Appendix 5 Breakdown of energy bills

Gas bills

1.1 The breakdown of the gas bill was based on an average domestic direct debit gas bill, including VAT. Gas costs were calculated using forward prices for all four quarters of 2004. The prices were then weighted according to an estimated average domestic consumption for each of the four quarters. Storage costs were also included in the gas cost. Transportation costs were based on National Grid Transco's transportation charging statement for 2003/04 and metering costs were based on National Grid Transco's metering charging statement for 2004/05. The cost of the Energy Efficiency Commitment (EEC) was assumed to be £3.60, which was based on an estimate made by the Department for the Environment, Food and Rural Affairs (DEFRA) of how much it costs a supplier per customer per fuel to meet their EEC. Supply costs, such as marketing, advertising, billing and call centres, and margin make up the remainder of the bill.

Electricity bills

1.2 The breakdown of the electricity bill was based on an average domestic direct debit electricity bill, including VAT. The generation component of the bill has been derived using BGT's reported weighted average cost of electricity (WACOE)[1]. For 2003, BGT report a residential WACOE of 2.46 p/kWh. This reported cost is arguably a measure of the new entrant cost of purchasing electricity, and therefore excludes the higher cost of legacy contracts borne by incumbent suppliers. Generation costs have been adjusted to reflect distribution and transmission losses. Distribution line loss factors for each ex-PES were profiled for a standard domestic customer consuming 3300kWh per annum. Final distribution losses represent a simple arithmetic average of regional losses. Transmission losses were approximated at 1.5 per cent of customer volume[2]. Combined, transmission and distribution losses account for approximately 10

[1] Centrica plc, Preliminary Results for the year ended 31 December 2003 (unaudited)

[2] To more accurately reflect the true cost of losses, as well as distribution and transmission charges, we would weight losses or charges by customer demand in each ex-PES area. In gas, the arithmetic mean may represent a more accurate measure, since there is less regional variation.

per cent of generation costs, and are included within the 37 per cent generation cost identified in Figure 4.2.

1.3 DUoS and metering costs were calculated by taking the average charge across the 14 ex-PES regions from published charging statements for 2003/04. TNUoS charges were calculated for each of the 14 ex-PES regions using published charging statements for 2003/04, a loss adjustment factor for each of the 14 regions, which varied between standard rate and economy seven, and a peak share of 18.6 per cent for standard rate and 11.6 per cent for economy 7.

1.4 The estimate of the cost of the Renewables Obligation was calculated by assuming that a new entrant would purchase Renewable Obligation Certificates (ROCs) and pay the buy-out price in the same proportions as the average for the Renewables Obligation period of 2002-2003. The Renewables Obligation assumed was 4.9 per cent, which is the obligation for April 2004 – March 2005, and the buy-out price assumed was £31.39. The Energy Efficiency Commitment (EEC) cost was assumed to be £3.60. This was based on an estimate made by DEFRA of how much it would cost per customer per fuel for suppliers to meet their EEC. Supply costs and margin make up the remainder of the bill.

Appendix 6 Regression analysis of pass through

1.1 This Appendix describes the full set of retail and wholesale price regression models that were tested to determine whether retail prices were responsive to wholesale prices.

Electricity

1.2 In order to meet the domestic customer demand profile, suppliers must purchase peak contracts to cover periods of peak (domestic) demand. Ofgem has shaped annual baseload and annual peak prices by weighting baseload prices (in £/MWh) by 0.92 and peak prices (in £/MWh) by 0.08[3].

1.3 Prices from February 2001 are over-the-counter (OTC) prices. Prior to February 2001 when the Grid Trade Master Agreement (GTMA) was introduced, Electricity Forward Agreement (EFA) baseload and peak prices are used. EFA baseload and peak prices have been adjusted by adding £1/MWh to the recorded price[4].

1.4 The wholesale price series was then converted to a monthly average of annual (daily) prices. This averaging is done to match the monthly frequency of retail price data observations (see paragraph 1.27 in chapter 4). The averaging aids visual inspection of the wholesale and retail prices data and facilitates a more formal analysis of the relationship.

1.5 The analysis also uses a 12 month moving average to remove volatility in the series. The 12 month moving average represents the average of wholesale prices for each of the previous 12 month periods.

1.6 The equation below identifies the model specification tested in electricity for which the statistical significance between wholesale and retail price was the

[3] This weighting seeks to approximate the demand weighted prices that a supplier must pay to meet the aggregate domestic consumption profile by weighting baseload prices by 0.92 and peak prices by 0.08.
[4] This is to take account of the transmission uplift factor that applied at that time. The uplift factor reflected dynamic transmission loss factors, which were incurred on a half hourly basis under the Pool prior to the introduction of NETA.

greatest.

$$AVEP_r = \alpha + \beta 12MAP_w + \gamma D + \xi T$$

1.7 In the above equation $AVEP_r$ is the average direct debit domestic retail electricity price, $12MAP_w$ is the 12 month moving average of the shaped annual wholesale price, D is a variable for measuring asymmetry in the responsiveness of retail prices to increases compared to decreases in the wholesale price, and T is a time trend, which separately identifies whether the two series trend together over time. Capital letters denote the natural logarithm of that variable.

1.8 The intuition behind the equation is as follows. At any given point in time, movements in retail prices can be explained by movements in the average monthly wholesale price, where each monthly price is derived on a 12 month moving average basis (ie, the point in time wholesale price incorporates historic pricing information going back 12 months). The point in time wholesale price therefore incorporates historic price information that relates to delivery of wholesale energy to meet customer demand from the current period and into future periods.

1.9 The coefficients α, β, γ, ξ represent the magnitude or size of the relationship between the relevant explanatory variable and the retail price. Taking the natural logarithm of these variables means that the coefficients can be interpreted as an 'elasticity' or responsiveness in the retail price to movements in the explanatory variables. Table A6.1 presents the results for the regression analysis.

Table A6.1: Results of formal econometric regression - electricity

Dependent variable	Independent Variable	Coefficient 12 month MA
Average direct debit price	Constant(α)	4.8885
	Wholesale price (β)	0.06306
	Asymmetry variable (γ)	0.00130*
	Time trend (ξ)	0.00121

Source: Frontier Economics
*statistically insignificant coefficients ($t < 1.96$)

Gas methodology

Gas

1.10 Ofgem converted the NBP gas price series by averaging annual (daily) prices to a 12 month moving average to match the monthly frequency of retail price data observations. The analysis also uses a 12 month moving average to remove volatility in the series when formally examining the relationship between wholesale and retail prices.

1.11 As with electricity, a key reason for using forward gas prices is that they are relevant to considering the marginal cost of purchasing gas for an additional customer.

1.12 Table A6.2 identifies the model specification tested in gas for which the statistical significance between wholesale and retail price was the greatest. Note that the equation in paragraph 6.2 is equivalent to that used for gas.

Table A6.2: Results of formal econometric regression - gas

Dependent variable	Independent Variable	Coefficient 12 month MA
Average direct debit price	Constant	3.92935
	Wholesale price	0.43613
	Asymmetry variable	-0.004637
	Time trend	0.001758

Source: Frontier Economics
*statistically insignificant coefficients ($t < 1.96$)

Full set of results

1.13 Table A6.3 sets out key results in electricity.

Table A6.3: Wholesale price pass through in the electricity market

Dependent variable	Independent variable	Coefficient (no moving average)	Coefficient (moving average)
Average price	Constant	4.9139	4.8885
	Wholesale price	0.05603	0.06306
	Asymmetry variable	0.00087*	0.00130*
	Time trend	0.00081	0.00121
Best offer	Constant	4.7872	4.9708
	Wholesale price	0.06812	0.00632*
	Asymmetry variable	0.00139*	0.00399*
	Time trend	0.00071	0.00062*
Ex-PES in-area direct debit	Constant	5.27944	5.28977
	Wholesale price	-0.03179	-0.03275*
	Asymmetry variable	-0.00122*	-0.00056*
	Time trend	0.00088	0.00057

Source: Frontier Economics
*statistically insignificant coefficients ($t < 1.96$)

1.14 The long run coefficients estimated in Table A6.3 represent the magnitude of the relationship between key variables of retail prices as explained by movement in the wholesale price. Key results include:

- the results are not sensitive to whether the wholesale price is on a moving average basis or not
- the asymmetric dummy variable is always insignificant
- the wholesale price in the average retail price specification is always significant
- the wholesale price in the ex-PES direct debit price specification is only significant on the non-moving average basis, but the sign on the coefficient is negative, not positive as one might expect
- the wholesale price in the best offer price specification is only significant on the non-moving average basis, and

- where the coefficient on the wholesale price is significant and correctly signed, it is very small.

1.15 The long run coefficients are estimated for gas in Table A6.4

Table A6.4: Wholesale price pass through in the gas market

Dependent variable	Independent variable	Coefficient (no moving average)	Coefficient (moving average)
Average price	Constant	5.5624	3.92935
	Wholesale price	-0.11440*	0.43613
	Asymmetry variable	-0.004929*	-0.004637
	Time trend	0.003202	0.001758
Best offer	Constant	6.62069	4.2891
	Wholesale price	-0.51585	0.27032
	Asymmetry variable	-0.00168*	-0.016258
	Time trend	0.004246	0.002918
BGT price	Constant	6.01640	4.25571
	Wholesale price	-0.24405	0.35338
	Asymmetry variable	0.001415*	-0.010823
	Time trend	0.00399	0.002846

Source: Frontier Economics
*statistically insignificant coefficients ($t < 1.96$)

1.16 The following key results can be obtained from the above table:

- the results are sensitive to whether the wholesale price is on a moving average basis or not, with the average price sensitive only to the 12 month moving average of the wholesale price, and

- the asymmetry dummy variable is significant when the wholesale price is expressed as a moving average. However, the magnitude of the asymmetry is small. The full results are therefore[5]:

  - for the average price, the inclusion of the asymmetry dummy variable (which takes on values of zero when wholesale prices are falling and one when wholesale prices are increasing) means that one interprets the coefficient on the wholesale price variable to be the cost pass though when prices are falling (0.4361). We then subtract the coefficient for the dummy variable to obtain upward cost pass through (0.4361 - 0.0046 = 0.4315)

- for the best offer: Downward cost pass through is 0.270, whereas upward cost pass through is 0.254, and

- for the BGT offer: Downward cost pass though is 0.353, whereas upward cost pass through is 0.343.

1.17 These results suggest that the long run pass through is approximately 1/100th less during periods of wholesale price increases than during wholesale price falls (0.4315 compared to 0.4361).

1.18 The highest degree of pass through is therefore in the average retail price specification, followed by the ex-PES, followed by the best new offer.

An explanation of the asymmetry dummy variable

1.19 The asymmetry dummy variable is a variable that takes on a value of the relevant wholesale price if the wholesale price has increased in the past 3 months, and zero otherwise. Consequently, the specification is (with the prices in logs):

$$P_R = \alpha + \beta P_W + \delta P_W^+ + \rho \text{time}$$

1.20 The elasticity with respect to wholesale prices when they rise is equal to $\beta + \delta$, whilst the elasticity with respect to wholesale prices when they fall is simply β.

