.0
Downstream supply	0.0	0.0
Score—all market areas	0.0	0.0
Score—network area	0.0	2.1
Overall gas score	0.0	0.6

4.7 Spain

4.7.1 Electricity

There have been some minor changes in the Spanish electricity market resulting in an increase in its score from 5.5 to 5.7. In particular, the upstream market concentration has increased from 60% to 61%. The wholesale market liquidity figure has been reduced to 81% from the previous 100%. In addition, supply market concentration has increased from 64% to 71%, largely as a result of the increase in Iberdrola's market share from 13% to 18%.

There are positive prospects for the future competitiveness of the Spanish electricity market. In 2006, the Spanish government launched a reform package for the Spanish energy market, including requirements for virtual capacity auctions and a clampdown on vertically integrated companies selling to themselves, with the aim of increasing transparency in the wholesale market and consequently reducing the dominant operators' ability to manipulate pool prices.[22]

A further positive move in the wholesale areas, was the first Mibel (the Iberian electricity market) auction that took place on July 1st.[23] This development is likely to reduce concentration in the Spanish and Portuguese markets in the future, also raising questions about the appropriate definition of the markets—should Spain and Portugal be considered separate markets, or should upstream concentration be evaluated at an Iberian level?

[21] *EU Energy*, **140**, September 8th 2006.
[22] *EU Energy*, **126**, February 10th 2006.
[23] *EU Energy*, **138**, July 28th 2006.

Table 4.7a Spanish electricity market: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	3.8	3.5
Wholesale market	6.0	5.8
Downstream supply	1.8	3.1
Score—all market areas	3.8	4.1
Score—network area	9.4	9.4
Overall electricity score	5.5	5.7

4.7.2 Gas

Several changes in the Spanish gas market have resulted in the increase in its gas market competitiveness (5.3 to 6.5). The shipper market concentration has declined from 60% to 48%. Wholesale market liquidity has increased from 20% to 38%. In addition, there has been a minor decline in supply market concentration from 66% to 65%.

Table 4.7b Spanish gas market: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	3.3	6.5
Wholesale market	4.7	5.2
Downstream supply	3.9	4.2
Score—all market areas	3.9	5.2
Score—network area	8.7	9.6
Overall gas score	5.3	6.5

4.8 Sweden

4.8.1 Electricity

While there have been changes in the Swedish electricity market, with its upstream market and network area scores rising between 2005 and 2006, the downstream market score has declined, with the overall effect being that Sweden’s competitiveness score has remained at 7.0.

More specifically, generation market concentration has declined from 68% to 65%, with the degree of technical openness increasing from 24% to 28%. Supply market concentration has increased significantly from 37% to 51%. On the network aspects, Sweden has introduced ownership unbundling of transmission.

Table 4.8a Swedish electricity: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	3.6	4.1
Wholesale market	7.3	7.3
Downstream supply	8.6	6.5
Score—all market areas	6.4	5.9
Score—network area	8.5	9.4
Overall electricity score	7.0	7.0

4.8.2 Gas

Swedish gas market competitiveness has improved by 0.3 from 2.6 to 2.9. While an increase in downstream concentration (68% to 72%) has tended to put a downward pressure on its gas market score, legal unbundling of gas distribution has had a positive impact on it.

With the opening of the domestic gas supply market to competition on July 1st 2007, there is some potential for competition to come about for that category of customers.

Table 4.8b Swedish gas: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	0.0	0.0
Wholesale market	0.0	0.0
Downstream supply	0.2	0.0
Score—all market areas	0.1	0.0
Score—network area	8.5	9.6
Overall gas score	2.6	2.9

4.9 UK

4.9.1 Electricity

The UK remains the most competitive of the electricity markets evaluated. The competitiveness of the UK electricity market has in general remained unchanged (with a score of 8.3), other than an increase in wholesale market liquidity from 157% to 173%.

In the retail areas, Ofgem has found that competition is working well with gas and electricity consumers switching more regularly today than in the last four years, with competition between the leading suppliers intensifying. Ofgem has also reported that price discrepancies between the major six suppliers have diminished, though concerns have been raised about the scale and speed of price reductions in light of lower wholesale costs.[24]

[24] http://www.ofgem.gov.uk/Markets/RetMkts/Compet/Documents1/DRMR%20March%202007doc%20v9%20-%20FINAL.pdf.

Table 4.9a UK electricity: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	8.3	8.3
Wholesale market	6.3	6.4
Downstream supply	9.1	9.1
Score—all market areas	7.8	7.8
Score—network area	9.4	9.4
Overall electricity score	8.3	8.3

4.9.2 Gas

A series of factors have been at play in driving the increase in the UK's gas market competitiveness from 8.2 to 8.5. In particular, the wholesale liquidity figure has been increased from 100% to 240%. While I&C supply market concentration has increased from 36% to 38%, domestic supply concentration has declined from 65% to 60%, largely as a result of the decline in BGT's share from 53% to 47%.

Table 4.9b UK gas: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	10.0	10.0
Wholesale market	6.0	6.6
Downstream supply	6.7	7.2
Score—all market areas	7.5	7.9
Score—network area	10.0	10.0
Overall gas score	8.2	8.5

4.10 Germany

4.10.1 Electricity

The German electricity remains dominated by four large electricity companies (RWE, E.ON, Vattenfall and EnBW), which together control 90% of generation capacity, almost the entire transmission network and around 50% of the downstream supply market.[25] The concentration of the largest companies has further increased, as the decline in the German electricity market score from 7.4 in 2005 to 7.2 in 2006 has been driven by the increase in concentration of its upstream market (48% to 55%), due to increases in E.ON and RWE's generation market shares. This has been partly compensated by a decline in downstream market concentration from 33% to 30%.

The German competition authority, the FCO, has stated that owing to the fact that 90% of the generation capacity is in the hands of the largest four companies and that the remainder of the capacity is spread across a large number of regional and local players, there is little potential for competition, particularly given that the base and middle load capacity is offered

[25] European Commission (2007), 'GERMANY–Internal Market Factsheet', January.

by the big four.[26] Furthermore, even when considering power imports, it found that two-thirds were accounting for by the large four companies.

However, there is potential for reduction in market concentration with almost half of the planned power generation capacity to be installed by 2011 (24 power stations with 18GW in total) due to be built by companies other than the four incumbents.[27]

Discussions between RWE Transportnetz Strom and the Dutch TSO (TenneT) to build a new 1500MW line between Germany and the Netherlands, may have the potential for increasing the degree of technical openness of the market in the future.[28]

Improvements in wholesale market liquidity may be expected as electricity market participants plan to anonymously publish data on wholesale trading, balancing energy, load, generation and cross-border trade to aid transparency in the market.[29] RWE, E.ON, EnBW and Vattenfall planned to make public generation capacity available on a given day and the output for the previous day on the website of the European Energy Exchange from April 10th 2006 for plants generating more than 20MW.[30]

In the network areas, the Energy Act of July 13th 2005, postponed the obligation to separate distribution networks (serving more than 100,000 customers) from supply until July 1st 2007.[31]

Table 4.10a German electricity: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	7.0	5.9
Wholesale market	7.4	7.4
Downstream supply	8.5	8.8
Score—all market areas	7.6	7.3
Score—network area	7.1	7.1
Overall electricity score	7.4	7.2

4.10.2 Gas

The German upstream market is divided between five large companies (E.ON-Ruhrgas, RWE, VNG, Wingas and BEB), that import gas from different sources and, together with a number of regional companies, operate the transmission system.[32]

The upstream market concentration in Germany has increased from 60% to 70% from 2005 to 2006. Domestic switching levels in 2006 have been reported as 1% as compared to the 5% figure for the entire downstream market reported for 2005. While these factors have tended to decrease Germany’s score, the introduction of regulated third party access to distribution has had a tendency to increase its competitiveness. The aggregate impact of these factors is a decline in German competitiveness from 4.5 to 3.7.

[26] *Power in Europe,* **490–491**, December 18th 2006.
[27] European Commission (2007), ‘GERMANY–Internal Market Factsheet’, January.
[28] *EU Energy,* **127,** February 24th 2006.
[29] *EU Energy,* **127,** February 24th 2006.
[30] *Power in Europe,* **473**, April 10th 2006.
[31] European Commission (2007), ‘GERMANY–Internal Market Factsheet’, January.
[32] European Commission (2007), ‘GERMANY–Internal Market Factsheet’, January.

As a result of long-term contracts and contractual congestion in the pipeline preventing new market entrants from acquiring capacity, have led to a lack of liquidity in terms of both capacity and commodity.[33] In particular, the German federal Cartel Office issued a formal prohibition order against E.On Ruhrgas on December 13th 2005 against its long-term supply contracts which were considered to infringe European and German anti-trust law.[34] Starting October 2006, E.ON-Ruhrgas was required to terminate selected supply contracts with mid-stream firms. The FCO has been said to be aiming to ban contracts with a delivery period of over two years, covering more than 80% of a users' demand and those contracts running over four years meeting more than half a mid-stream firm's actual requirements.

Furthermore, in July 2007, the Commission opened formal proceedings against E.ON and GDF over suspicions of market sharing. The investigation was prompted by the joint ownership of the MEGAL pipeline in southern Germany and the possibility that the two companies agreed not to sell gas into each other's markets.[35]

Table 4.10b German gas: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	3.3	0.0
Wholesale market	5.4	5.4
Downstream supply	3.0	1.8
Score—all market areas	3.9	2.4
Score—network area	6.1	6.6
Overall gas score	4.5	3.7

4.11 Ireland

4.11.1 Electricity

The Irish electricity market's competitiveness has remained unchanged from 2005 levels. The Electricity Supply Board (ESB) owns or controls the output of the vast majority of generation plants in Ireland. It is, however, required to supply a significant amount of such capacity to other potential suppliers through Virtual Power Plant auctions conducted on an annual basis, thus mitigating the impact of its large market share.[36]

In order to increase the competitiveness of the market, the regulator (Commission for Electricity Regulation) has required ESB to dispose of 1,300MW of its mid-merit plants by 2010.[37] The regulator considers that further disposals of plants would be essential to ensure sufficient competition is made possible.

The degree of technical openness of the market will also increase in the future, given the plans for a new 300MW electricity interconnector between Northern Ireland and the Republic of Ireland, due to be operational by 2012.[38] The Irish government is also said to be considering building a 500MW east-west interconnector between Ireland and Wales.

