

Energy market investigation

Analysis of the potential gains from switching

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This is one of a series of consultative working papers which will be published during the course of the investigation. This paper should be read alongside the updated issues statement and the other working papers which accompany it. These papers do not form the inquiry group's provisional findings. The group is carrying forward its information-gathering and analysis work and will proceed to prepare its provisional findings, which are currently scheduled for publication in May 2015, taking into consideration responses to the consultation on the updated issues statement and the working papers. Parties wishing to comment on this paper should send their comments to energymarket@cma.gsi.gov.uk by 18 March 2015.

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The Competition and Markets Authority has excluded from this published version of the working paper information which the Inquiry Group considers should be excluded having regard to the three considerations set out in section 244 of the Enterprise Act 2002 (specified information: considerations relevant to disclosure).
The omissions are indicated by [✂].

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Introduction

1. This paper sets out the methodology and preliminary results of our assessment of the savings in the gas and electricity bills that domestic customers of the Six Large Energy Firms could potentially make if they switched to a different tariff within the same supplier (internal switching) or switched supplier (external switching).
2. A finding of high potential savings that are persistent over time and available to large groups of domestic customers may be evidence of weak customer engagement in the retail markets for electricity and gas in Great Britain (GB). The size of switching gains is also a measure of price differences among suppliers in these markets, and as such it may provide additional evidence on the different strategies followed by the energy suppliers to position themselves in terms of price.
3. We have conducted a preliminary calculation of the potential savings at ten quarterly snapshot dates from 31 March 2012 to 30 June 2014 (the Relevant Period). We have used tariff price data and regional consumption levels by tariff family¹ to calculate the bills that the domestic customers subscribed to each tariff were paying at each snapshot date. We have identified the cheapest available tariff from all tariffs available at the snapshot date, including tariffs offered by independent suppliers.
4. It should be noted at the outset that our preliminary calculation of the potential savings presented in this paper does not yet include all relevant data² and the data cleaning process is not finalised. Future improvements to the quality of the datasets may result in changes to our analysis and the figures presented in this paper.
5. With this in mind, our initial findings suggest that the average potential savings available to dual fuel domestic customers of the Six Large Energy Firms amounted to, on average across the Relevant Period:
 - (a) £44–£144 annually from switching to a different tariff with the same supplier (these savings were available to 56 to 82% of the dual fuel customer base of each supplier);

¹ A description of the consumption data we use is set out in the next section of this paper. We have so far used only the mean consumption level (as observed for each region and tariff family, in each year) to summarise the results.

² At this stage our dataset does not include SSE's dual fuel customers' data and single fuel gas data in Q3 2013, and excludes some relatively small portions of the other suppliers' data where this data requires further cleaning.

- (b) £46–£153 annually from switching to other suppliers' tariffs with the same characteristics (these savings were available to 58 to 94% of the dual fuel customer base of each supplier);
 - (c) £158–£234 annually from switching to other suppliers' tariffs with different characteristics (these savings were available to 94 to 99% of the dual fuel customer base of each supplier).
- 6. We note that the value of the potential savings calculated in our analysis should be interpreted as a measure of the domestic customers' engagement with the market and price differences among suppliers. We do not consider that the result of our analysis can be relied upon to measure aggregate welfare loss. This is because equilibrium prices in the retail gas and electricity markets would be likely to change if all customers who are currently paying higher prices switched.
- 7. This paper is structured as follows:
 - (a) The first section describes the data used for this analysis.
 - (b) The second section sets out the methodology.
 - (c) The third section presents descriptive statistics of the data.
 - (d) The fourth section presents our initial results and describes the regression analysis we are currently scoping.
 - (e) The last section outlines the further work we intend to carry out.
 - (f) Appendix A sets out the definitions used in the data and throughout this paper.
 - (g) Appendix B describes in detail the data used for this analysis and the steps taken to clean it.