1.21 An identical result can be found by creating two dummy variables – one equal to the wholesale price when prices rise (and zero otherwise), and the other equal to minus the wholesale price when prices fall (and zero otherwise). The specification would be:

$$P_R = \alpha + \gamma_1 P_W^+ + \gamma_2 P_W^- + \rho \text{time}$$

[5] See below for an explanation of the asymmetric dummy variable.

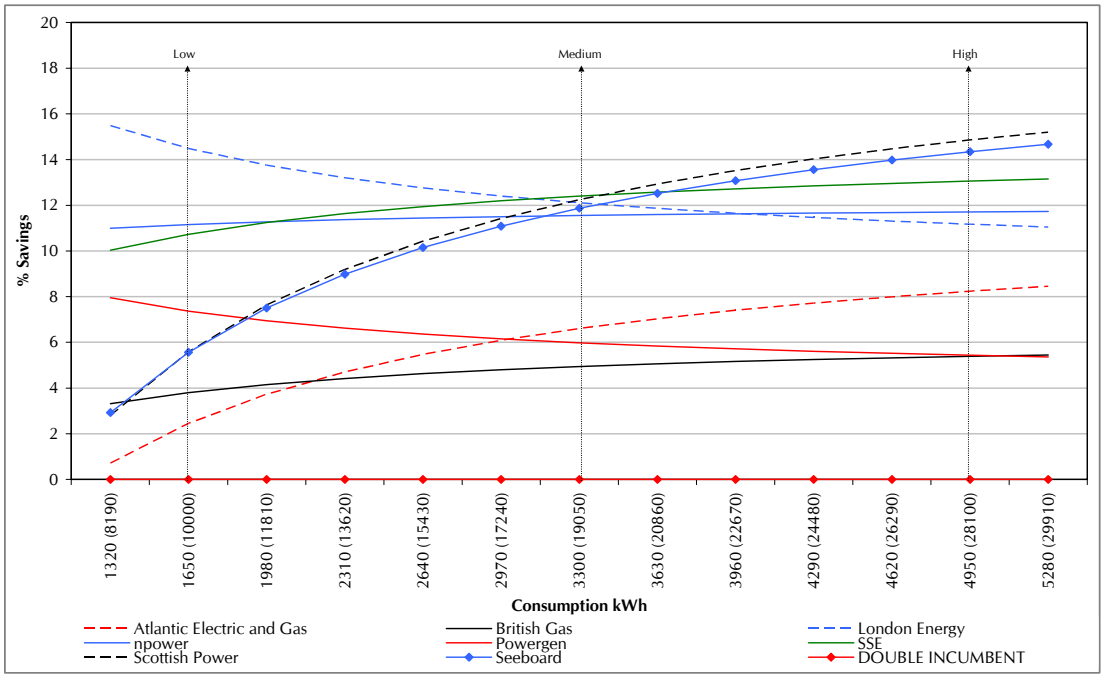
Appendix 7 Available price savings: dual fuel

Dual fuel

1.1 This section presents dual fuel savings relative to the double incumbent for all 14 supply service areas.

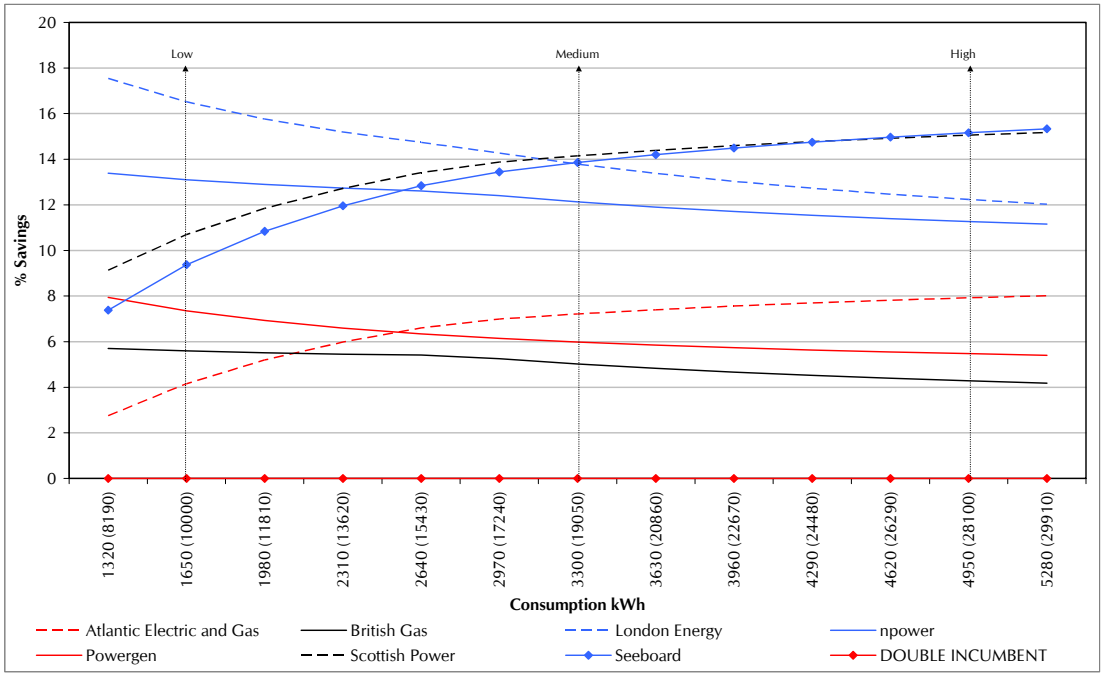
1.2 The following figures represent direct debit dual fuel savings.