[33] European Commission (2007), 'GERMANY–Internal Market Factsheet', January.
[34] *EU Energy,* **124**, January 13th 2006 and *EU Energy,* **136,** June 30th 2006.
[35] http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/07/316&format=HTML&aged=0&language=EN&guiLanguage=en
[36] European Commission (2007), 'IRELAND–Internal Market Factsheet', January.
[37] *EU Energy,* **147–148**, December 15th 2006.
[38] *EU Energy,* **124**, January 13th 2006 and *Power in Europe*, **477**, June 5th 2006.

While the wholesale market is currently uncompetitive, wholesale market liquidity may be expected to increase with the introduction of the all-island (encompassing the Republic of Ireland and Northern Ireland) market in November 2007. This will involve the introduction of a pool market as opposed to the currently existing bilateral trading market.[39]

There are indications that the Irish gas incumbent Bord Gais Eirann is planning on strengthening its position in the electricity market, where it currently has an 8% share of generation, by building an additional 440 MW gas-fired power station.[40]

Table 4.11a Irish electricity: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	1.6	1.6
Wholesale market	0.0	0.0
Downstream supply	2.2	2.2
Score—all market areas	1.2	1.2
Score—network area	7.1	7.1
Overall electricity score	3.0	3.0

4.11.2 Gas

Concentration of the Irish gas supply market has declined throughout the supply chain. In the upstream market, there has been a decline from 66% to 46%. Where a combined I&C and domestic supply market concentration of 68% was used for 2005, in 2006, the I&C market concentration has been found to equal 60%.

In addition to these changes in the market areas, competitiveness in the network areas has improved, with the introduction of legal unbundling at the distribution level.

However, state-owned Bord Gas Eirann remains the largest player in the gas market, with operations in transmission, distribution and supply activities. While the gas market has been opened to competition for I&C customers, domestic customers will not be able to benefit from competition until 2007.[41]

In aggregate, the competitiveness of the Irish Gas market has improved from 2.8 to 4.4.

Table 4.11b Irish gas: final 2005 versus preliminary 2006

	Final 2005	Preliminary 2006
Upstream market	1.5	7.0
Wholesale market	0.0	0.0
Downstream supply	2.0	1.9
Score—all market areas	1.1	2.9
Score—network area	6.6	7.7
Overall gas score	2.8	4.4

[39] *EU Energy,* **131**, April 21st 2006.
[40] *International Gas Report,* **548**, May 5th 2006.
[41] European Commission (2007), 'IRELAND–Internal Market Factsheet', January.

5 Conclusions on preliminary 2006 rankings

The analysis of preliminary 2006 results finds that the UK has retained the top ranking amongst the EU and G7 countries, with the higher ranks in the electricity and gas markets separately. While its electricity score has remained unchanged from the 2005 levels (8.3), its gas market score has increased from 8.2 to 8.5. Sweden retains the second rank with an energy market score of 8.1 relative to the UK's benchmark score of 10 as the highest ranker in the electricity and gas markets.

Appendix 1 Data updates in the preliminary 2005 dataset

Tables A1.1 and A1.2 set out the latest year of data availability for each of the competitiveness indicators measured. The ‘updated with 2005 data’ category includes the cases where 2006 data has been updated with 2006.

Table A1.1 2005 electricity update

Key:
2006 data
2005 data
2004 data
Assumptions[1]

Indicator	Austria	Denmark	Finland	Germany	Ireland	Italy	Spain	Sweden	UK	Netherlands	Portugal
Upstream market											
Market share of the largest generator	2006 data	2006 data	2006 data	2006 data	2005 data	2005 data	2006 data	2006 data	2006 data	2006 data	2006 data
Market share of the two largest generators	2006 data	2006 data	2006 data	2006 data	Assumptions	2005 data	2006 data	2006 data	2006 data	2006 data	2006 data
Market share of the three largest generators	2005 data	Assumptions	2006 data	2006 data	2004 data	2005 data	2006 data	2006 data	2006 data	2006 data	2006 data
Degree of technical openness of market	2005 data	2006 data	2006 data	2005 data	Assumptions	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data
Openness of allocation mechanism to import capacity	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data
Wholesale market											
Existence of price reporting	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data
Share of total (daily) volume traded covered by price reporting	Assumptions	2004 data	2004 data	2004 data	2006 data	2006 data	2006 data	2005 data	2006 data	2006 data	2006 data
Existence of standardised contracts	2004 data	2004 data	2004 data	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data	2006 data

Indicator	Austria	Denmark	Finland	Germany	Ireland	Italy	Spain	Sweden	UK	Netherlands	Portugal
Downstream supply											
I&C											
Degree of supply market opening											
Market share of largest supplier											
Market share of two largest suppliers											
Market share of three largest suppliers											
Annual gross switching											
Domestic											
Degree of supply market opening											
Market share of largest supplier											
Market share of two largest suppliers											
Market share of three largest suppliers											
Annual gross switching											
Network-related activities											
Unbundling at transmission level											
rTPA at transmission level											
Unbundling on distribution network level											
rTPA at distribution level											

Note: [1] Appendix 2 details the basis for making assumptions where data is not available.
Source: Oxera.

Table A1.2 2005 gas update

Key:

2005 data

2004 data

Assumptions[1]

Indicator	Austria	Denmark	Finland	Germany	Ireland	Italy	Spain	Sweden	UK	Netherlands	Portugal
Upstream market											
Market share of the largest shipper											
Market share of the two largest shippers											
Market share of the three largest shippers											
Wholesale market											
Existence of price reporting											
Share of total (daily) volume traded covered by price reporting											
Existence of standardised contracts											
Downstream supply											
I&C											
Degree of supply market opening											
Market share of largest supplier											
Market share of two largest suppliers											
Market share of three largest suppliers											
Annual gross switching											

Domestic											
Degree of supply market opening											
Market share of largest supplier											
Market share of two largest suppliers											
Market share of three largest suppliers											
Annual gross switching											
Network-related activities											
Unbundling at transmission level											
rTPA at transmission level											
Unbundling on distribution level											
rTPA at distribution level											
Competitive access to gas storage											

Note: [1] Appendix 2 details the basis for making assumptions where data is not available.
Source: Oxera.

Appendix 2 Data for indicator evaluation, preliminary 2005 dataset

A2.1 Data availability, preliminary 2005 dataset

Tables A2.1 and A2.2 set out whether data is available for the different segments of the electricity and gas markets in the 11 comparator countries, providing details where data is missing (not available, n/a).

Table A2.1 Electricity

Indicator	Austria	Denmark	Finland	Germany	Ireland	Italy	Spain	Sweden	UK	Netherlands	Portugal
Upstream market											
Market share of generators	Yes	n/a for third largest generator	Yes	Yes	n/a for second largest generator	Yes	Yes	Yes	Yes	Yes	Yes
Degree of technical openness of market	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Openness of allocation mechanism to import capacity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wholesale market											
Price reporting	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Share of total (daily) volume traded covered by price reporting	n/a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Standardised contracts in wholesale markets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Downstream market											
Degree of supply market opening	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market share of largest suppliers	Yes	Yes	Yes	Yes	n/a for second largest I&C supplier	Yes	Yes	Yes	Yes	Yes	Yes
Switching rates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Indicator	Austria	Denmark	Finland	Germany	Ireland	Italy	Spain	Sweden	UK	Netherlands	Portugal
Network-related activities											
Unbundling at transmission level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
rTPA at transmission level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Unbundling at distribution level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
rTPA at distribution level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table A2.2 Gas

Indicator	Austria	Denmark	Finland	Germany	Ireland	Italy	Spain	Sweden	UK	Netherlands	Portugal
Upstream market											
Market share of shippers	n/a for second largest shipper	n/a for second largest shipper	Yes	n/a for second largest shipper	n/a for second largest shipper	Yes	Yes	Yes	Yes	n/a for second largest shipper	Yes
Wholesale market											
Price reporting	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Share of total (daily) volume traded covered by price reporting	Yes	Yes	Yes	N/a	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Standardised contracts in wholesale markets	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Downstream market											
Degree of supply market opening	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Market share of largest suppliers	Yes	Yes	N/a for the largest and second largest suppliers	Yes	n/a for the second largest supplier	Yes	Yes	Yes	Yes	Yes	Yes
Switching rates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Network-related activities											
Unbundling at transmission level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
rTPA at transmission level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Unbundling at distribution level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
rTPA at distribution level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Competitive access to gas storage	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

A2.2 Detailed data, final 2005 dataset

Austrian electricity market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest generator	Proportion of total available capacity	0.45	http://reports.verbund.at/2006/ar/servicepages/downloads/files/complete_vb_ar06.pdf, and UCTE Memo 2006	
two largest generators	As above	0.50	EVN (http://www1.financialreports.evn.at/2006-07/ir/2/keyfigures)	
three largest generators	As above	0.63	Energie Allianz	
Degree of technical openness of market	Total interconnector capacity as proportion of peak demand	0.14	EC2005, p. 106 interconnection and Austrian 2005 ERGEG report	
Openness of allocation mechanism to import capacity	rTPA, auction mechanism, long-term contracts	Auction	EC 2007	Explicit auction
Wholesale market				
Price reporting	Price information publicly available	Y	Energy Exchange Austria	
Share of total (daily) volume traded covered by price reporting		0.500	As above	
Standardised contracts		Y	As above	
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1.00	Austria fact-sheet to the EC	The electricity market was fully opened on 1 October 2001
Market share of				
largest supplier	Proportion of total supply/consumption	0.440	Verbund annual report 2006, p.69.	
two largest suppliers	As above	0.534	EVN http://www.investor.evn.at/e-investor/Kennzahlen.asp and http://www2.financialreports.evn.at/2006-07/ir/2/servicepages/downloads/files/business_segments_evn_ir207.pdf	
three largest suppliers	As above	0.600	EC2005, p. 45	
Switching	Proportion of eligible customers' gross switching per annum	0.07	Difference between data in EC2004, Annex 1, p. 5 and EC2005, p. 38	

Indicator	Definition	Assessment	Source	Comments
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, Annex 1, p. 2	
Market share of				
largest supplier	Proportion of total supply/ consumption	0.440	Verbund annual report 2006, p.69.	
two largest suppliers	As above	0.534	EVN http://www.investor.evn.at/e-investor/Kennzahlen.asp and http://www2.financialreports.evn.at/2006-07/ir/2/servicepages/downloads/files/business_segments_evn_ir207.pdf	
three largest suppliers	As above	0.600	EC2005, p. 45	
Switching	Proportion of eligible customers' gross switching per annum	0.01	BWB Annual Report 2005/06	Does not distinguish between I&C and domestic
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	L	EC2005, p.79 (Corrigendum), EC2006 page 123	
rTPA at transmission level	Tariffs imposed/approved by independent regulator	Y		
Unbundling at distribution level	Legal or ownership separation	N	EC2006, p.123, p.125	
rTPA at distribution level		Y		

Sources (for this and subsequent tables): EC2003 = European Commission (2004), 'Third Benchmarking Report on the Implementation of the Internal Electricity and Gas market', March; EC2004 = European Commission (2005), 'Fourth Benchmarking Report on the Implementation of the Internal Energy and Gas Market', January; and EC2005 = European Commission (2005), 'Report on progress in creating the internal gas and electricity market', November.