Data

- 8. We have collected three sets of data for this analysis:
 - (a) The first set includes data on the number of domestic customers subscribed to each tariff (of all of the Six Large Energy Firms) at a given quarterly snapshot, along with information on the relevant characteristics

of that tariff, such as its price, payment method and whether the price is variable, fixed or capped.³

- (b) The second set includes annual data on estimated consumption levels at the 10th, 25th, 50th, 75th and 90th percentiles and the mean consumption level for each tariff family and for each of the Six Large Energy Firms.⁴ The tariff families group the tariffs offered by one specific supplier that share the same region, meter type (Economy 7 or standard, as observed from the type of tariff they subscribe to), payment method and price type (variable, fixed, capped). Tariffs excluded from the analysis (for example green, social, complex time-of-use and certain other niche tariffs) do not form part of these tariff families (see Appendix B for details on what was excluded from the analysis).
- (c) The third set includes data on all tariffs available for subscription at a given quarterly snapshot, including tariffs offered by the Six Large Energy Firms and independent suppliers. This data includes information on the relevant characteristics of all tariffs available such as their price, payment methods and whether the price is variable, fixed or capped.⁵

9. The quarterly snapshots are taken at the last day of each quarter from Q1 2012 to Q2 2014.
10. The analysis at this stage excludes all SSE's twin fuel data⁶ and single fuel gas data in Q3 2013. A more detailed explanation of the data and the process of data manipulation is set out in Appendix B.

Methodology

Dimensions and scope of analysis

11. A potential gain from switching, or a potential saving for any given domestic customer, is primarily driven by three factors: the size of the customer's current bill, the range of available tariffs at the time when switching is being considered, and the preferences of that customer over tariff characteristics other than the price (for example price type and payment method).

³ The Six Large Energy firms submitted this data in response to the Tariff Information Request (12 September 2014).

⁴ The Six Large Energy firms submitted this data in response to the Tariff Information Request (12 September 2014).

⁵ This dataset originates from the database of Energylinx, a price comparison website.

⁶ This is because at this stage we have been unable to successfully combine gas and electricity tariffs to form a twin fuel bill. Further work on this analysis will include solving this issue in the data.

12. To calculate the potential gains for switching, we have defined switching scenarios (see below). While the aim of this analysis is to quantify potential financial gains only, the switching scenarios allow us to consider non-financial benefits that different tariffs can offer to customers.

Switching scenarios

13. We have defined switching scenarios to accommodate a number of key choice parameters. A switching scenario, for a given domestic customer, is a set of assumptions on what other tariffs this customer would be willing to switch to without giving up the non-financial benefits their current tariff offers. As we cannot directly measure customers' preferences, we analyse scenarios with assumptions that range from relatively restrictive to relatively flexible.
14. We have considered the following key parameters for defining a switching scenario:⁷
 - (a) Region (we use the 14 PES regions for both gas and electricity).
 - (b) Supplier type (a customer may prefer to stay with the same supplier, or may not be willing to switch to an independent supplier).
 - (c) Fuel type (single fuel gas, single fuel electricity, or dual fuel / twin fuel).
 - (d) Payment method (pre-payment, credit and direct debit).
 - (e) Economy 7 (or similar time of use tariffs) or standard meter tariff.
 - (f) Price type (variable, fixed or capped).
 - (g) Contract length.
15. Some parameters are restricted in the same way in all switching scenarios:
 - (a) We have restricted the choices of pre-pay customers to switch to other pre-payment tariffs only.
 - (b) We have limited switching within a fuel type (single fuel gas, single fuel electricity, or dual fuel). That is, single fuel customers can switch to other single fuel tariffs, and dual fuel customers can switch to other dual fuel tariffs.

⁷ See detailed definitions in Appendix A.

- (c) We have allowed Economy 7 customers to switch to non-Economy 7 (standard meter) tariffs, but not the reverse.
- (d) We have allowed all customers to switch to both online and offline tariffs (including online tariffs offering paperless billing discounts).
- (e) Naturally, we only explore switching within the same region.