Figure A7.1: Direct debit dual fuel savings in East Midlands area



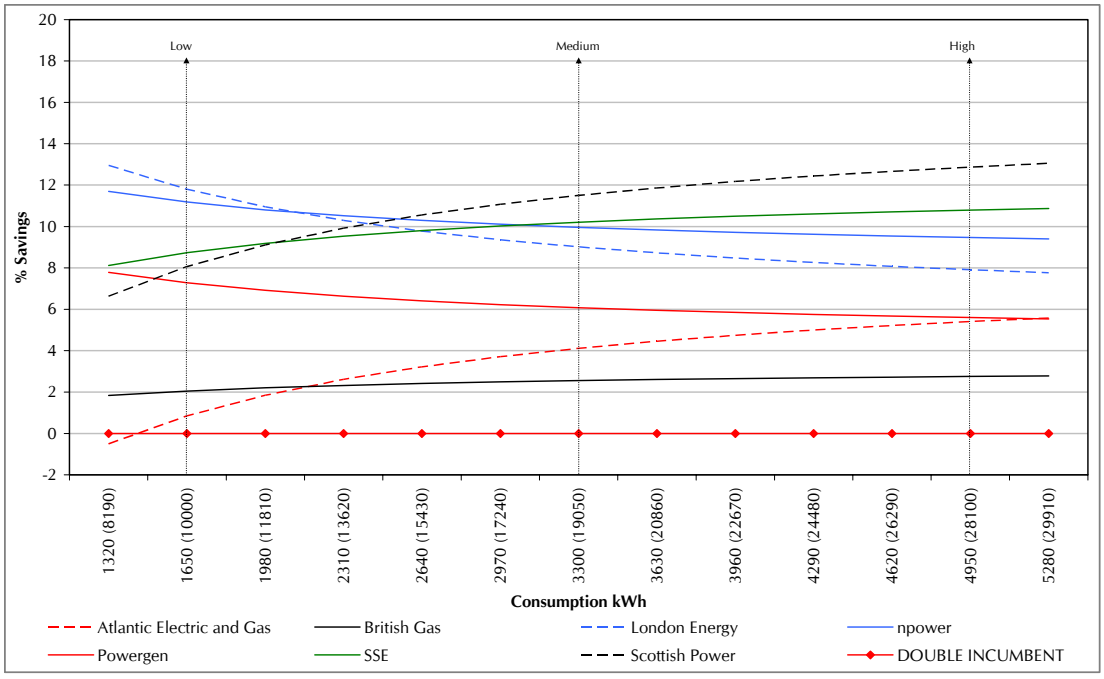
Source: Ofgem

Figure A7.2: Direct debit dual fuel savings in Eastern area



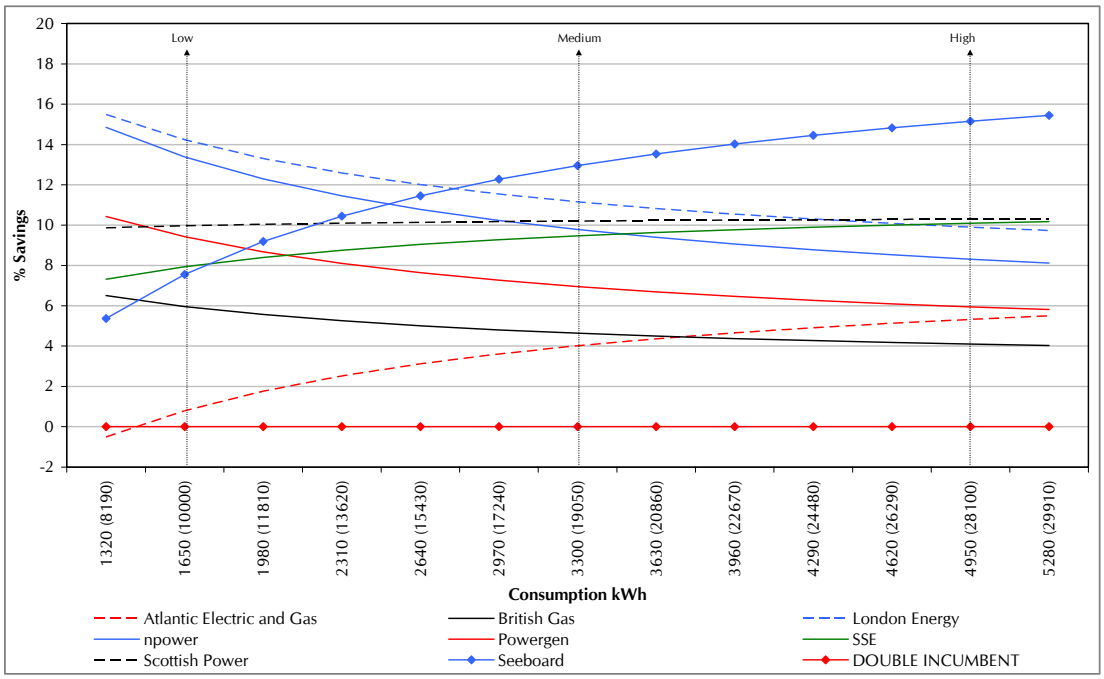
Source: Ofgem

Figure A7.3: Direct debit dual fuel savings in London area



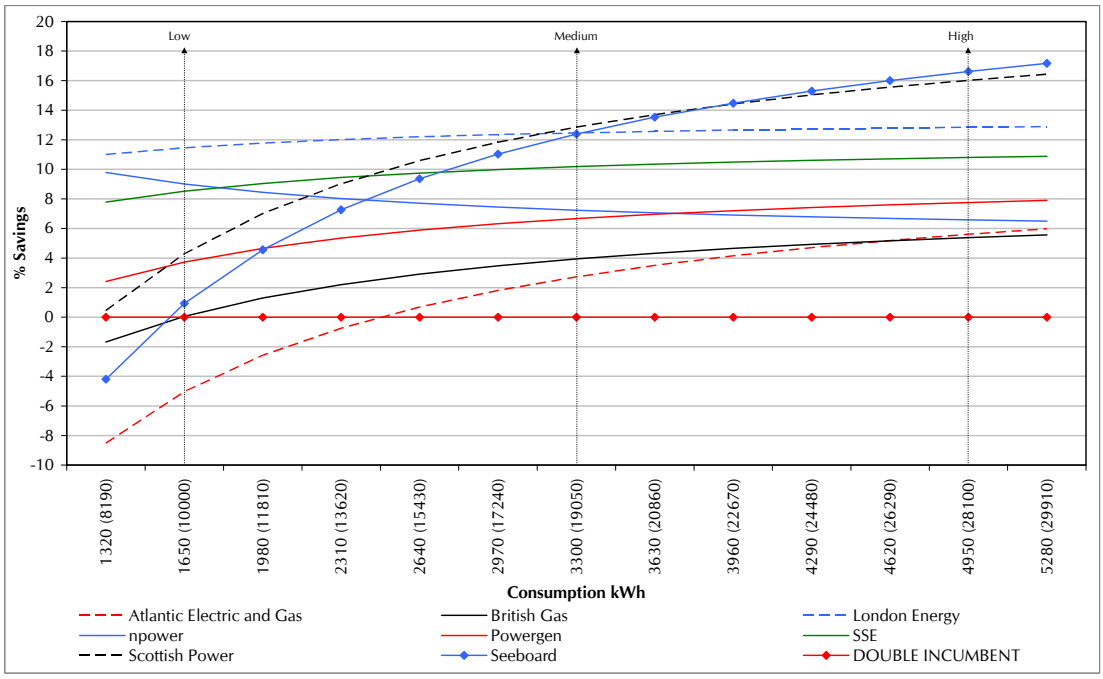
Source: Ofgem

Figure A7.4: Direct debit dual fuel savings in Manweb area



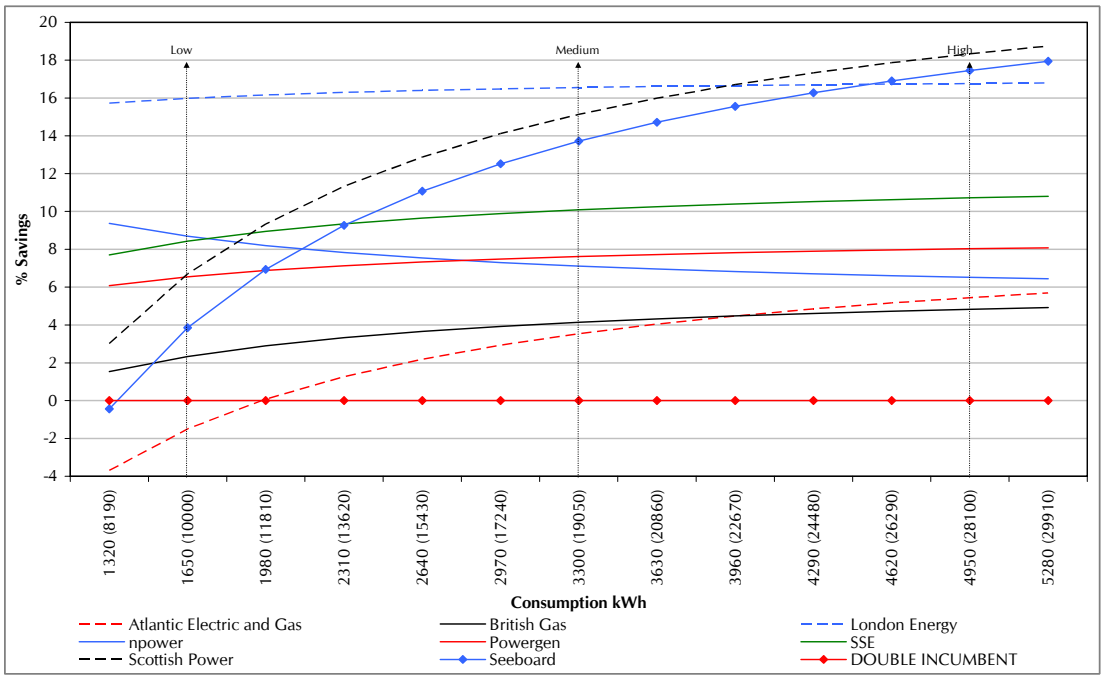
Source: Ofgem

Figure A7.5: Direct debit dual fuel savings in Midlands



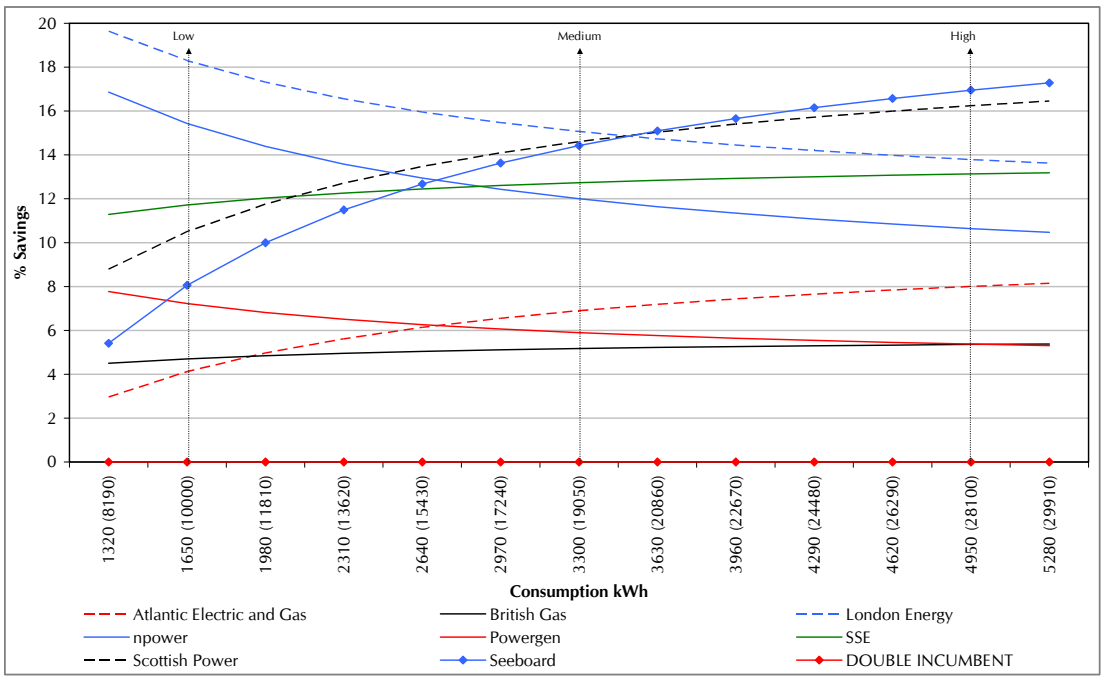
Source: Ofgem

Figure A7.6: Direct debit dual fuel savings in Northern area



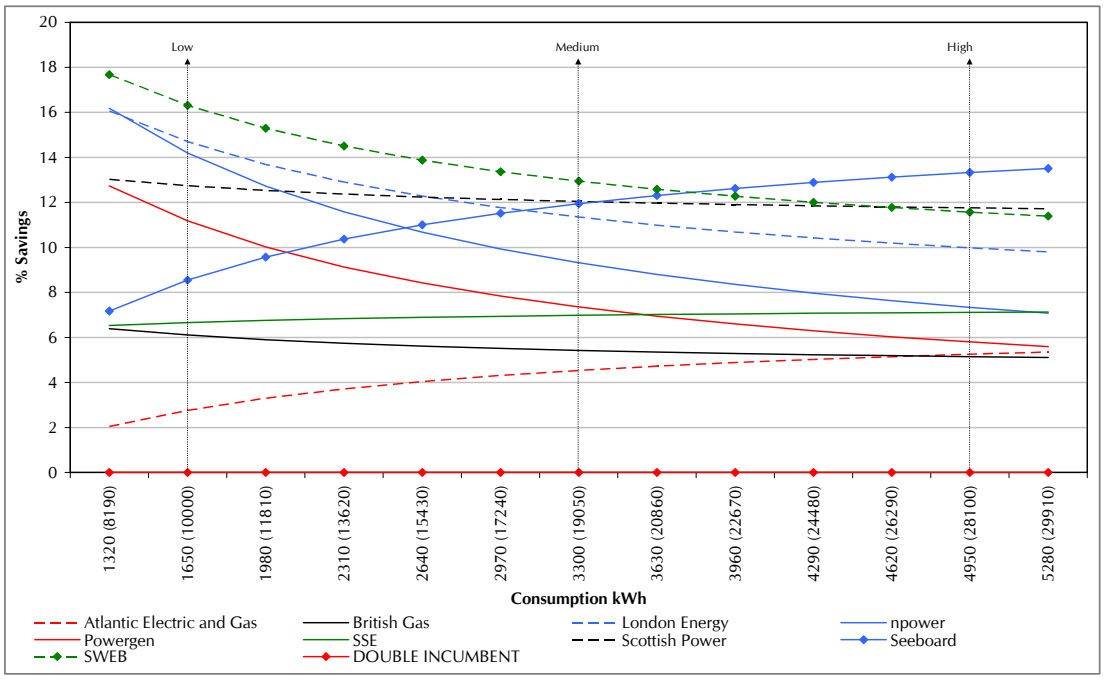
Source: Ofgem

Figure A7.7: Direct debit dual fuel savings in Norweb area



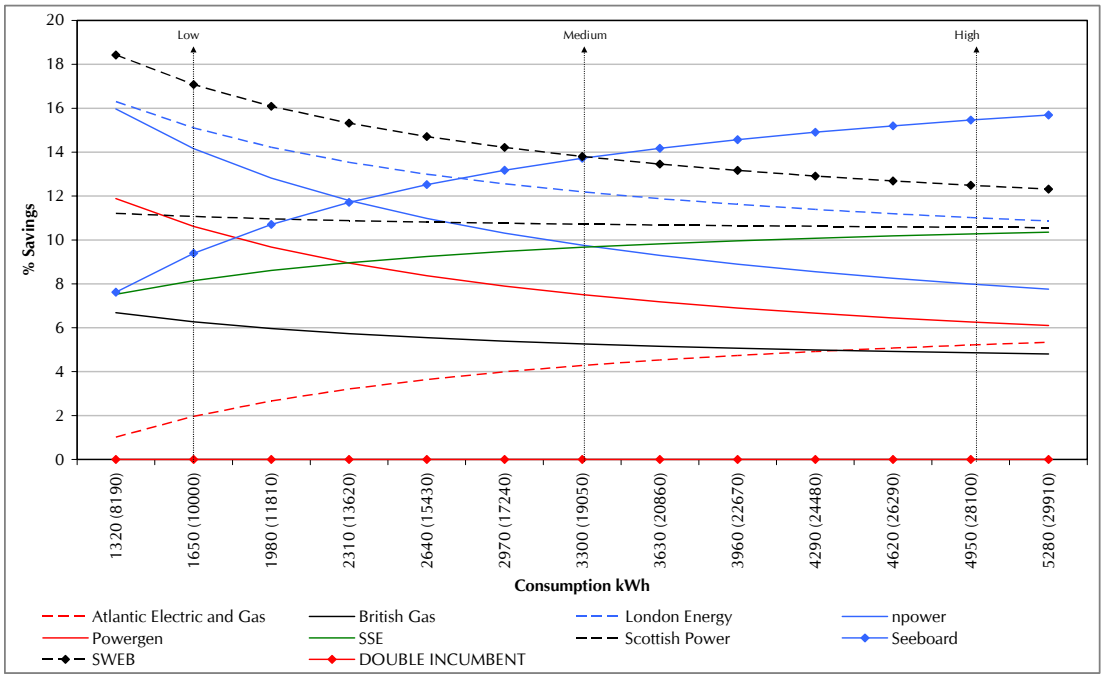
Source: Ofgem

Figure A7.8: Direct debit dual fuel savings in Scottish Hydro area



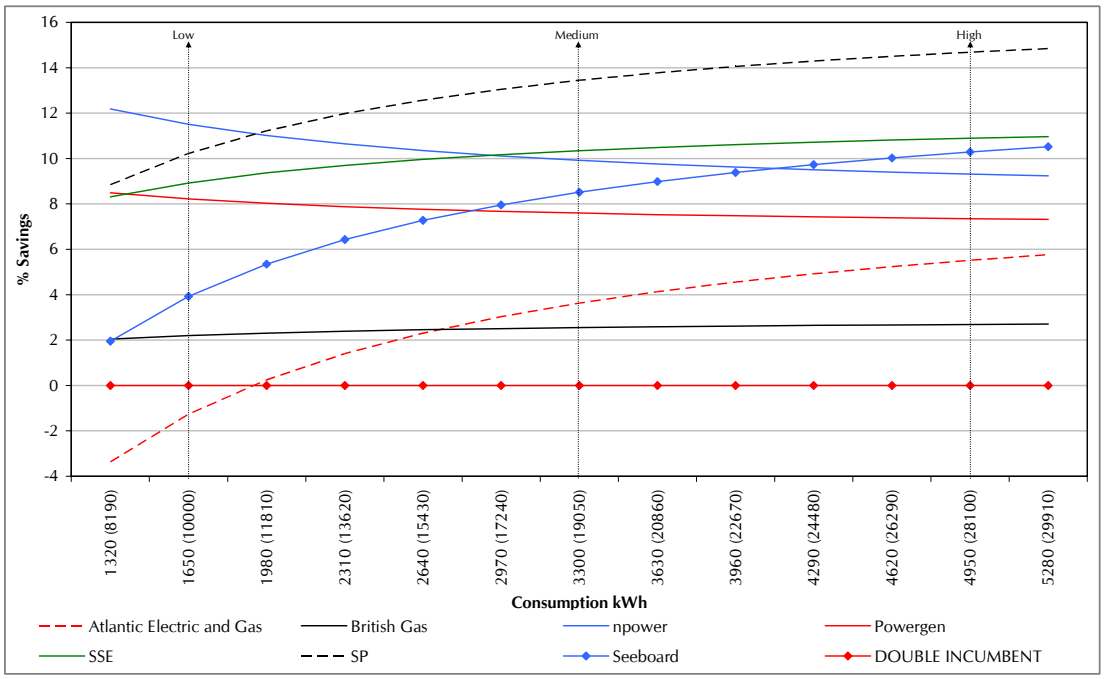
Source: Ofgem

Figure A7.9: Direct debit dual fuel savings in ScottishPower area



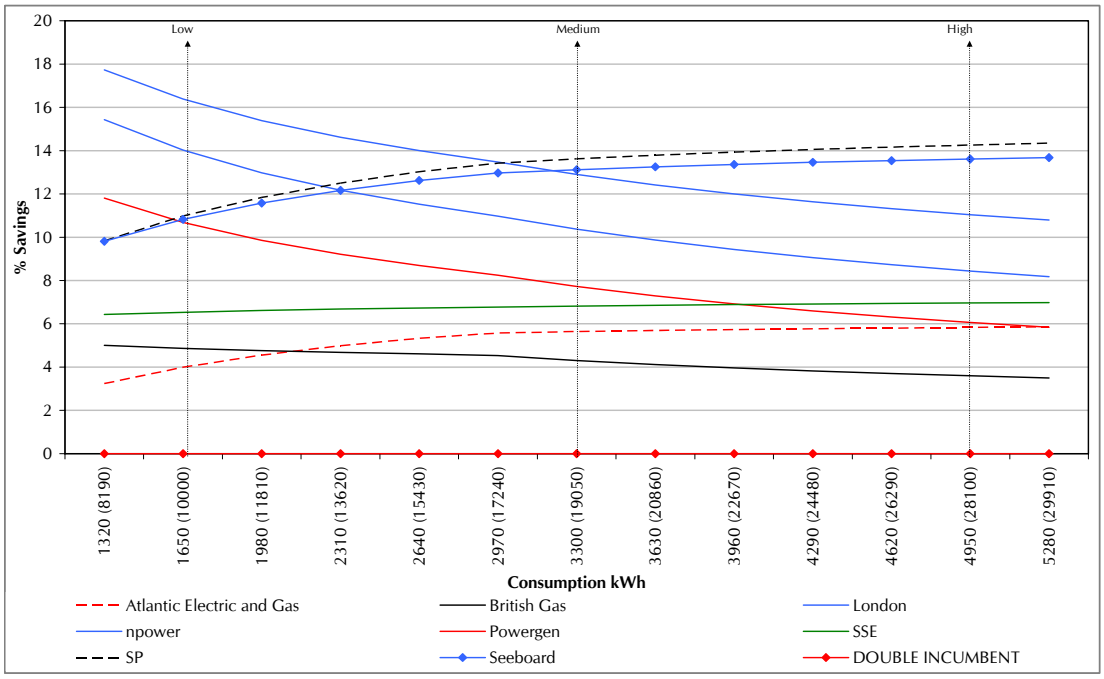
Source: Ofgem

Figure A7.10: Direct debit dual fuel savings in Seeboard area



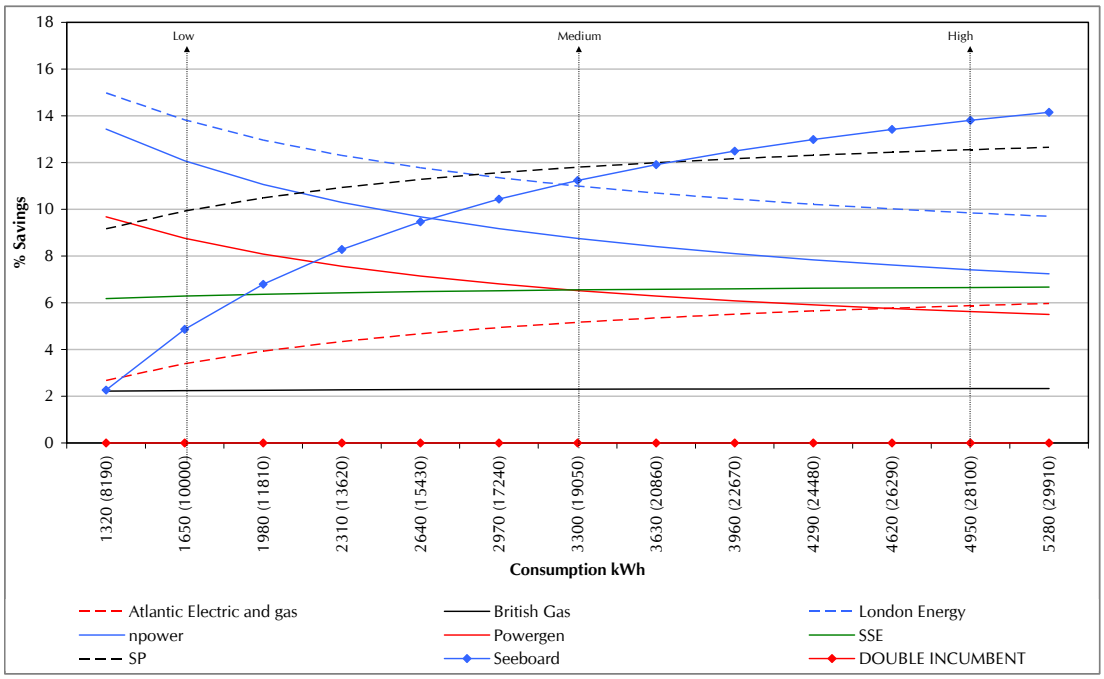
Source: Ofgem

Figure A7.11: Direct debit dual fuel savings in Southern area