Austrian gas market data

Indicat or	Definition	ɩessment	Source	Comments
Upstream market				
Market share of				
largest shipper	Proportion of total gas sources by shipper	0.73	Econgas website 2006 and E-control Annual report 2006.	
two largest shippers	As above	0.77	Assumption	Two firms with market share > 5%
three largest shippers	As above	0.80	EC2005 annex table5.1 p55	
Wholesale market				
Price reporting	Price information publicly available	N	Austria annual report to ERGEG 2005, p 60	
Share of total (daily) volume traded covered by price reporting		0	As above	
Standardised contracts		Y	Because of the Baumgarten hub	
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, p. 2	The gas market was fully opened in 2002
Market share of				
largest supplier	Proportion of total supply/consumption	0.72	E-Control Market Report 2006, p.81	
two largest suppliers	As above	0.85	As above	STGW–Steirische Gas Wärme
three largest suppliers	As above	0.95	As above	Terragas
Switching	Proportion of eligible customers' gross switching	0.04	EC Energy Internal Market Fact Sheet Austria	
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, p. 2	
Market share of				
largest supplier	Proportion of total supply/consumption	0.10		At household level, the gas market is split between the nine, roughly equal, historical regions of Austria. The incumbent gas company in each region has over 90% of the market share. It is therefore assumed that each of the three largest suppliers has a market share of 10% across Austria
two largest suppliers	As above	0.20		As above
three largest suppliers	As above	0.30		As above
Switching	Proportion of eligible customers' gross switching	0.004	EC Energy Internal Market Fact Sheet Austria	

Indicat or	Definition	essment	Source	Comments
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	L	EC2006, p.126	Does not specify whether at transmission or distribution level
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y	Natural Gas Marketing Act 2002	As above
Unbundling at distribution level	Legal or ownership separation	L	EC2006, p.126	As above
rTPA at distribution level		Y	Natural Gas Marketing Act 2002	As above
Competitive access to gas storage	Competitive auctions; rTPA	Y	E-control 2006 report, p. 85	

Danish electricity market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest generator	Proportion of total available capacity	0.51	DERA 2006 report to the EC, pp. 21–22	
two largest generators	As above	0.66	As above	
three largest generators	As above	0.68	Only 2 generators in Denmark with >5% share	
Degree of technical openness of market	Total interconnector capacity as proportion of peak demand	0.42	Country report to ERGEG 2006, pp. 11, 12 and.49	The Danish system has 12,600 MW installed capacity and interconnection capacity of Denmark is 5,240 MW
Openness of allocation mechanism to import capacity	rTPA, auction mechanism, long-term contracts	rTPA		
Wholesale market				
Price reporting	Price information publicly available	Y	Nord Pool and EC 2006, p. 26	
Share of total (daily) volume traded covered by price reporting		5.66	EC Sector Inquiry, Tables 16 and 17	
Standardised contracts		Y		
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1.00	DERA 2006 report to the EC, p. 10	
Market share of				
largest supplier	Proportion of total supply/consumption	0.18	DERA Press Release 'Elforsyningspligtselskaber - efterregulering', October 31st 2005.	
two largest suppliers	As above	0.30	As above	
three largest suppliers	As above	0.40	As above	
Switching	Proportion of eligible customers' gross switching per annum	0.207	IEA Denmark 2006 Review, Table 24, p.141.	

Indicator	Definition	Assessment	Source	Comments
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1.00	DERA 2006 report to the EC, p. 10	
Market share of				
largest supplier	Proportion of total supply/consumption	0.18	DERA Press Release 'Elforsyningspligtselskaber–efterregulering', October 31st 2005.	
two largest suppliers	As above	0.30	As above	
three largest suppliers	As above	0.40	As above	
Switching	Proportion of eligible customers' gross switching per annum	0.01	IEA Denmark 2006 Review, Table 24, p.141.	
Network-related activities		O	DERA 2006 report to the EC, p.9	
Unbundling at transmission level	Legal or ownership separation	Y	EC2003, p.13, Table 1.	Data does not specify whether regulated network access applies to TSO or DSOs.
rTPA at transmission level	Tariffs imposed or approved by independent regulator	L	EC 2006, p.28	
Unbundling at distribution level	Legal or ownership separation	Y	EC2006, p.23	
rTPA at distribution level		O	DERA 2006 report to the EC, p.19	

Danish gas market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest shipper	Proportion of total gas sources by shipper	0.83	14/03/2006:EC Press Release, March 14th 2006 (MEMO/06/125)	DONG's market share in the Danish gas wholesale market is 80-85%
two largest shippers	As above	0.92	Assumption	
three largest shippers	As above	0.97	EC2005 Annex Table5.1 p55	
Wholesale market				
Price reporting	Price information publicly available	N	Herbet Smith (2007), 'European Energy Review 2007. Denmark', p.8.	From 2004, Gastra has introduced a so-called Gas Transfer Facility (GTF), which makes it possible for shippers to trade natural gas directly with each other. Each trade and the prices at which the gas is traded are treated as confidential information. There is no national gas exchange and therefore no market based price information immediately and publicly available.
Share of total (daily) volume traded covered by price reporting		0	See above	See above
Standardised contracts		Y	See above	A gas supplier must enter into a consumer handling agreement with the distribution companies in the areas in which the supplier is active. Industry standard bilateral gas trading agreements as well as ISDA formats are used.
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1	DERA 2006 Report to the EC, p. 31	The Danish natural gas market was fully liberalized as of January 1st 2004.
Market share of				
largest supplier	Proportion of total supply/consumption	0.51	DERA 2006 National Report to the European Commission, p. 45	DONG Energy
two largest suppliers	As above	0.73	As above	Statoil Gazelle
three largest suppliers	As above	0.9	As above	HNG/MN
Switching	Proportion of eligible customers' gross switching	0.3	Danish Energy Regulatory Authority Annual Report 2006 p. 46	

Indicator	Definition	Assessment	Source	Comments
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	DERA 2006 Report to the EC, p. 31 "The Danish natural gas market was fully liberalized as of January 1, 2004."	1
Market share of				
largest supplier	Proportion of total supply/ consumption	0.52	DERA 2006 National Report to the European Commission, p. 45	HNG/MN
two largest suppliers	As above	0.8	As above	Dong
three largest suppliers	As above	1	As above	Statoil Gazelle
Switching	Proportion of eligible customers' gross switching	0.0024	Danish Competition Authority	2004 data refers to consumers who consume <300,000m3
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	O	EC2005 p.81 (Corrigendum)	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y	EC2002, p.13, Table 1.	Data does not specify whether regulated network access applies to TSO or DSOs.
Unbundling at distribution level	Legal or ownership separation	L	EC2006, p. 23	
rTPA at distribution level		Y	EC2006, p. 25	
Competitive access to gas storage	Competitive auctions; rTPA	N	EC2006, p. 25	Negotiated TPA

Finnish electricity market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest generator	Proportion of total available capacity	0.30	Fortum 2006 Annual Report p.2..	
two largest generators	As above	0.54	Pohjolan Voima Environmental Information 2006, p.5.	
three largest generators	As above	0.61	Vattenfall presentation, EEI Utility Conference 2007, p.9.	
Degree of technical openness of market	Total interconnector capacity as proportion of peak demand	0.23	Finland annual report to ERGEG 2005, 26.	
Openness of allocation mechanism to import capacity	rTPA, auction mechanism, long-term contracts	Auction	Finland report to ERGEG 2006, p.14.	Implicit auctions
Wholesale market				
Price reporting	Price information publicly available	Y	Nord Pool	
Share of total (daily) volume traded covered by price reporting		5.66	EC Sector Inquiry, Tables 16 and 17	
Standardised contracts		Y		
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1.00	EC2004, Annex 1, p.2	
Market share of				
largest supplier	Proportion of total supply/consumption	0.14	Stora Enso Oyj,2006 Sustainability report.	
two largest suppliers	As above	0.26	UPM-Kymmene Group, 2006 Annual Report.	
three largest suppliers	As above	0.32	Metsäliitto, 2006 Annual Report.	
Switching	Proportion of eligible customers' gross switching per annum	0.03	EC2006	
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, Annex 1, p. 2	
Market share of				
largest supplier	Proportion of total supply/consumption	0.11	Development of a Common Nordic Balance Settlement, Report 3/2006 p.28.	
two largest suppliers	As above	0.22	As above	
three largest suppliers	As above	0.33	Finland Report to ERGEG 2006, p.33, Table 7	
Switching	Proportion of eligible customers' gross switching per annum	0.03	Finland annual report to ERGEG 2006, p.34, Table 8	Difference between 2005 and 2004 levels used.