16. The table below summarises the scenarios that we have defined at this stage. We may consider changing or abandoning some of these scenarios as we progress with the analysis.⁸

Table 1: Switching scenario definitions

<i>Scenario</i>	<i>Parameters that can be changed when switching</i>	<i>Parameters that are held fixed when switching</i>
S1 Internal switch: change tariff type, but keep payment method	Price type (variable / fixed / capped) Contract length	Supplier Payment method
S2 Internal switch: change tariff type and payment method	Price type (variable / fixed / capped) Payment method: only monthly direct debit and standard credit (or similar) Contract length	Supplier Payment method if Pre-payment
S3a External like-for-like switch to Six Large Energy Firms only	Supplier (within Six Large Energy Firms only)	Payment method Price type (variable / fixed / capped) – switching between ‘standard’ variable and ‘non-standard’ variable allowed Contract length (if fixed term) – ‘short’ or ‘long’
S3b External like-for-like switch including independents	Supplier (including independents)	Payment method Price type (variable / fixed / capped)* – switching between ‘standard’ variable and ‘non-standard’ variable allowed Contract length (if fixed term) – ‘short’ or ‘long’
S4 External switch: flexible tariff characteristics, any supplier	Supplier (including independents) Payment method: only DD and Credit Price type (variable / fixed / capped) Contract length	Payment method if Pre-payment

Source: CMA definitions.

*Customers on capped tariffs are allowed to switch to fixed tariffs but not variable tariffs. Customers on fixed tariffs are only allowed to switch to other fixed tariffs.

⁸ For example, we will consider whether the data allows us to meaningfully use online or paperless billing as switching parameters.

17. For some groups of domestic customers, some switching scenarios produce the same savings estimate. For example, by definition scenarios S1 and S2 should yield identical results for pre-paying customers.
18. Scenarios S1 and S2 produce estimates of potential gains from switching tariffs within a supplier (gains from internal switching). Scenarios S3a and S3b indicate the potential gains that could be made if the customers were to choose the same type of tariff from another supplier.⁹ Scenario S4 is the most flexible scenario where the search for alternative tariffs includes the possibility of changing the supplier, payment method, price type and contract length (in case of fixed term contracts).
19. We note that:
 - (a) In scenarios where the payment methods are fixed, switching is still allowed within payment sub-types (for example, we do not distinguish quarterly direct debit and monthly direct debit as different payment methods). Please see Appendix B, paragraph 8 for a detailed description of how payment methods were grouped.
 - (b) The possibility of receiving paperless billing discounts is currently included in all switching scenarios. This is because some tariffs are only available with paperless billing, and for that reason we consider that it would be incorrect to assume that customers would be unwilling to switch to such tariffs. We are aware that this may incorrectly assume that all customers would be willing to receive their bills online. However, we do not consider that this affects our results materially. This is because paperless billing discounts, where offered, have not been large during the Relevant Period (typically around £5 per fuel per year).

Calculation steps

20. We have calculated potential savings for each group of customers (as defined by supplier, region, tariff, payment type and fuel type) at each quarterly snapshot in three steps.

⁹ These scenarios also restrict switching to tariffs with a similar contract length (where relevant). The contract length dimension is defined as follows. Some fixed term tariffs have a fixed end date for their contract (regardless of when exactly a customer signed up), whereas other contracts end based on a contract length that counts from the date the customer signed up. We create a standardised contract length by using the contract ending date of the former to calculate, at first launch of tariff, the maximum length. We then use this standardised measure to classify tariffs into short- and long-term. We define short-term tariffs as those with a contract of up to and including 24 months, and long-term tariffs as those with a contract of more than 24 months. The switching scenarios S3a and S3b allow switching from short to short and from long to long fixed term tariffs, but not switching from short to long. This restriction does not apply to non-standard variable price products which may have a limited contract, or capped tariffs.