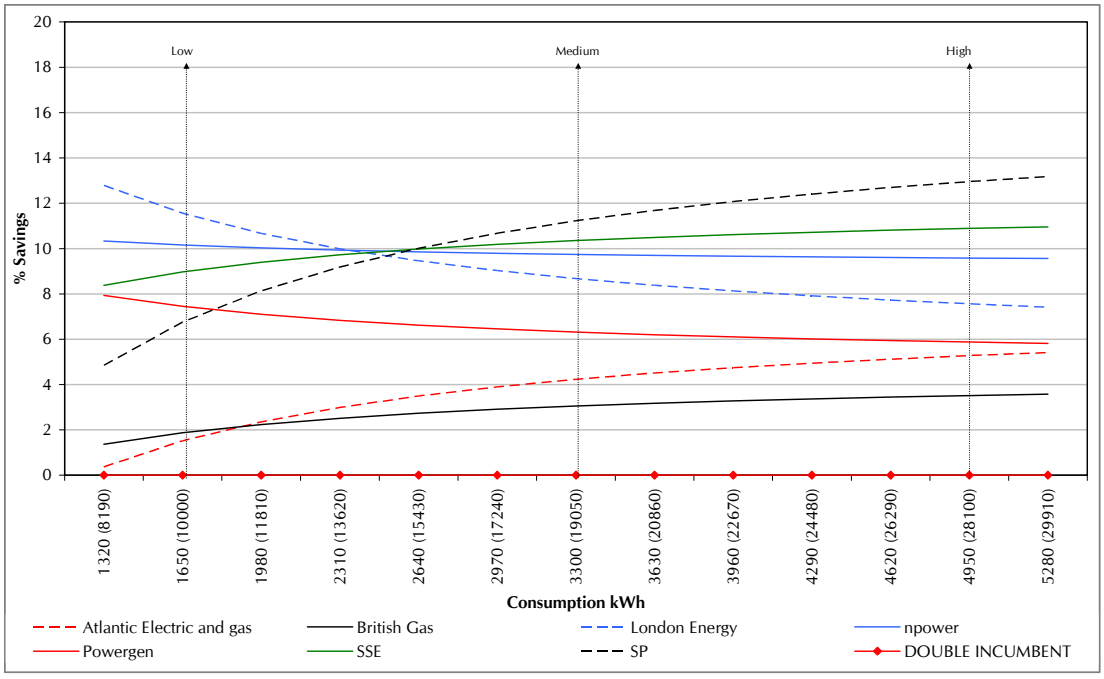
Source: Ofgem

Figure A7.12: Direct debit dual fuel savings in SWALEC area



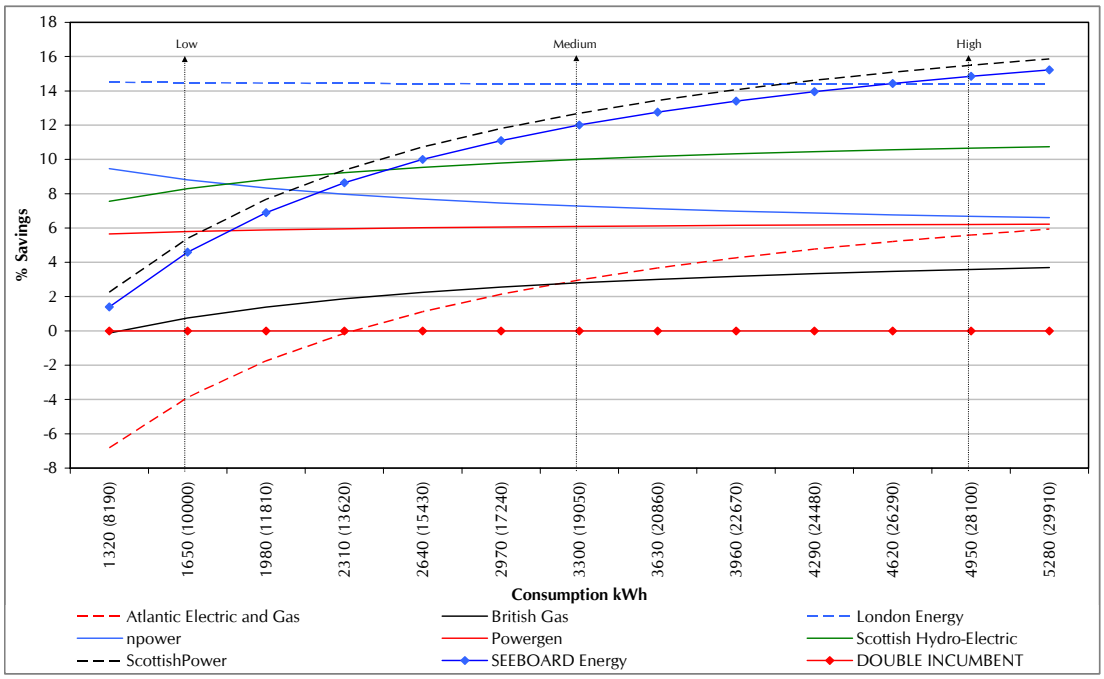
Source: Ofgem

Figure A7.13: Direct debit dual fuel savings in SWEB area



Source: Ofgem

Figure A7.14: Direct debit dual fuel savings in Yorkshire area



Source: Ofgem

1.3 The tables below identify the maximum, minimum, median savings, and number of suppliers cheaper than the incumbent for low, medium and high consumption levels for all 14 ex-PES regions, for direct debit.

Table A7.1: Dual fuel direct debit savings - low consumption

Region	Min saving (£)	Max saving (£)	Min saving (%)	Max saving (%)	Median saving (%)	Number of suppliers offering discount
East Midlands	8	47	2	14	6	8
Eastern	14	54	4	17	9	7
London	3	39	1	12	8	7
Manweb	3	50	1	14	9	8
Midlands	0	36	0	11	4	7
Northern	8	52	2	16	7	7
Norweb	14	61	4	18	9	8
Scottish Hydro	10	57	3	16	11	9
ScottishPower	7	60	2	17	11	9
Seeboard	7	37	2	12	9	6
Southern	14	56	4	16	11	8
Swalec	8	49	2	14	8	8
SWEB	5	39	2	12	7	7
Yorkshire	2	46	1	14	6	7
Range of savings	£0-£14	£36-£61	0%-4%	11%-18%	4%-11%	6-9

Source: Ofgem

Table A7.2: Dual fuel direct debit savings - medium consumption