Indicator	Definition	Assessment	Source	Comments
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	L	EC2005, p.79 (Corrigendum)	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y	EC2003, p.13, Table 1	Data does not specify whether regulated network access applies to TSO or DSOs.
Unbundling at distribution level	Legal or ownership separation	L	EC2005, p.80 (Corrigendum)	
rTPA at distribution level		Y	EC2003, p.13, Table 1	

Finnish gas market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest shipper	Proportion of total gas sources by shipper	1.00	Finland report to ERGEG 2006, p.44.	
two largest shippers	As above	1.00		
three largest shippers	As above	1.00		
Wholesale market				
Price reporting	Price information publicly available	Y	Energiamarkkinavirasto	
Share of total (daily) volume traded covered by price reporting		0.70	Finland annual report to ERGEG 2006, p44	
Standardised contracts		Y	Finland annual report to ERGEG 2005, p41 and Finland annual report to ERGEG 2006, p44	
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	0		Because of the derogation and 0% market opening, the competitiveness indicators of market opening and customer switching = 0
Market share of				
largest supplier	Proportion of total supply/consumption	0.25	Assumption	
two largest suppliers	As above	0.40	Assumption	
three largest suppliers	As above	0.50	Finland annual report to ERGEG 2006, p.45	
Switching	Proportion of eligible customers' gross switching	0		
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	0		
Market share of				
largest supplier	Proportion of total supply/consumption	0.25	Assumption	
two largest suppliers	As above	0.40	Assumption	
three largest suppliers	As above	0.50	Finland annual report to ERGEG 2006, p.45	
Switching	Proportion of eligible customers' gross switching	0		

Indicator	Definition	Assessment	Source	Comments
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	N	Finland annual report to ERGEG 2006, p.39	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y	Finland annual report to ERGEG 2006, pp.10–11	
Unbundling at distribution level	Legal or ownership separation	N	Finland annual report to ERGEG 2006, p.39	
rTPA at distribution level		Y	Finland annual report to ERGEG 2006, pp.10–11	
Competitive access to gas storage	Competitive auctions; rTPA	N		There are no production or storage facilities in Finland

German electricity market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest generator	Proportion of total available capacity	0.33	RWE Annual Report 2006	
two largest generators	As above	0.58	EON Annual Report 2006, p.90	
three largest generators	As above	0.73	Vattenfall annual report 2006, p.39	
Degree of technical openness of market	Total interconnector capacity as proportion of peak demand	0.15	UCTE System Adequacy Forecast, Nordel Annual Statistics, NGC 7 Yr Statement and Eirgrid Transmission Forecast Statement	
Openness of allocation mechanism to import capacity	rTPA, auction mechanism, long-term contracts	Auction	Germany's National Contribution to EC Benchmarking Report 2006, p.5	Implicit auction
Wholesale market				
Price reporting	Price information publicly available	Y	EEX and EC2006	
Share of total (daily) volume traded covered by price reporting		6.58	EC Sector Inquiry, Tables 16 and 17	
Standardised contracts		Y		
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, Annex 1, p. 2	
Market share of				
largest supplier	Proportion of total supply/consumption	0.16	RWE facts and figures 2007, pp.194–195.	
two largest suppliers	As above	0.32	As above	
three largest suppliers	As above	0.42	As above	
Switching	Proportion of eligible customers' gross switching per annum	0.08	Verband der Elektrizitätswirtschaft e.V. (German Electricity Association), April 2005, quoted p. 7	
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1.00	EC 2006–Internal Market Fact Sheet	
Market share of				
largest supplier	Proportion of total supply/consumption	0.16	RWE facts and figures 2007, pp.194–195.	
two largest suppliers	As above	0.32	As above	
three largest suppliers	As above	0.42	As above	
Switching	Proportion of eligible customers' gross switching per annum	0.01	Verband der Elektrizitätswirtschaft e.V. (German Electricity Association), April 2005.	Based on 5% of customers having switched since 1999.

Indicator	Definition	Assessment	Source	Comments
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	L	EC2006, p.29	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y	Germany Network Agency Annual Report 2006.	Under section 23a (1) of the Energy Act the charges for access to the system require approval. Operators of electricity supply networks had to submit a first application by 31 October 2005.
Unbundling at distribution level	Legal or ownership separation	N	EC2006, p.29.	Implementation of the legal unbundling rules is mandatory on DSOs only from July 2007 (Germany 2006 report to EC).
rTPA at distribution level		Y	Germany Network Agency Annual Report 2006.	Under section 23a (1) of the Energy Act the charges for access to the system require approval. Operators of electricity supply networks had to submit a first application by 31 October 2005.

German gas market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest shipper	Proportion of total gas sources by shipper	0.6	Germany Fact Sheet to the EC 2006.	
two largest shippers	As above	0.7	Assumption	
three largest shippers	As above	0.8	EC2005, p.55 table 5.1	
Wholesale market				
Price reporting	Price information publicly available	Y	Eurohub	
Share of total (daily) volume traded covered by price reporting		0.5	Assumption as no figures reported	
Standardised contracts		Y	Eurohub	
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1	Germany EC 2006 Internal market Fact Sheet	
Market share of				
largest supplier	Proportion of total supply/consumption	0.553	Eon Strategy & key figures 2007, p.64	E.ON-Ruhrgas
two largest suppliers	As above	0.703	VNG Annual Report 2006	
three largest suppliers	As above	0.844	Wingas Annual Report 2006.	
Switching	Proportion of eligible customers' gross switching	0.07	German report to ERGEG 2006, p.12	
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	Germany EC 2006 Internal market Fact Sheet	
Market share of				
largest supplier	Proportion of total supply/consumption	0.553	Eon Strategy & key figures 2007, p.64	
two largest suppliers	As above	0.703	VNG Annual Report 2006	
three largest suppliers	As above	0.844	Wingas Annual Report 2006.	
Switching	Proportion of eligible customers' gross switching	0.01	German report to ERGEG 2006, p.12	

Indicator	Definition	Assessment	Source	Comments
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	L	EC2006, p. 29	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y	Germany Network Agency Annual report 2006, p. 143.	
Unbundling at distribution level	Legal or ownership separation	N	EC2006, p.29	Accounts
rTPA at distribution level		Y	Germany Network Agency Annual report 2006, p. 144.	
Competitive access to gas storage	Competitive auctions; rTPA	N	EC2006, p. 40	

Italian electricity market data

Indicator	Definition	essment	Source	Comments
Upstream market				
Market share of				
largest generator	Proportion of total available capacity	0.47	Autorita' per l'energia elettrica e il gas 2006.	Enel
two largest generators	As above	0.56	As above	Edipower
three largest generators	As above	0.65	As above	Edison
Degree of technical openness of market	Total interconnector capacity as proportion of peak demand	0.14	Autorita' per l'energia elettrica e il gas, http://www.aceaspa.it/upload/azionisti/relazione_gestione311206.pdf, and EC2006	
Openness of allocation mechanism to import capacity	rTPA, auction mechanism, long-term contracts	Auction	Italy report to ERGEG 2006, p.15	Implicit and explicit auction
Wholesale market				
Price reporting	Price information publicly available	Y		GME became operational on 31st March 2004. IPEX exists
Share of total (daily) volume traded covered by price reporting		0.60		
Standardised contracts		Y	GME website	OMEL exists
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1.00	Italy 2006 Annual report to EC, p.13.	Complete opening of the market for non-residential customers has effect from 1st July 2004, but there have been problems in implementation
Market share of				
largest supplier	Proportion of total supply/consumption	0.44	Enel 2006 annual report, p.14.	Enel
two largest suppliers	As above	0.49	ENI	ENI
three largest suppliers	As above	0.53	Acea	Acea
Switching	Proportion of eligible customers' gross switching per annum	0.15	EC 2006.	60% had switched since Oct 01. Equals 15% per year.

Indicator	Definition	;essment	Source	Comments
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	0.79	European electricity market indicators of the liberalization process, Table 1, p. 1	
Market share of				
largest supplier	Proportion of total supply/consumption	0.44	Enel 2006 annual report, p.14.	Enel
two largest suppliers	As above	0.49	ENI	ENI
three largest suppliers	As above	0.53	Acea	Acea
Switching	Proportion of eligible customers' gross switching per annum	0.001	EC2006	.
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	O	EC2006, p.76	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y		
Unbundling at distribution level	Legal or ownership separation	L	EC2006, p.76	
rTPA at distribution level		Y		

Italian gas market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest shipper	Proportion of total gas sources by shipper	0.65	ENI Factbook 2006, p58,	
two largest shippers	As above	0.76	As above	
three largest shippers	As above	0.86	As above	
Wholesale market				
Price reporting	Price information publicly available	N	Italy 2006 Annual report to EC, pp.36–37.	
Share of total (daily) volume traded covered by price reporting		0.00	As above	Steps are being taken to "encourage the development of the spot market".
Standardised contracts		N	As above	A consultation on the proposed standard contract for gas trading has been opened.
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, Annex 1, p. 2	
Market share of				
largest supplier	Proportion of total supply/consumption	0.495	Autorita' per l'energia elettrica e il gas I	
two largest suppliers	As above	0.648	As above.	
three largest suppliers	As above	0.678	As above.	
Switching	Proportion of eligible customers' gross switching	0.13	Italy annual report to ERGEG 2005, p53	
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	Italy Annual Report to EC 2006, p.35.	
Market share of				
largest supplier	Proportion of total supply/consumption	0.495	Autorita' per l'energia elettrica e il gas I	
two largest suppliers	As above	0.648	As above.	
three largest suppliers	As above	0.678	As above.	
Switching	Proportion of eligible customers' gross switching	0.01	EC2006, p.82	

Indicator	Definition	Assessment	Source	Comments
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	L	EC2006 p.76 and following.	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y		
Unbundling at distribution level	Legal or ownership separation	L	EC2006 p.78	
rTPA at distribution level		Y		
Competitive access to gas storage	Competitive auctions; rTPA	Y		

Irish electricity market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest generator	Proportion of total available capacity	0.65	http://www.esb.ie/main/news_events/press_release277.jsp	
two largest generators	As above	0.90	Assumed	
three largest generators	As above	0.93	Ireland annual report to ERGEG 2005, Table 3.2.1, p. 24	
Degree of technical openness of market	Total interconnector capacity as proportion of peak demand	0.06	EC2005, Annex, Table 9.1, p. 89	
Openness of allocation mechanism to import capacity	rTPA, auction mechanism, long-term contracts	Auction	Ireland annual report to ERGEG 2005, p. 26	Explicit auction
Wholesale market				
Price reporting	Price information publicly available	N	Ireland 2006report to EC, p.25.	'At present there is no facility in place to allow market participants to participate directly in the wholesale market'.
Share of total (daily) volume traded covered by price reporting		0		
Standardised contracts		N	Ireland annual report to ERGEG 2006, p.24	
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1	European electricity market indicators of the liberalization process, Table 1, p. 1	
Market share of				
largest supplier	Proportion of total supply/consumption	0.70	Ireland annual report to ERGEG 2005, Table 3.2.5, p. 27	
two largest suppliers	As above	0.89	Assumed	
three largest suppliers	As above	0.99	Inferred from Ireland annual report to ERGEG 2005, Table 3.2.7, p. 28	
Switching	Proportion of eligible customers’ gross switching per annum	0.06	Ireland annual report to ERGEG 2005, Table 3.2.7, p. 28	
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	European electricity market indicators of the liberalization process, Table 1, p. 1	
Market share of				
largest supplier	Proportion of total supply/consumption	0.70	Ireland annual report to ERGEG 2005, p.27, Table3.2.5	
two largest suppliers	As above	1.00	Ireland 2006 annual report to EC, p 26.	There are 2 suppliers in the domestic market
three largest suppliers	As above	1.00	As above	As above
Switching	Proportion of eligible customers’ gross switching per annum	0.02	Ireland annual report to ERGEG 2005, Table 3.2.7, p. 28	

Indicator	Definition	Assessment	Source	Comments
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	L	EC2006, p.70.	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y		
Unbundling at distribution level	Legal or ownership separation	N	EC2006, p.71	
rTPA at distribution level		Y		

Irish gas market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest shipper	Proportion of total gas sources by shipper	0.37	Bord Gais Annual Report 2006, p.11	
two largest shippers	As above	0.47		
three largest shippers	As above	0.54		
Wholesale market				
Price reporting	Price information publicly available	N	Ireland 2006 annual report to EC, p.39.	
Share of total (daily) volume traded covered by price reporting		0	As above	
Standardised contracts		N	As above	
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1	ERGEG 2006 page 33 - Since 2004 all non-domestic customers have been free to choose their supplier	
Market share of				
largest supplier	Proportion of total supply/consumption	0.37	BordGais OpReview2006, p.25.	
two largest suppliers	As above	0.62	Assumption	
three largest suppliers	As above	0.82	Vayu.	
Switching	Proportion of eligible customers' gross switching	0.23	Ireland annual report to ERGEG 2005, Table4.2.5, p49	
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	Ireland annual report to ERGEG 2005, p. 37	
Market share of				
largest supplier	Proportion of total supply/consumption	0.369	Ireland annual report to ERGEG 2005, Table 4.2.5, p. 47	
two largest suppliers	As above	0.711	Assumed	
three largest suppliers	As above	1	EC2005, Annex, Table 6.2, p. 58	
Switching	Proportion of eligible customers' gross switching	0	Ireland annual report to ERGEG 2005, Table 4.2.5, p. 49	

Indicator	Definition	Assessment	Source	Comments
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	L	Ireland 2006 Annual Report to EC, pp. 33,34 and 37.	BGE owns transmission system operator. New legislation to implement the legal unbundling provision is expected to be in place by the end of the year.
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y		
Unbundling at distribution level	Legal or ownership separation	L	Ireland 2006 Annual Report to EC, pp. 33,34 and 37.	
rTPA at distribution level		Y		
Competitive access to gas storage	Competitive auctions; rTPA	N		

Spanish electricity market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest generator	Proportion of total available capacity	0.36	Endesa Annual Report 2006	
two largest generators	As above	0.69	Iberdrola Annual Report 2006	
three largest generators	As above	0.79	Union Fenosa Annual Report 2006	
Degree of technical openness of market	Total interconnector capacity as proportion of peak demand	0.05	EC2006 pp. 60, 114, 141	
Openness of allocation mechanism to import capacity	rTPA, auction mechanism, long-term contracts	Auction	EC Sector Inquiry 2006, p. 182	
Wholesale market				
Price reporting	Price information publicly available	Y	OMEL	
Share of total (daily) volume traded covered by price reporting		0.81	Spanish Regulators Annual Report to the EC, p. 38; IEA - MES 2006, Table 30	
Standardised contracts		Y	OMEL	
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, Annex 1, p. 2 (combined figure for I&C and domestic)	
Market share of				
largest supplier	Proportion of total supply/consumption	0.44	Endesa 2006 Annual report, p. 110	Combined figure for I&C and domestic
two largest suppliers	As above	0.67	Iberdrola 2006 Annual Report, p. 77	As above
three largest suppliers	As above	0.82	ERGEG's Assessment of the development of the European Energy Market; Spanish Regulator's Annual Report to the EC, p. 47	As above
Switching	Proportion of eligible customers' gross switching per annum	0.07	Difference between values in EC2004, Annex 1, p. 5 and EC2005, p. 45	
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, Annex 1, p. 2 (combined figure for I&C and domestic)	
Market share of				
largest supplier	Proportion of total supply/consumption	0.44	Endesa 2006 Annual report, p. 110	Combined figure for I&C and domestic
two largest suppliers	As above	0.67	Iberdrola 2006 Annual Report, p. 77	As above
three largest suppliers	As above	0.82	ERGEG's Assessment of the development of the European Energy Market; Spanish Regulator's Annual Report to the EC, p. 47	As above
Switching	Proportion of eligible customers' gross switching per annum	0.01	Difference between values in EC2004, Annex 1, p. 5 and EC2005 p. 45	

Indicator	Definition	Assessment	Source	Comments
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	O	EC2006, p.53	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y	EC2003, p.13, Table 1.	Data does not specify whether regulated network access applies to TSO or DSOs.
Unbundling at distribution level	Legal or ownership separation	L	EC2006, p.59	
rTPA at distribution level		Y	EC2003, p.13, Table 1.	Data does not specify whether regulated network access applies to TSO or DSOs.

Spanish gas market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest shipper	Proportion of total gas sources by shipper	0.35	Spanish Regulator's Annual Report to the EC (2006), p. 82	Gas Natural
two largest shippers	As above	0.50	As above	Iberdrola
three largest shippers	As above	0.59	As above	Union Fenosa
Wholesale market				
Price reporting	Price information publicly available	Y	Gas release programme	
Share of total (daily) volume traded covered by price reporting		0.38	Spanish Regulator's Annual Report to the EC (2006), p. 84	
Standardised contracts		Y	As above	
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, Annex 1, p. 2.	
Market share of				
largest supplier	Proportion of total supply/consumption	0.54	Gas Natural 5 yr data summary. Figure is TPA distribution only.	
two largest suppliers	As above	0.67	Iberdrola 2005 financial results, p. 3	
three largest suppliers	As above	0.78	BP. Cedigaz, 'The Players on the European Gas Market: Positioning and Strategies', p. 11.	
Switching	Proportion of eligible customers' gross switching	0.1	Difference between EC2005, Table 3.2, p. 39 & EC2004, Annex 1, p. 6	
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, Annex 1, p. 2	
Market share of				
largest supplier	Proportion of total supply/consumption	0.54	Gas Natural 5 yr data summary. Figure is TPA distribution only.	
two largest suppliers	As above	0.67	Iberdrola 2005 financial results, p. 3	
three largest suppliers	As above	0.78	BP. Cedigaz, 'The Players on the European Gas Market: Positioning and Strategies', p. 11	
Switching	Proportion of eligible customers' gross switching	0.14	COMISIÓN NACIONAL DE ENERGÍA Memoria 2005, p. 16	

Indicator	Definition	Assessment	Source	Comments
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	O	EC2006 p.53	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y	EC2006, p. 56	
Unbundling at distribution level	Legal or ownership separation	L	EC2005, p.82 (Corrigendum)	
rTPA at distribution level		Y	EC2006, p. 56	
Competitive access to gas storage	Competitive auctions; rTPA	Y	EC2006, p. 57	

Swedish electricity market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest generator	Proportion of total available capacity	0.45	Swedish Competition Authority 2007, p. 2	Vattenfall
two largest generators	As above	0.66	As above	E.ON
three largest generators	As above	0.85	As above	Fortum
Degree of technical openness of market	Total interconnector capacity as proportion of peak demand	0.28	Nordel Annual Statistics 2006; Nordel Annual Report 2006, p. 33	
Openness of allocation mechanism to import capacity	rTPA, auction mechanism, long-term contracts	Auction	EC Sector Inquiry 2006, p.182	
Wholesale market				
Price reporting	Price information publicly available	Y	Nord Pool	
Share of total (daily) volume traded covered by price reporting		6.02	The Swedish Energy Markets Inspectorate's Annual Report to the European Commission, p.24 and table	
Standardised contracts		Y		
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, Annex 1, p. 2	
Market share of				
largest supplier	Proportion of total supply/consumption	0.36	Swedish Competition Authority 2007, p. 3	No distinction between I&C and domestic
two largest suppliers	As above	0.51	Swedish Competition Authority 2007, p. 3	As above
three largest suppliers	As above	0.65	Swedish Competition Authority 2007, p. 3	As above
Switching	Proportion of eligible customers' gross switching per annum	0.03	Supplier Switching in the Nordic Countries, Sept 05, p. 76 for 2003 as well, according to EC2004, p. 5	

Indicator	Definition	Assessment	Source	Comments
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, Annex 1, p. 2	
Market share of				
largest supplier	Proportion of total supply/consumption	0.36	Swedish Competition Authority 2007, p. 3	No distinction between I&C and domestic
two largest suppliers	As above	0.51	Swedish Competition Authority 2007, p. 3	As above
three largest suppliers	As above	0.65	Swedish Competition Authority 2007, p. 3	As above
Switching	Proportion of eligible customers' gross switching per annum	0.10	Swedish Energy Agency, The Swedish Energy Market 2005, p. 27	
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	O	EC2006, p.157	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y	EC2003, p.13, able 1.	
Unbundling at distribution level	Legal or ownership separation	L	EC2006, p.157	
rTPA at distribution level		Y	EC2003, p.13, Table 1.	

Swedish gas market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest shipper	Proportion of total gas sources by shipper	0.50	E.ON Strategy & Key Figures 2006, p. 109 and Internal Market Fact Sheet (2006) available at http://ec.europa.eu/energy/energy_policy/facts_en.htm	Proxied by market share in Nordic market
two largest shippers	As above	1.00	SWEDEN—Internal Market Fact Sheet (2006) available at http://ec.europa.eu/energy/energy_policy/facts_en.htm	
three largest shippers	As above	1.00	.	Order of E.ON and DONG is arbitrary, since they claim equal market shares
Wholesale market				
Price reporting	Price information publicly available	N	The Swedish Energy Markets Inspectorate's Annual Report to the European Commission, p. 32	No gas hub exists
Share of total (daily) volume traded covered by price reporting		0.00	As above	As above
Standardised contracts		N	As above	As above
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1	SWEDEN – Internal Market Fact Sheet (2006) available at http://ec.europa.eu/energy/energy_policy/facts_en.htm	
Market share of				
largest supplier	Proportion of total supply/consumption	0.53	Energimarknads inspektionen, Annual report 2006, p. 55	E.ON
two largest suppliers	As above	0.74	As above	DONG Sverige
three largest suppliers	As above	0.88	As above	Goteborg Energi
Switching	Proportion of eligible customers' gross switching	0	EC2003 p.9, Table 4.	Still blank for 2004 and 2005 papers so probably still zero
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	0	EC2005, p. 175, country summary	The gas market was fully opened in July 2005
Market share of				
largest supplier	Proportion of total supply/consumption	0.53	Energimarknads inspektionen, Annual report 2006, p. 55	E.ON
two largest suppliers	As above	0.74	As above	DONG Sverige
three largest suppliers	As above	0.88	As above	Goteborg Energi
Switching	Proportion of eligible customers' gross switching	0	EC2005	EC2005, p. 175 states that very few customers have changed supplier or renegotiated their contracts, also adding that no specific studies have been undertaken on the subject.