Region	Min saving (£)	Max saving (£)	Min saving (%)	Max saving (%)	Median saving (%)	Number of suppliers offering discount
East Midlands	29	72	5	12	12	8
Eastern	29	82	5	14	12	7
London	15	67	3	12	9	7
Manweb	24	78	4	13	10	8
Midlands	16	74	3	13	9	7
Northern	21	98	4	17	9	7
Norweb	30	88	5	15	12	8
Scottish Hydro	27	78	5	13	9	9
ScottishPower	26	85	4	14	10	9
Seeboard	15	77	3	13	9	7
Southern	26	81	4	14	9	8
Swalec	14	73	2	12	8	8
SWEB	18	68	3	11	9	7
Yorkshire	16	83	3	14	9	7
Range of savings	£14-£30	£67-£98	2%-5%	11%-17%	8%-12%	7-9

Source: Ofgem

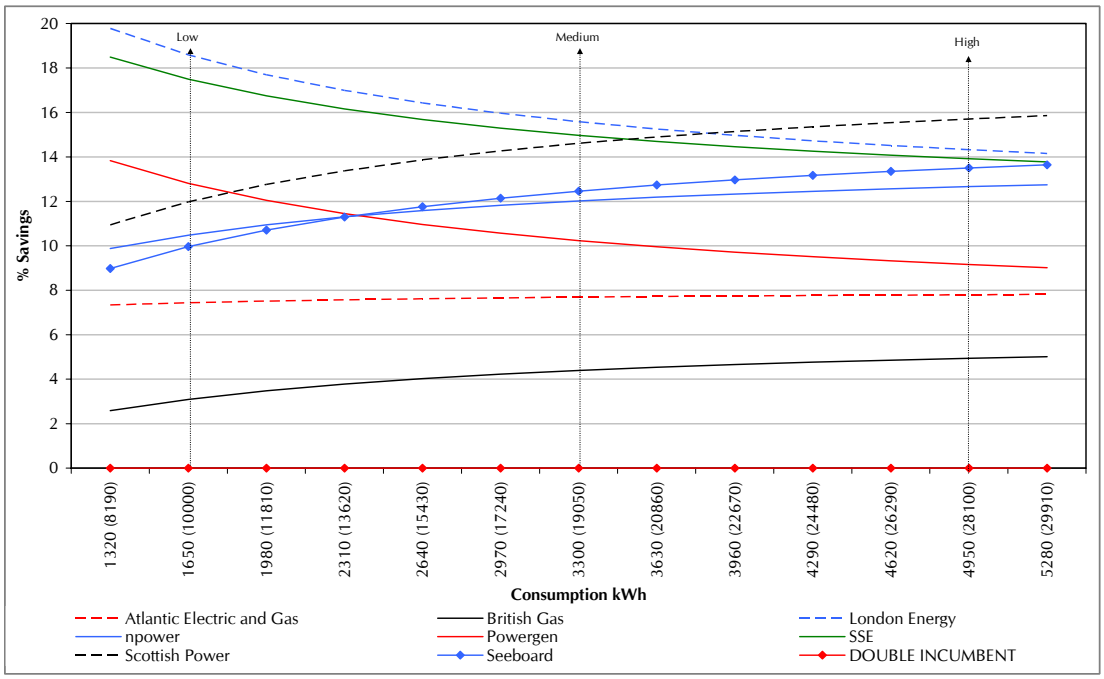
Table A7.3: Dual fuel direct debit savings - high consumption

Region	Min saving (£)	Max saving (£)	Min saving (%)	Max saving (%)	Median saving (%)	Number of suppliers offering discount
East Midlands	45	123	5	15	11	8
Eastern	35	125	4	15	11	7
London	23	107	3	13	9	7
Manweb	35	130	4	15	10	8
Midlands	46	141	5	17	9	7
Northern	41	157	5	18	9	7
Norweb	45	142	5	17	12	8
Scottish Hydro	44	115	5	13	7	9
ScottishPower	43	135	5	15	10	9
Seeboard	22	121	3	15	10	7
Southern	30	120	4	14	8	8
Swalec	20	121	2	14	7	8
SWEB	30	112	4	13	8	7
Yorkshire	30	129	4	15	9	7
Range of savings	£20-£46	£107-£157	2%-5%	13%-18%	7%-12%	7-9

Source: Ofgem

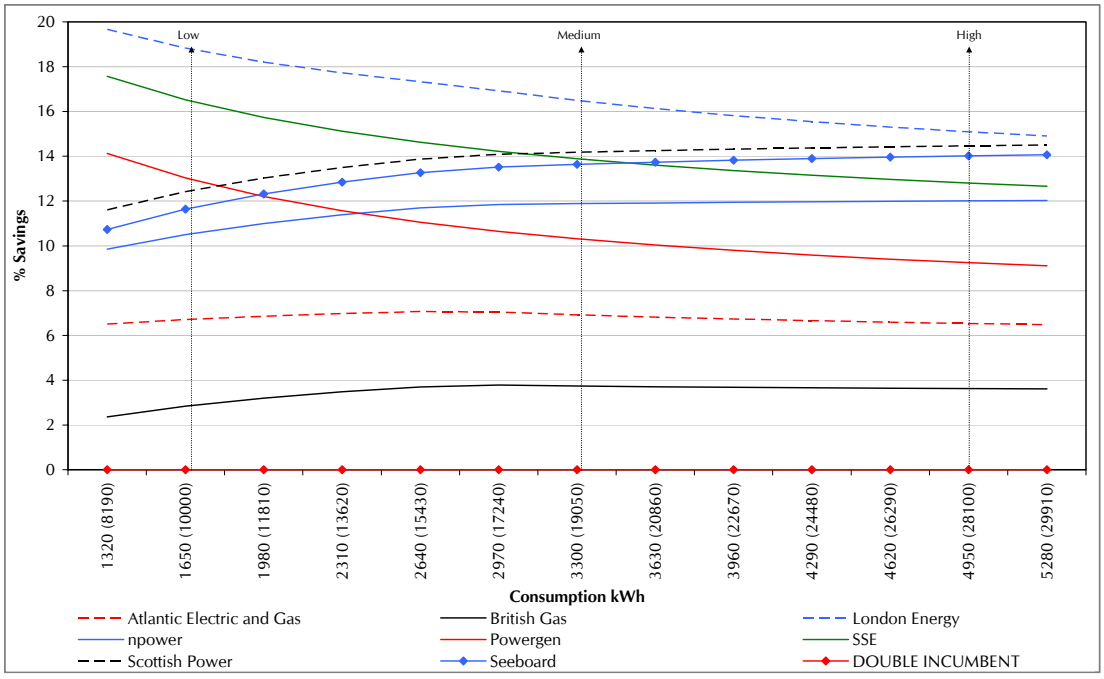
1.4 The following figures represent standard credit dual fuel savings.