Indicator	Definition	Assessment	Source	Comments
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	O	Energimarknads inspektionen, Naturgasmarknads-rapport 2005:1, Marknadsöppning 2005	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y	Swedish Energy Markets Inspectorate	
Unbundling at distribution level	Legal or ownership separation	L	As above	
rTPA at distribution level		Y	As above	
Competitive access to gas storage	Competitive auctions; rTPA	Y	The Swedish Energy Markets Inspectorate's Annual Report to the European Commission, p. 42	

UK electricity market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest generator	Proportion of total available capacity	0.14	DUKES 2006, Table 5.11	
two largest generators	As above	0.27	DUKES 2006, Table 5.11	
three largest generators	As above	0.39	DUKES 2006, Table 5.11	
Degree of technical openness of market	Total interconnector capacity as proportion of peak demand	0.03	UCTE System Adequacy Forecast, Nordel Annual Statistics, NGC 7 Yr Statement and Eirgrid Transmission Forecast Statement	
Openness of allocation mechanism to import capacity	rTPA, auction mechanism, long-term contracts	Auction	EC Sector Inquiry 2006, p. 182	
Wholesale market				
Price reporting	Price information publicly available	Y	Ofgem's 2006 Submission to the European Commission (DGTREN) Report, p. 30	
Share of total (daily) volume traded covered by price reporting		1.73	As above	
Standardised contracts		Y	As above	
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, Annex 1, p. 2	
Market share of				
largest supplier	Proportion of total supply/consumption	Market concentration = 0.35	Department of Business, Enterprise and Regulatory Reform	
two largest suppliers	As above	As above	As above	
three largest suppliers	As above	As above	As above	
Switching	Proportion of eligible customers' gross switching per annum	0.20	Peace Software & VaasaEmg, Utility Customer Switching Research Project, Dec 2004 figure	

Indicator	Definition	Assessment	Source	Comments
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, Annex 1, p. 2	
Market share of				
largest supplier	Proportion of total supply/consumption	0.22	Domestic Retail Market Report - March 2006, Ofgem	
two largest suppliers	As above	0.42	As above	
three largest suppliers	As above	0.58	As above	
Switching	Proportion of eligible customers' gross switching per annum	0.19	Peace Software and VaasaEmg, Utility Customer Switching research project, June 2005.	
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	O	EC2006 p. 163	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y	EC2003, p.13, Table 1.	
Unbundling at distribution level	Legal or ownership separation	L	EC2006 p. 163	
rTPA at distribution level		Y	EC2003, p.13 Table 1.	

UK gas market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest shipper	Proportion of total gas sources by shipper	0.20	DG Competition report on energy sector inquiry (SEC(2006)1724, 10 January 2007). Part 1.	
two largest shippers	As above	0.27	Gas Contingency Arrangements and Customer Demand Side Response 1 December 2005, slide 3. BG Group Response to Energy Sector Inquiry Preliminary Report. 02/05/06 states it has 6% market share.	
three largest shippers	As above	0.33	Ofgem's 2006 Submission to the European Commission (DGTREN) Report (2006), Table 4.11	
Wholesale market				
Price reporting	Price information publicly available	Y	Spectron	
Share of total (daily) volume traded covered by price reporting		2.40	DUKES (2006), Table 4.1 and Ofgem's 2006 Submission to the European Commission (DGTREN) Report (2006), p. 68	
Standardised contracts		Y	Ofgem's 2006 Submission to the European Commission (DGTREN) Report (2006), p. 27	
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, Annex 1, p. 2	
Market share of				
largest supplier	Proportion of total supply/consumption	Market concentration = 0.38	Department of Business, Enterprise and Regulatory Reform	2004 data
two largest suppliers	As above	As above	As above	As above
three largest suppliers	As above	As above	As above	As above
Switching	Proportion of eligible customers' gross switching	0.15	Ofgem Domestic Retail Market Report - June 2006, p. 9.	
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, Annex 1, p. 2	
Market share of				
largest supplier	Proportion of total supply/consumption	0.47	Ofgem Domestic Retail Market Report - June2006, p. 22	
two largest suppliers	As above	0.6	As above	
three largest suppliers	As above	0.73	As above	
Switching	Proportion of eligible customers' gross switching	0.15	Ofgem Domestic Retail Market Report - June 2006, p. 9.	

Indicator	Definition	Assessment	Source	Comments
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	O	EC2006, p.163	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y	OECD Natural Gas Market Review 2007, p. 236	
Unbundling at distribution level	Legal or ownership separation	O	EC2006, p.163	
rTPA at distribution level		Y	OECD Natural Gas Market Review 2007, p. 236	
Competitive access to gas storage	Competitive auctions; rTPA	Y		

Dutch electricity market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest generator	Proportion of total available capacity	0.24	Electrabel Activities Report 2006, p. 39; UTCE Memo 2006, p. 6	
two largest generators	As above	0.47	Essent. 2006 Annual Report, page 48; UTCE Memo 2006, p. 6	
three largest generators	As above	0.66	Nuon Annual Report 2006; UTCE Memo 2006, p. 6	
Degree of technical openness of market	Total interconnector capacity as proportion of peak demand	0.16	UCTE Memo 2006, p. 6; EC2006 p. 114	
Openness of allocation mechanism to import capacity	rTPA, auction mechanism, long-term contracts	Auction	EC2006, p. 114; EC Sector Inquiry 2006, p. 182	
Wholesale market				
Price reporting	Price information publicly available	Y	APX	
Share of total (daily) volume traded covered by price reporting		0.17	EnergieNed, 'Energy in the Netherlands 2006', p.57	
Standardised contracts		Y	APX	
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1.00	EC2005, p156 (combined figure for I&C and domestic) (no updates from the 2006 report)	
Market share of				
largest supplier	Proportion of total supply/consumption	0.55	Essent Annual Report 2006, p. 56	
two largest suppliers	As above	0.68	Assumption	
three largest suppliers	As above	0.81	Annual Report by the Office of Energy Regulation (DTe) to the European Commission 2006 National Report, p. 15	Combined figure for I&C and domestic
Switching	Proportion of eligible customers' gross switching per annum	0.06	EnergieNed, 'Energy in the Netherlands 2006', p. 56	

Indicator	Definition	Assessment	Source	Comments
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2005, p. 156 (combined figure for I&C and domestic)	
Market share of				
largest supplier	Proportion of total supply/consumption	0.55	Essent Annual Report 2006, p. 56	
two largest suppliers	As above	0.68	Assumption	
three largest suppliers	As above	0.81	Annual Report by the Office of Energy Regulation (DTe) to the European Commission 2006 National Report, p. 15	Combined figure for I&C and domestic
Switching	Proportion of eligible customers' gross switching per annum	0.08	Peace Software and VaasaEmg, Utility Customer Switching research project, June 2005, p. 7	
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	O	EC2006, p.112	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y	EC2003, p.13, Table 1.	
Unbundling at distribution level	Legal or ownership separation	L	EC2006, p. 112	
rTPA at distribution level		Y	EC2003, p.13 ,Table 1.	

Dutch gas market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest shipper	Proportion of total gas sources by shipper	0.49	GasTerra. Figure provided on their website (http://www.gasterra.com/Natural+gas/Share+of+natural+gas.htm)	
two largest shippers	As above	0.83	Assumption	
three largest shippers	As above	0.85	EC2005, p.55, Table 5.1	
Wholesale market				
Price reporting	Price information publicly available	Y	APX	
Share of total (daily) volume traded covered by price reporting		0.44	APX press release January 10th 2007 and EnergieNed 'Energie in Nederland 2007'	
Standardised contracts		Y	APX	
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, p. 2. No differentiation between I&C/domestic market	
Market share of				
largest supplier	Proportion of total supply/consumption	0.31	Continuon Netbeheer. EnergieNed 'Energie in Nederland 2007', p. 22.	
two largest suppliers	As above	0.58	Essent. EnergieNed 'Energie in Nederland 2007', p. 22.	
three largest suppliers	As above	0.84	ENECO Netbeheer. EnergieNed 'Energie in Nederland 2007', p. 22.	
Switching	Proportion of eligible customers' gross switching	0.05	EnergieNed, 'Energy in the Netherlands 2007' pp. 22, 56	
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2004, p. 2. No differentiation between I&C/domestic market	
Market share of				
largest supplier	Proportion of total supply/consumption	0.31	Continuon Netbeheer. EnergieNed 'Energie in Nederland 2007', p. 22.	
two largest suppliers	As above	0.58	Essent. EnergieNed 'Energie in Nederland 2007', p. 22.	
three largest suppliers	As above	0.84	ENECO Netbeheer. EnergieNed 'Energie in Nederland 2007', p. 22.	
Switching	Proportion of eligible customers' gross switching	0.05	EnergieNed, 'Energy in the Netherlands 2007' pp. 22, 56	

Indicator	Definition	Assessment	Source	Comments
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	O	Annual Report by the Office of Energy Regulation (DTe) to the European Commission (2006), Section 3.1.4	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	N	International Energy Agency (2006), 'Standard Review of the Netherlands'	
Unbundling at distribution level	Legal or ownership separation	L	As above	
rTPA at distribution level		Y	IEA, 'Energy Policies of the Netherlands 2004', p. 82	
Competitive access to gas storage	Competitive auctions; rTPA	N	Reported on the NAM website (http://www.nam.nl) on July 13th 2007	

Portuguese electricity market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				
Market share of				
largest generator	Proportion of total available capacity	0.50	EC2006, pp.138–139	
two largest generators	As above	0.63	As above	
three largest generators	As above	0.72	As above	
Degree of technical openness of market	Total interconnector capacity as proportion of peak demand	0.09	EC2006, pp.114, 141	
Openness of allocation mechanism to import capacity	rTPA, auction mechanism, long-term contracts	Auction	ERSE Annual Report to the European Commission 2006, p. 32	
Wholesale market				
Price reporting	Price information publicly available	Y	MIBEL	
Share of total (daily) volume traded covered by price reporting		0.81	As above	
Standardised contracts		Y	As above	
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	1.00	EC2006, p. 137 (as of Sept. 4th 2006) (combined figure)	
Market share of				
largest supplier	Proportion of total supply/consumption	0.56	EDP Institucional Report 2006, p. 65	
two largest suppliers	As above	0.79	Iberdrola 2006 Annual Report, p.77	No distinction between I&C and domestic
three largest suppliers	As above	0.98	ERGEG’s Assessment of the development of the European Energy Market 2006	
Switching	Proportion of eligible customers’ gross switching per annum	0.07	Difference between EC2004, Annex 1, p. 5 & EC2005, p. 38. Figure has stayed consistent in 2005	