Figure A7.15: Standard credit dual fuel savings in East Midlands area



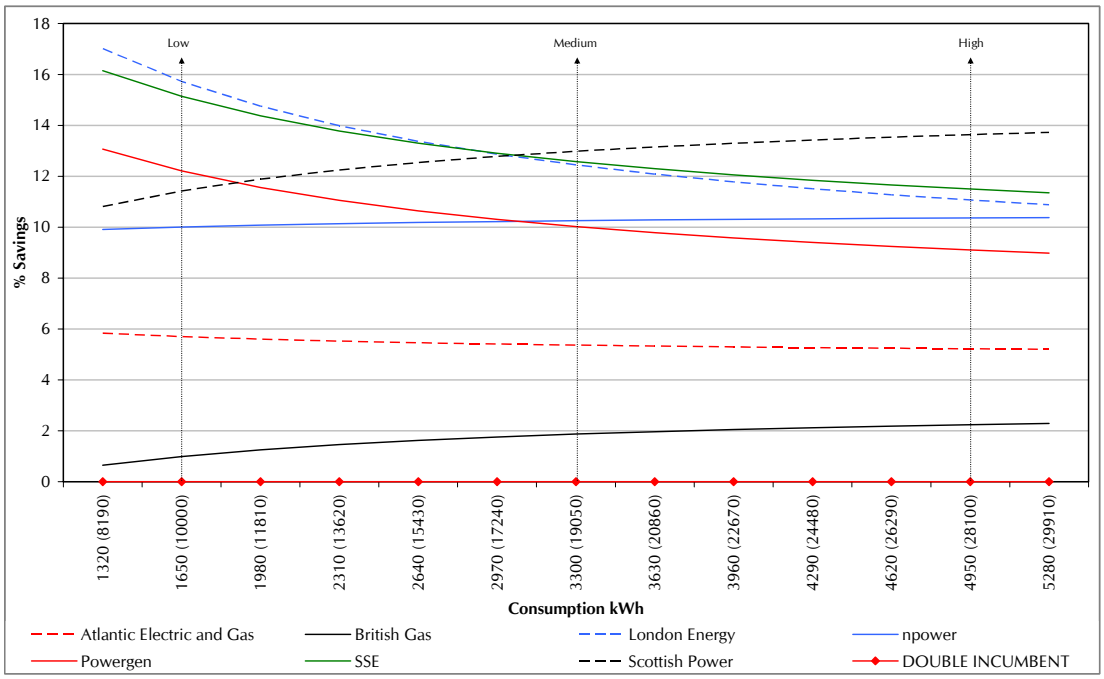
Source: Ofgem

Figure A7.16: Standard credit dual fuel savings in Eastern area



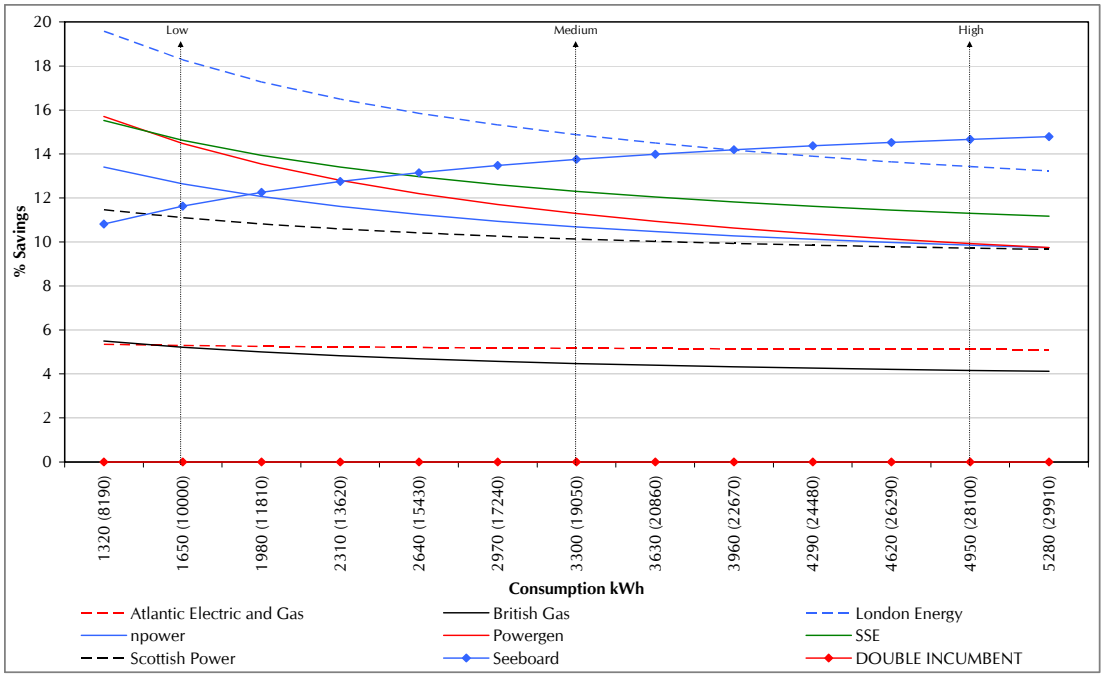
Source: Ofgem

Figure A7.17: Standard credit dual fuel savings in London area



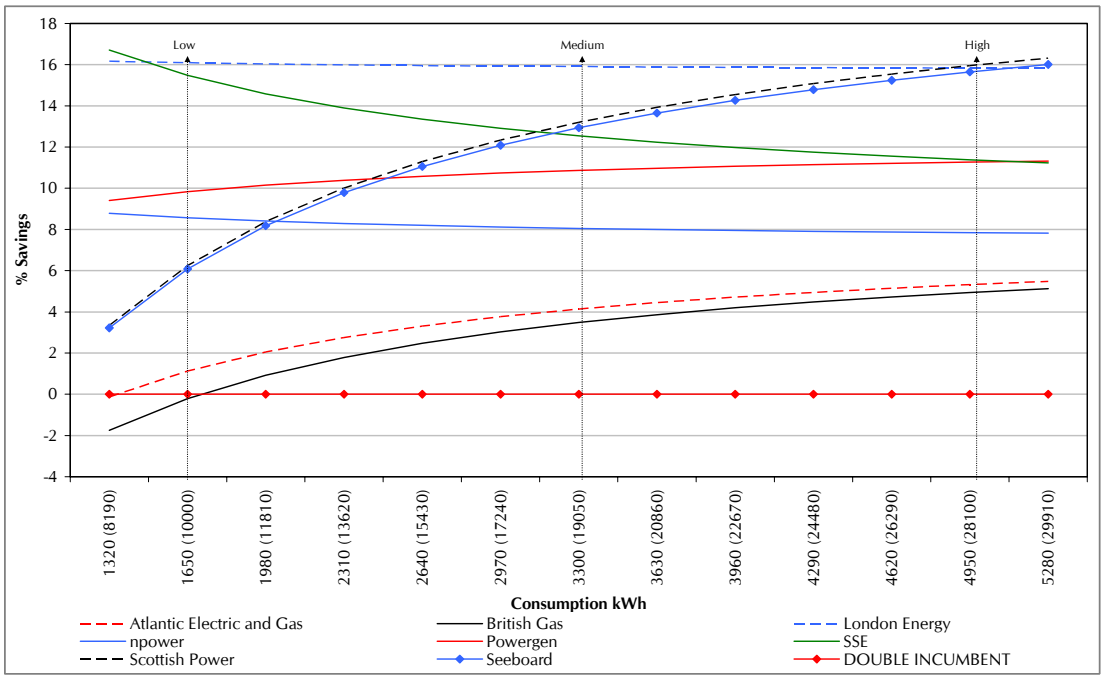
Source: Ofgem

Figure A7.18: Standard credit dual fuel savings in Manweb area



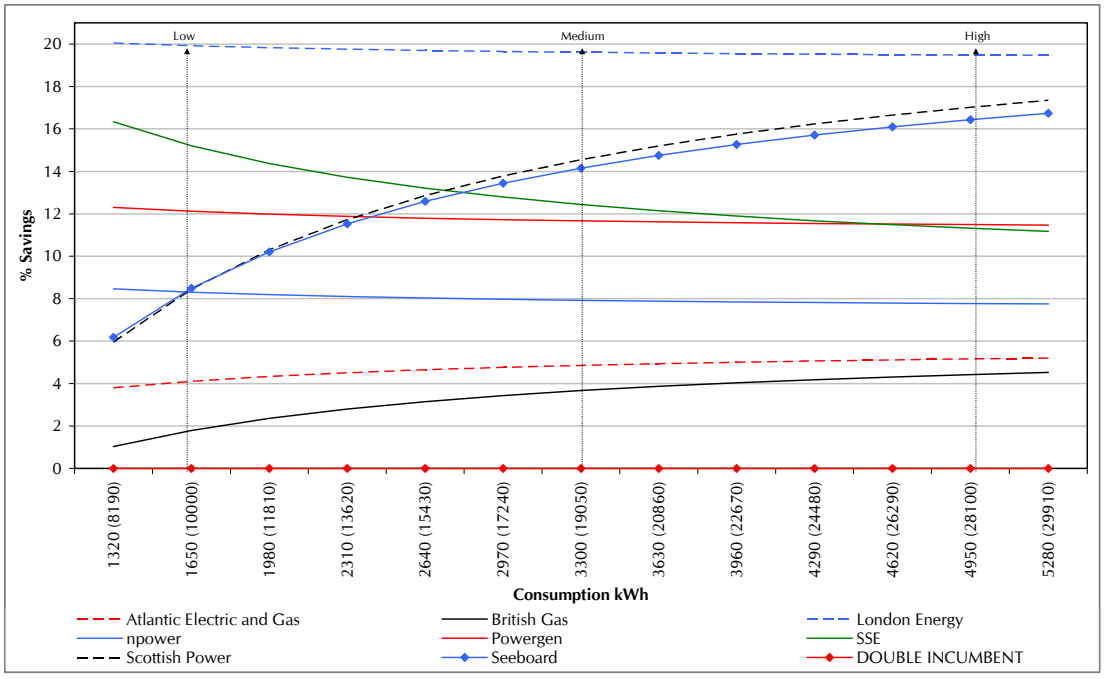
Source: Ofgem

Figure A7.19: Standard credit dual fuel savings in Midlands area



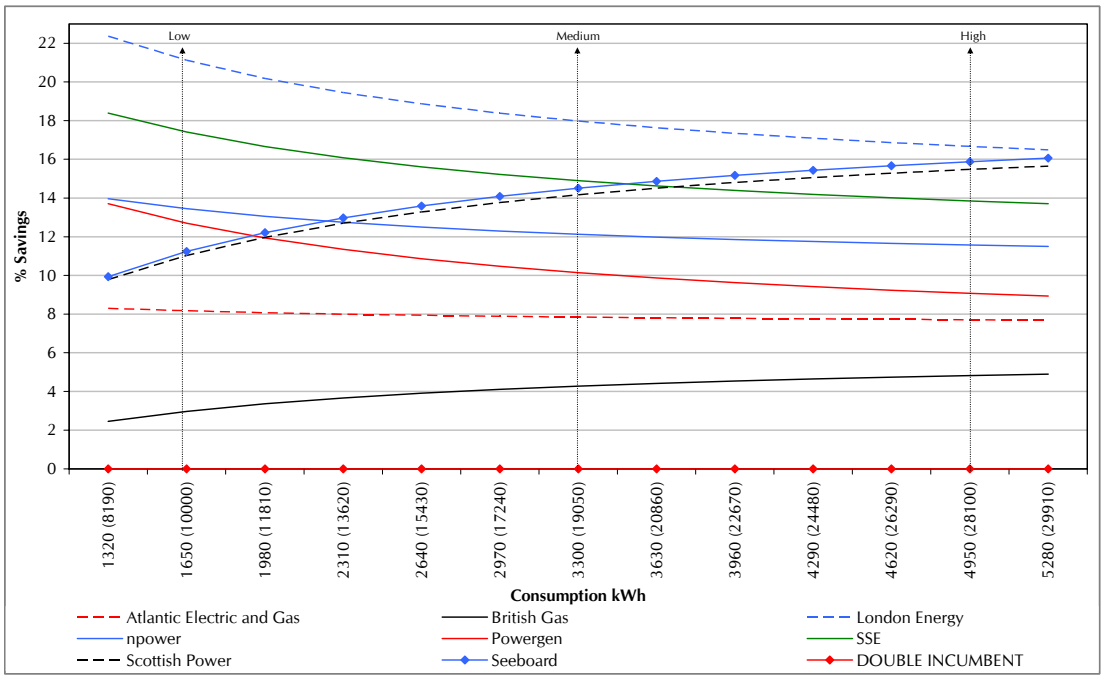
Source: Ofgem

Figure A7.20: Standard credit dual fuel savings in Northern area



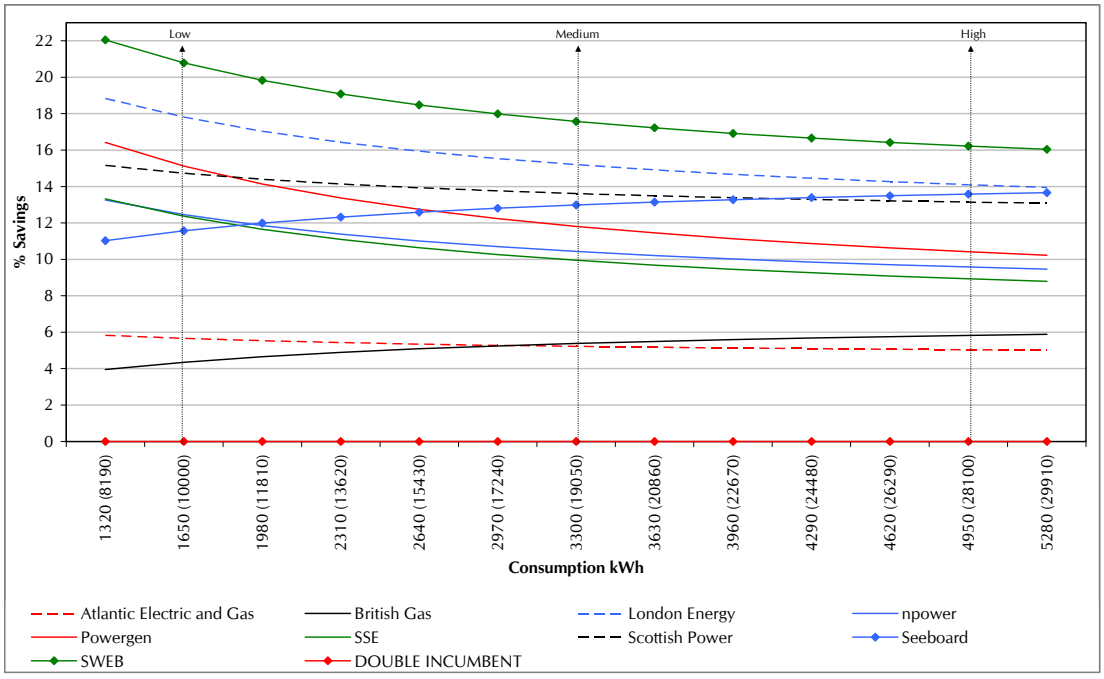
Source: Ofgem

Figure A7.21: Standard credit dual fuel savings in Norweb area



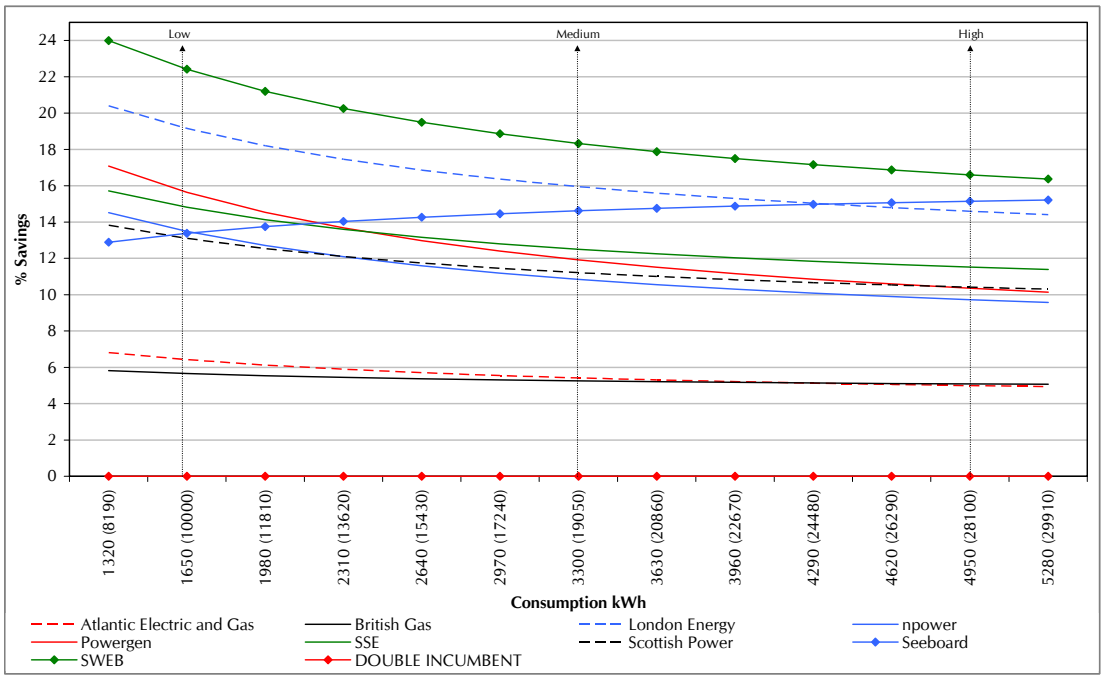
Source: Ofgem

Figure A7.22: Standard credit dual fuel savings in Scottish Hydro area



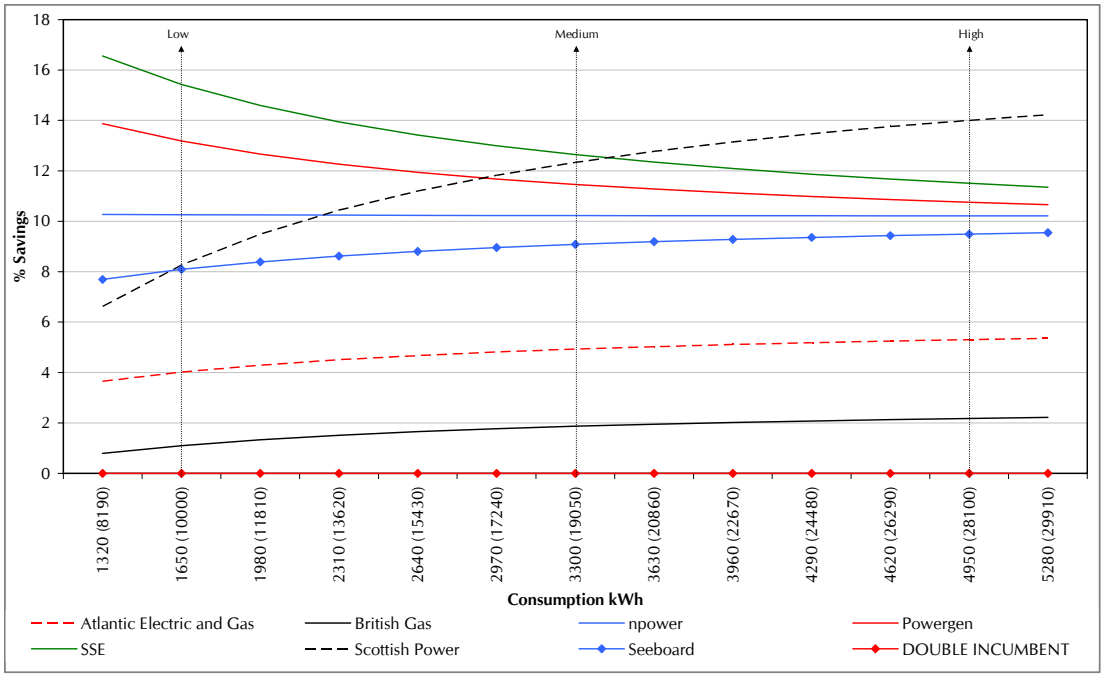
Source: Ofgem

Figure A7.23: Standard credit dual fuel savings in ScottishPower area



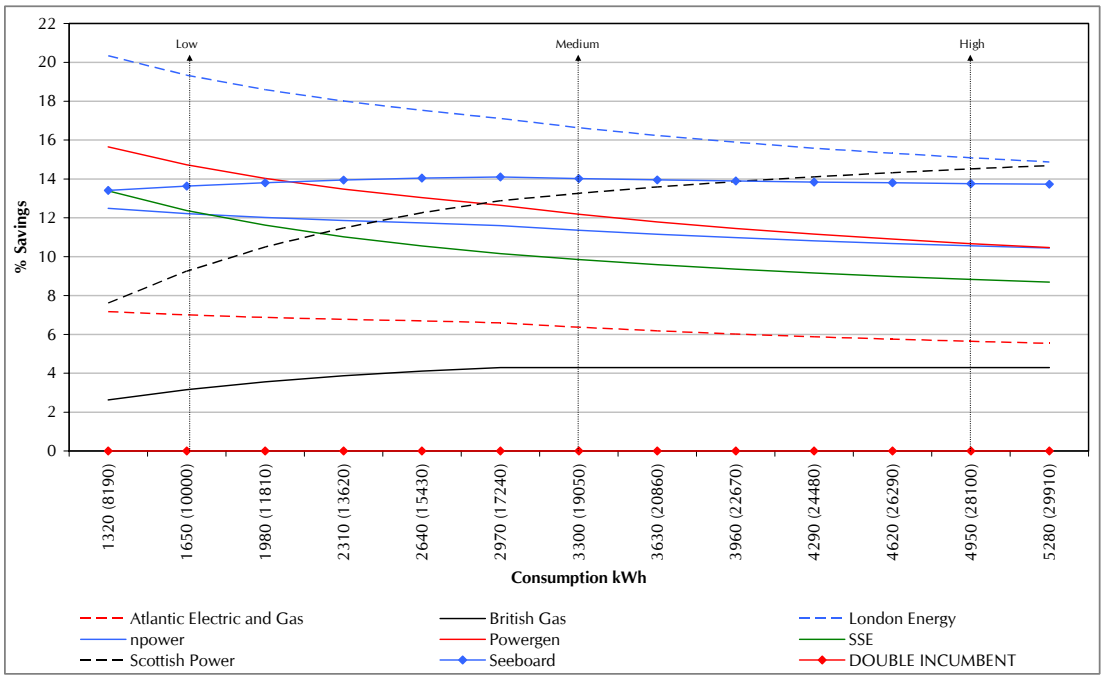
Source: Ofgem

Figure A7.24: Standard credit dual fuel savings in Seeboard area



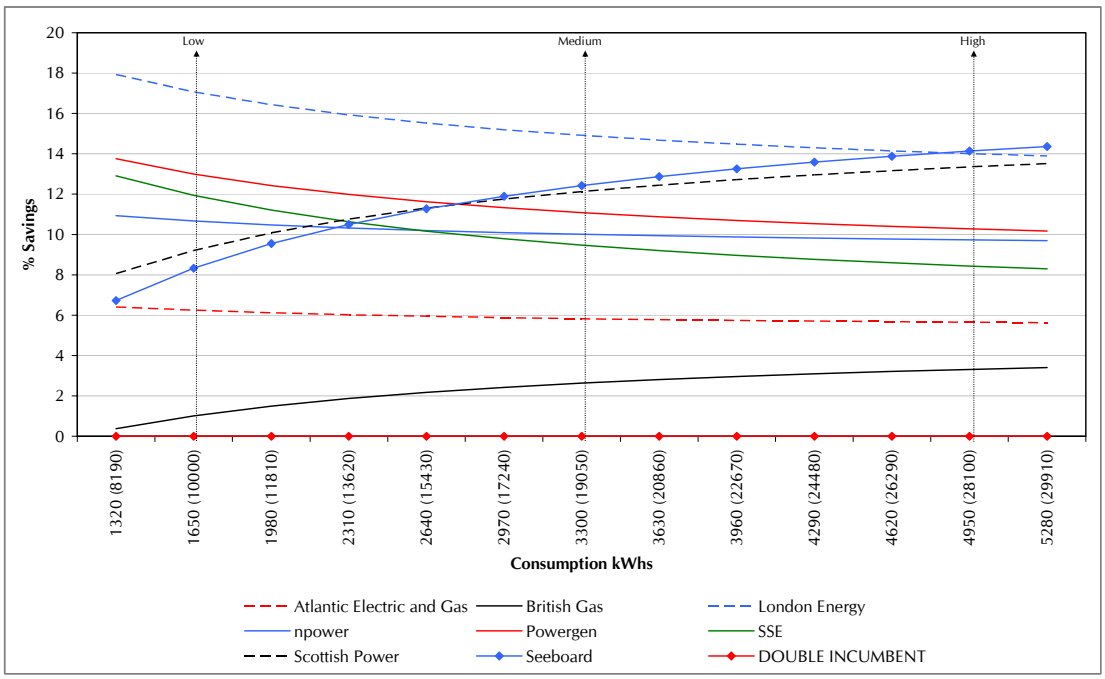
Source: Ofgem

Figure A7.25: Standard credit dual fuel savings in Southern area



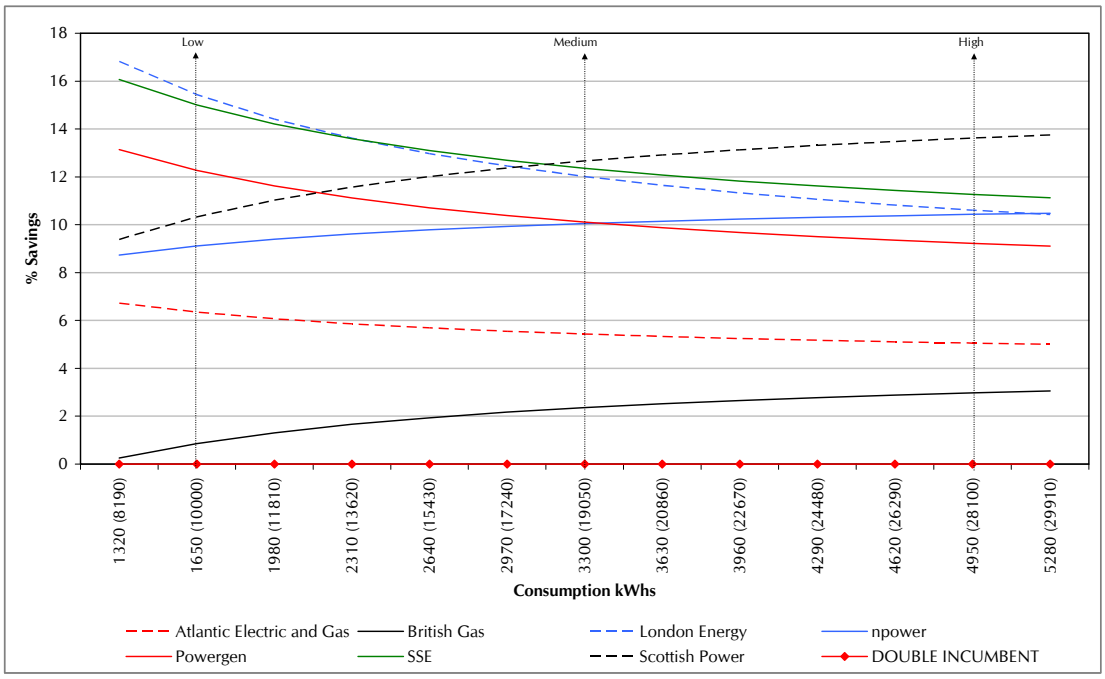
Source: Ofgem

Figure A7.26: Standard credit dual fuel savings in SWALEC area



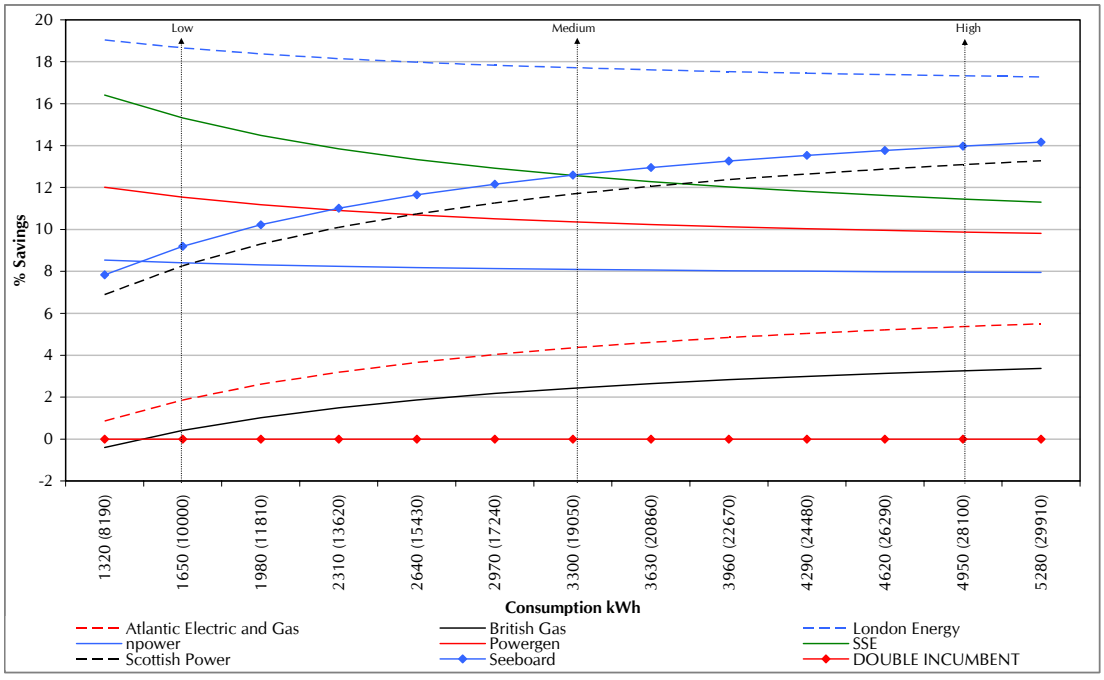
Source: Ofgem

Figure A7.27: Standard credit dual fuel savings in SWEB area



Source: Ofgem

Figure A7.28: Standard credit dual fuel savings in Yorkshire area



Source: Ofgem

1.5 The tables below identify the maximum, minimum, median savings, and number of suppliers cheaper than the incumbent for low, medium and high consumption levels for all 14 ex-PES regions, for standard credit.

Table A7.4: Dual fuel standard credit savings - low consumption

Region	Min saving (£)	Max saving (£)	Min saving (%)	Max saving (%)	Median saving (%)	Number of suppliers offering discount
East Midlands	11	69	3	19	11	8
Eastern	10	69	3	19	12	8
London	4	58	1	16	11	7
Manweb	21	72	5	18	12	8
Midlands	4	57	1	16	9	7
Northern	7	73	2	20	8	8
Norweb	11	79	3	21	12	8
Scottish Hydro	17	81	4	21	12	9
ScottishPower	23	89	6	22	13	9
Seeboard	4	56	1	15	8	7
Southern	12	74	3	19	12	8
Swalec	4	68	1	17	10	8
SWEB	3	58	1	15	10	7
Yorkshire	1	68	0	19	9	8
Range of savings	£1-£23	£56-£89	0%-6%	15%-22%	8%-13%	7-9

Source: Ofgem