Indicator	Definition	Assessment	Source	Comments
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	1	EC2005, Annex, p. 163 (combined figure for I&C and domestic)	
Market share of				
largest supplier	Proportion of total supply/consumption	0.56	EDP Institucional Report 2006, p. 65	
two largest suppliers	As above	0.79	Iberdrola 2006 Annual Report, p.77	No distinction between I&C and domestic
three largest suppliers	As above	0.98	ERGEG's Assessment of the development of the European Energy Market 2006	
Switching	Proportion of eligible customers' gross switching per annum	0.01	Since 2004 all electricity consumers are eligible. However, eligibility of household customers can only be implemented when the required computer platform becomes operational (expected 2006)–EC2005, p. 163	
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	O	EC2006, p.137	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	Y	EC2003, p.13, Table 1	
Unbundling at distribution level	Legal or ownership separation	L	EC2006, p.137	
rTPA at distribution level		Y	EC2003, p.13 , Table 1	

Portuguese gas market data

Indicator	Definition	Assessment	Source	Comments
Upstream market				Information not available due to derogation from the European Commission's Second Gas Directive
Market share of				
largest shipper	Proportion of total gas sources by shipper	1	Assumed, because of derogation	
two largest shippers	As above	1	As above	
three largest shippers	As above	1	As above	
Wholesale market				
Price reporting	Price information publicly available	N		
Share of total (daily) volume traded covered by price reporting		0		
Standardised contracts		N		
Downstream market				
I&C				
Degree of supply market opening	Proportion of total customer base in volume terms	0	Assumed, because of derogation	
Market share of				
largest supplier	Proportion of total supply/consumption	1	As above	
two largest suppliers	As above	1	As above	
three largest suppliers	As above	1	As above	
Switching	Proportion of eligible customers' gross switching	0	Derogation	
Domestic				
Degree of supply market opening	Proportion of total customer base in volume terms	0	Assumed, because of derogation	
Market share of				
largest supplier	Proportion of total supply/consumption	1	As above	
two largest suppliers	As above	1	As above	
three largest suppliers	As above	1	As above	
Switching	Proportion of eligible customers' gross switching	0	As above	

Indicator	Definition	Assessment	Source	Comments
Network-related activities				
Unbundling at transmission level	Legal or ownership separation	L	Portugal – Internal Market Fact Sheet (2006) available at http://ec.europa.eu/energy/energy_policy/facts_en.htm	
rTPA at transmission level	Tariffs imposed or approved by independent regulator	N	As above	
Unbundling at distribution level	Legal or ownership separation	N	As above	
rTPA at distribution level		N	As above	
Competitive access to gas storage	Competitive auctions; rTPA	N	EU Energy, Issue 97–98, December 17th 2004, p. 27	

Appendix 3 Detailed calculation of the US comparators

A3.1 Construction of a single US electricity composite

A3.1.2 Methodology

Tables A3.1 and A3.2 list the US states, separated into those that pass the filters and those that do not, and sorted according to market size as defined in terms of electricity retail sales. The market size data used has been determined by data availability and consistency between the countries included in the PSA target—market size data for the USA, Canada and the EU Member States is needed for the creation of the composites. For reasons of concise presentation, only the ten largest states that do not pass the filters are presented in Table A3.2.

Tables A3.1 and A3.2 show that the states that pass the filters together account for 31.7% of the total US electricity market.

California does not appear in the list of states considered among the most competitive electricity markets because of the measures imposed following the crisis in 2001, which led to the suspension of full retail market opening in September 2001.

Table A3.1 US states passing the filters for electricity markets, ranked by size

US state	100% open	Separation at transmission level[1]	rTPA[2]	Market size (2006) Total retail sales (GWh)
Ohio	Y	Y	Y	155,093
New York	Y	Y	Y	149,837
Pennsylvania	Y	Y	Y	146,211
Illinois	Y	Y	Y	142,297
Michigan	Y	Y	Y	108,668
Virginia	Y	Y	Y	106,885
New Jersey	Y	Y	Y	78,731
Arizona	Y	Y	Y	73,018
Maryland	Y	Y	Y	61,001
Massachusetts	Y	Y	Y	55,832
Connecticut	Y	Y	Y	31,626
Delaware	Y	Y	Y	11,642
District Of Columbia	Y	Y	Y	11,523
Maine	Y	Y	Y	11,510
New Hampshire	Y	Y	Y	11,090
Rhode Island	Y	Y	Y	7,798
Total (competitive states)				**1,162,763**
Total US electricity market				**3,665,099**
% of competitive US electricity market				**31.7**

Notes: [1] Federal Energy Regulatory Commission (FERC) Order 888 (1996) requires all public utilities that own, control, or operate facilities used for transmitting electricity in interstate commerce to separate transmission from generation and marketing functions and communications. [2] FERC regulates wholesale electricity rates and services for wholesale transactions. In December 1999 FERC issued Order 2000 calling for the creation of regional transmission organizations (RTOs), independent entities that would control and operate the transmission grid.
Sources: US Department of Energy: Energy Information Administration, and Federal Energy Management Program.

Table A3.2 US states not passing the filters for electricity, ranked by size (10 largest states only)

US state	Market size (2006) Total retail sales (GWh)
Texas[1]	338,028
California[2]	259,888
Florida	227,428
Georgia	136,370
North Carolina	127,074
Indiana	105,935
Tennessee	102,826
Alabama	90,198
Kentucky	88,851
Washington	84,024
Total (non-competitive states)	2,502,335
Total US electricity market	3,665,099
% of non-competitive US electricity market	**68.3**

Note: [1] On January 1st 2004 competitive metering was launched for industrial and non-residential commercial customers with a peak demand greater than 200 KW. However, while retail competition remains in effect in Electric Reliability Council of Texas (ERCOT) controlled regions, it has been delayed in the non-ERCOT regions of Texas; El Paso Electric, Southwestern Electric Power Company, and Southwestern Public Service Company service areas. These areas remain, for now, regulated, primarily because of the lack of independent operation of the transmission systems in those areas and the lack of organized wholesale markets. [2] The Californian electricity market had full retail access from March 31st 1998 until its suspension in September 2001.
Source: Market size data compiled from the state profiles on the Energy Information Administration website.

If the critical mass for the single US composite in electricity is defined as similar to the largest EU market, then the German market provides the indication for the size of the US composite: the total size of the German electricity market is 568.1TWh (electricity supplied in 2006).[42]

Given this indication of the critical size for the US composite, states must have an aggregate market size of at least 180.1TWh (568.1 × 0.317) to pass the filters. Taking the largest state from Table A2.1 first, Ohio, gives a market size of 155.1TWh. Thus, the comparator needs to be scaled up to maintain the ratio 32:68 between competitive and non-competitive states.

After proportional adjustment, the threshold for the uncompetitive states becomes 329.58TWh (ie 155.1× (0.68/0.32)). Adding Georgia, Indiana and Kentucky (combined total of 331.2TWh) gives a total market indicator with 155.1TWh competitive and 331.2TWh non-competitive market volumes—ie, a ratio of 32:68.

In summary, the composite indicator for the US electricity market would take into account the markets of Ohio, Georgia, Indiana and Kentucky.

A3.1.3 Aggregation of sub-markets

In view of the initial analysis above, the representative US electricity market composite is constructed on the basis of a proportional mix of liberalised and non-liberalised US states, and takes into account the markets of Ohio, Georgia, Indiana and Kentucky. The filter information on these four states is summarised in Table A2.3, together with market size information used as weights for the aggregation of the composite.

[42] Eurostat (21/05/07), Statistics in focus, 'Electricity Statistics—Provisional data for 2006', 04/2007.

Table A3.3 Construction of US electricity market comparator

US electricity market	Degree of market opening (%)	Market size (2006) Total retail sales (GWh)	Relative market size in composite (%)
Ohio	100	155,093	31.90
Georgia	0	136,370	28.05
Indiana	0	105,935	21.79
Kentucky	0	88,851	18.27
Total market size of composite	**–**	**486,249**	**100**
Composite US electricity market comparator	**32**		**–**

Source: Energy Information Administration and Oxera calculations.

Using market size as weights, it is possible to construct a theoretical US electricity market comparator with a 32% degree of market opening and passing the filters of transmission unbundling and rTPA.

A3.2 Construction of a single US gas composite

A3.2.2 Methodology

Tables A3.4 and A3.5 separate the US gas markets into those that pass the filters and those that do not. As for the electricity markets, the states in both groups are sorted according to market size (defined in terms of gas consumption). Again, only the largest states that do not pass the filters are presented in Table A3.4. Tables A3.4 and A3.5 show that the group of states that pass the filters account for 32% of the total US gas market, leading to a ratio of 32:68 of competitive versus non-competitive market parts for US gas.

Table A3.4 US states passing the filters for gas market, ranked by size

US state	100% open	Separation at transmission level	rTPA	Market size (2006) Delivered to residential and commercial customers (BCF)
California	Y	Y	Y	724.6
New York	Y	Y	Y	621.6
New Jersey	Y	Y	Y	354.0
Pennsylvania	Y	Y	Y	337.2
Massachusetts	Y	Y	Y	150.6
New Mexico	Y	Y	Y	54.3
West Virginia	Y	Y	Y	51.1
District of Columbia	Y	Y	Y	28.9
Total (competitive states)				2322.2
Total US gas market				**7,219.6**
% of competitive US gas market				**32**

Source: Energy Information Administration.

Table A3.5 US states not passing the filters, ranked by size (10 largest states only)

US state	Market size (2006) Delivered to residential and commercial customers (BCF)
Illinois	594.8
Michigan	468.1
Ohio	417.9
Texas	315.6
Wisconsin	205.8
Minnesota	203.7
Indiana	197.0
Colorado	178.0
Georgia	158.8
Missouri	152.9
Total (non-competitive states)	**4,891.5**
Total US gas market	**7,219.6**
% of non-competitive US gas market	**68**

Source: Energy Information Administration.

If the critical mass for the US composite in gas is defined as equal to the largest EU gas market, the UK provides the indication for the size of the composite. The size of the UK gas market is 3,642BCF (gas consumption in 2006).[43]

Therefore, the composite indicator requires states with an aggregate market size of 1165BCF (3,642 × 0.32) to have passed the filters. Taking four of the states from Table A3.4, New York, Pennsylvania, Massachusetts and New Mexico, gives a combined volume of 1164BCF, which is within the 5% buffer zone defined in the methodology.