Table A7.5: Dual fuel standard credit savings - medium consumption

Region	Min saving (£)	Max saving (£)	Min saving (%)	Max saving (%)	Median saving (%)	Number of suppliers offering discount
East Midlands	28	98	4	16	12	8
Eastern	23	103	4	16	13	8
London	12	81	2	13	10	7
Manweb	29	98	4	15	11	8
Midlands	22	100	3	16	12	8
Northern	23	126	4	20	12	8
Norweb	27	114	4	18	13	8
Scottish Hydro	34	116	5	18	12	9
ScottishPower	35	122	5	18	12	9
Seeboard	12	79	2	13	10	7
Southern	28	108	4	17	12	8
Swalec	18	100	3	15	11	8
SWEB	15	82	2	13	10	7
Yorkshire	15	111	2	18	11	8
Range of savings	£12-£35	£79-£126	2%-5%	13%-20%	10%-13%	7-9

Source: Ofgem

Table A7.6: Dual fuel standard credit savings - high consumption

Region	Min saving (£)	Max saving (£)	Min saving (%)	Max saving (%)	Median saving (%)	Number of suppliers offering discount
East Midlands	44	140	5	16	13	8
Eastern	32	133	4	15	12	8
London	20	121	2	14	10	7
Manweb	38	135	4	15	10	8
Midlands	45	144	5	16	11	8
Northern	40	178	4	19	11	8
Norweb	43	149	5	17	13	8
Scottish Hydro	47	151	5	16	10	9
ScottishPower	47	156	5	17	10	9
Seeboard	19	124	2	14	10	7
Southern	39	137	4	15	11	8
Swalec	31	134	3	14	10	8
SWEB	27	126	3	14	10	7
Yorkshire	29	154	3	17	11	8
Range of savings	£19-£47	£121-178	2%-5%	14%-19%	10%-13%	7-9

Source: Ofgem