With proportional adjustment, the threshold for the non-competitive states becomes 2,476BCF (ie, 1165 × (0.68/0.32)). Adding Illinois, Michigan, Ohio, Texas, Minnesota, Indiana and Connecticut (2,475BCF) gives a total market indicator, with 1164BCF competitive and 2,475BCF non-competitive market volumes (ie, a ratio of 32:68).

Thus, the composite indicator for the US gas market will take into account the markets of New York, Pennsylvania, Massachusetts, New Mexico, Illinois, Michigan, Ohio, Texas, Minnesota, Indiana and Connecticut.

A3.2.3 Aggregation of sub-markets

The composite US gas market comparator is constructed on the basis of the pertinent states. The filter information on these nine states is summarised in Table A2.6 below, together with the market size information used to create the weighted composite.

[43] Eurogas (2007), 'Evolution of Natural Gas Consumption in 2006, press release, February 26th. Conversion from petajoule into BCF undertaken with a conversion factor of 1 Petajoule = 0.95BCF.

Table A3.6 Construction of US gas market comparator

US gas market	Degree of market opening (%)	Market size (2006) Consumption (BCF)	Relative market size in composite (%)
New York	100	621.6	18
Pennsylvania	100	337.2	10
Massachusetts	100	150.6	4
New Mexico	100	54.3	2
Illinois	70.9	594.8	17
Michigan	95.3	468.1	14
Ohio	89.4	417.9	12
Texas	0	315.6	9
Minnesota	0	203.7	6
Indiana	9.1	197.0	6
Connecticut	0	71.7	2
Total market size of composite	**–**	**3,432.5**	**100**
Composite US gas market comparator	**71**	**–**	**–**

Source: Energy Information Administration and Oxera calculations.

Using market size as weights, the resulting theoretical US gas market comparator displays 71% degree of market opening and passes the filters of transmission unbundling and rTPA.

Appendix 4 Detailed calculation of the Canada comparator

A4.1 Construction of a single Canadian electricity composite

A4.1.2 Methodology

As at 2006, only Alberta and Ontario had deregulated their electricity markets (in January 2001 in Alberta and May 2002 in Ontario). New Brunswick opened part of its market to competition in 2003. Nova Scotia and Newfoundland have privatized parts of the electricity supply but there is little competition. Quebec and British Columbia do allow third party access to their electricity grids as the result of trade agreements with the United States, but neither province has plans to break up its utility monopoly.

Tables A4.1 and A4.2 list the Canadian provinces separated into two groups: those that pass the filters for electricity and those that do not, sorted according to market size defined in terms of electricity retail sales. The tables show that the ratio between competitive and non-competitive provinces is 37:63.

Table A4.1 Canadian provinces passing the filters for electricity markets, ranked by size

Canadian province	100% open	Separation at transmission level	RTPA	Market size (2006) Electricity generation (GWh)
Ontario	Y	Y	Y	157,893
Alberta	Y	Y	Y	60,121
Total (competitive provinces)	–	–	–	218,013
Total Canadian electricity market	**–**	**–**	**–**	**585,098**
% of competitive Canadian electricity market	**–**	**–**	**–**	**37.3**

Source: Energy Statistics Handbook, Statistics Canada.

Table A4.2 Canadian provinces not passing the filters for electricity, ranked by size

Canadian province	Market size (2006) Electricity generation (GWh)
Québec	178,845
British Columbia	62,021
Newfoundland and Labrador	42,783
Manitoba	34,172
Saskatchewan	18,530
New Brunswick	18,116
Nova Scotia	11,425
Northwest Territories	653
Yukon Territory	359
Nunavut	145
Prince Edward Island	33
Total (non-competitive provinces)	**367,084**
Total Canadian electricity market	**585,098**
% of non-competitive Canadian electricity market	**62.7**

Source: Energy Statistics Handbook, Statistics Canada.

To define the critical mass, C, for the Canadian market, a market size is chosen reflecting the relative proportions of the US and Canadian markets. The reason for not adopting a market size based on an EU market—as was done for the US case described above—is that the Canadian market is relatively small, and a large EU market would represent a large proportion, if not all, of the Canadian energy market.

The total size of the Canadian electricity market of around 585TWh represents 16% of the total US electricity market size of 3,665TWh. Considering that the US electricity composite had a size of 1,163TWh, the Canadian electricity composite should be scaled at 186TWh (1,163 × 0.16).

Given this indication of the critical size for the Canadian composite, the latter requires provinces with an aggregate market size of 69.4TWh (186 × 0.373) to have passed the filters. Taking the largest state from Table A3.1 first, Ontario, gives a volume of approximately 157.9TWh, and thus the comparator needs to be scaled up significantly to maintain the ratio of 37:63 between competitive and non-competitive Canadian provinces.

After proportional adjustment, the threshold for the non-competitive provinces becomes 268.8TWh (ie, 157.9 × (0.63/0.37)). Adding Quebec, Newfoundland, Manitoba and Nova Scotia (total: 267.2TWh) gives a total market indicator, with 157.9TWh competitive and 267.2TWh non-competitive market volumes—ie, a ratio of 37:63.

The composite indicator for the Canadian electricity market should therefore take into account the five markets of Ontario, Quebec, Newfoundland, Manitoba and Nova Scotia.

A4.13 Aggregation of sub-markets

The composite Canadian electricity market comparator is constructed on the basis of the provincial markets of Ontario, Quebec, Newfoundland, Manitoba and Nova Scotia. The filter information on these five states is summarised in Table A4.3

Table A4.3 Construction of Canadian electricity market comparator

Canadian electricity market	Degree of market opening (%)	Market size (2006) Electricity generated (GWh)	Relative market size in composite (%)
Ontario	100	157,893	37
Quebec	Wholesale access only	178,845	42
Newfoundland		42,783	10
Manitoba	Wholesale open access only	34,172	8
Nova Scotia		11,425	3
Total market size of composite	**–**	**425,118**	**–**
Composite Canadian electricity market comparator	**37.1**	**–**	**–**

Source: Statistics Canada and Oxera calculations.

The theoretical Canadian electricity market composite has a calculated degree of market opening of 37.1%.

A4.2 Construction of a single Canadian gas composite

A4.2.2 Methodology

Natural gas is the source of heating for nearly half of all Canadian homes. There are about 6,083,000 natural gas consuming households in Canada, representing 22% of total Canadian demand for natural gas. The residential and commercial sectors combined account for 40% of total Canadian natural gas demand; however, gas demand is dominated by the industrial sector, which typically accounts for about 35%. The power generation sector consumes about 10%. The remaining 15% is natural gas demand for transportation, which includes own-use natural gas consumption by producers and pipeline companies, as well as small amounts of natural gas for vehicles.

Third-party access is allowed to the distribution grids and some large industrial customers and power generators can buy gas directly from producers. Some smaller customers in the residential and commercial sectors can also buy gas directly from producers through aggregators and brokers.

Tables A4.4 and A4.5 separate the provincial Canadian gas markets into those that pass the filters and those that do not. As for the electricity markets, the states in both groups are being sorted according to market size (defined in terms of natural gas sales). The tables show that the ratio of competitive to non-competitive Canadian gas markets is 56:44.

Table A4.4 Canadian provinces passing the filters for gas market, ranked by size

Canadian province	100% open	Separation at transmission level	rTPA	Market size (2006) Natural gas sales (BCF)
Ontario	Y	Y	Y	887
Quebec	Y	Y	Y	200
British Columbia	Y	Y	Y	237
New Brunswick	Y	Y	Y	28
Nova Scotia	Y	Y	Y	5
Total (competitive provinces)	**–**	**–**	**–**	**1,357**
Total Canadian gas market	**–**	**–**	**–**	**2,435**
% of competitive Canadian gas market	**–**	**–**	**–**	**56**

Source: Canadian Gas Association, International Energy Agency, Statistics Canada.

Table A4.5 Canadian provinces not passing the filters, ranked by size

Canadian province	Market size (2006) Natural gas sales (BCF)
Alberta	816
Saskatchewan	192
Manitoba	70
Total (non-competitive provinces)	**1,078**
Total Canadian gas market	**2,435**
% of non-competitive Canadian gas market	**44**

Source: Canadian Gas Association, International Energy Agency.

To define the critical mass, C, for the Canadian gas market, the size of the Canadian gas market relative to the US gas market needs to be determined. The total size of the Canadian gas market is 2,435BCF, representing 344 of the total US gas market, the size of which is 7,220BCF. Considering that the US gas composite had a size of 2,322BCF, the Canadian gas composite should be scaled at 789.5BCF (2322 × 0.34).

Given this critical size for the Canadian composite, the latter requires provinces with an aggregate market size of 442BCF (789.5 × 0.56) to have passed the filters. Taking the largest province from Table 4.4 first, Ontario, gives a volume of 887BCF, and thus the comparator needs to be scaled up significantly to maintain the ratio 56:44 between competitive and non-competitive Canadian provinces.

After proportional adjustment, the threshold for the non-competitive states becomes 697BCF (ie, 887 × (0.44/0.56)). Adding Alberta (ie, 816BCF) will lead to a total market indicator with 887BCF competitive and 816BCF non-competitive market volumes—ie, a ratio of 52:48, which lies inside the 5% buffer.

Thus, the composite indicator for the Canadian gas market would take into account the markets of Ontario and Alberta.

A4.2.2 Aggregation of sub-markets

The composite Canadian gas market comparator is constructed on the basis of the markets of Ontario and Alberta. Table A4.6 summarises the filter information.

Table A4.6 Construction of Canadian gas market comparator

Canadian gas market	Degree of market opening (%)	Market size (2006) Natural gas sales (BCF)	Relative market size in composite (%)
Ontario	100.0	887	52
Alberta	90	816	48
Total market size of composite	**–**	**1,703**	**100**
Composite Canadian gas market comparator	**95.2**	**–**	**–**

Notes: In the Alberta gas market, local distribution companies, such as ATCO Gas are not allowed to make any profit on the purchase or sale of the commodity. Gas transportation prices remain regulated by the National Energy Board. Municipally owned utilities and regional gas co-operatives account for approximately 10% of the distribution.
Source: International Energy Agency and Oxera calculations.

Using market size as weights, the resulting theoretical Canadian gas market comparator displays a 95.2% degree of market opening.

Park Central
40/41 Park End Street
Oxford OX1 1JD
United Kingdom

Tel: +44 (0) 1865 253 000
Fax: +44 (0) 1865 251 172

Stephanie Square Centre
Avenue Louise 65, Box 11
1050 Brussels
Belgium

Tel: +32 (0) 2 535 7878
Fax: +32 (0) 2 535 7770

www.oxera.com