Step 1: Calculating the current bill

21. First, we have calculated the current bill; that is, the annual bill of domestic customers based on the tariff they were subscribed to at the quarterly snapshot dates. The size of the bill and savings depends on how much energy a customer consumes. As it is possible that customers with different levels of consumption subscribe to different types of tariff, we have collected data on the level of consumption of customers subscribed to particular tariff families (see paragraph 8(b)). For Economy 7 users we have taken account of the proportion of electricity used during the off-peak and peak times of the day.¹⁰
22. We have calculated an annual bill at each consumption level for each tariff. For single fuel tariffs, this is a bill for only one fuel. For dual fuel and twin fuel tariffs, this is a combined gas and electricity bill.¹¹ The bill calculation uses the standing charge, unit rate and other price information, as well as all tariff-specific discounts.
23. We note that the calculated bill is an annual bill derived at the current tariff's prices, regardless of when the tariff expires. That is, if the tariff expires in less than 12 months, our calculation still assumes that the same price will be paid throughout the 12 months. We consider this to be a conservative approach,¹² as many fixed term tariffs tend to be cheaper than the standard variable tariff over the Relevant Period. We have excluded from each quarterly snapshot those fixed term tariffs which had less than three months remaining until they expire.

Step 2: Calculating the bill for the cheapest alternative tariff

24. Next, we have searched for the cheapest available tariff for each customer type (as defined by supplier, region, current tariff characteristics and consumption). To identify the cheapest available bill, we repeat the following steps for each scenario:
 - (a) For each type of customer, filter all available tariffs to keep only those that meet the criteria set in the switching scenario.

¹⁰ See Appendix B for a more detailed description of the consumption data.

¹¹ We paired gas and electricity tariffs based on an identifier in the data which indicated, for each dual fuel electricity tariff, the most common dual fuel gas tariff. We have assumed that, for example, dual fuel customers in the 25th percentile of the gas consumption distribution will also be in the 25th percentile of the electricity consumption distribution (and likewise for other percentiles of the distribution). We may consider alternative assumptions in our sensitivity analysis, to the extent that such alternative assumptions can be used in the analysis in a tractable way.

¹² By this we mean that we may be underestimating the potential gains from switching.

- (b) For each of the tariffs that are remaining after filtering in (a), calculate an annual energy bill for each consumption level (as defined by the 10th, 25th, 50th, 75th and 90th percentiles and the mean consumption).
 - (c) For each consumption level, identify the tariff (and the value of the associated bill) which offers the lowest possible bill.
 - (d) Record the result from (c) as the best available bill for that type of customer for that quarter in that switching scenario.
25. We note that this method allows the search result to be different for domestic customers with the same characteristics but different consumption levels.

Step 3: Calculating the potential savings

26. The annualised potential savings are calculated as the difference between the current bill from step 1 and best available bill from step 2, or zero if the difference is negative.

Descriptive statistics

27. This section summarises the number of accounts included in the data we collected from the parties and the exclusions we have made to the data prior to the analysis.
28. Table 1 and Table 2 show the total number of accounts for each of the Six Large Energy Firms in each quarter, and the proportion of accounts excluded from the analysis.¹³ We note that we have excluded all SSE's twin fuel accounts and single fuel gas accounts in Q3 2013 at this stage of the analysis.

¹³ We note that some suppliers omitted certain types of tariffs from the datasets they submitted (this only affected tariffs that would have been excluded from the analysis for reasons agreed with the parties). See Appendix B.

Table 1: Total number of electricity accounts (millions) included in the tariff data,¹⁴ and proportion of these accounts excluded from the analysis, by supplier in each quarter

	<i>Centrica</i>		<i>EDF Energy</i>		<i>E.ON</i>		<i>RWE npower</i>		<i>Scottish Power</i>		<i>SSE</i>	
	m	%	m	%	m	%	m	%	m	%	m	%
Q1 2012	[X]	11	[X]	8	[X]	17	[X]	1	[X]	13	[X]	92
Q2 2012	[X]	8	[X]	13	[X]	17	[X]	2	[X]	12	[X]	93
Q3 2012	[X]	5	[X]	15	[X]	18	[X]	2	[X]	12	[X]	92
Q4 2012	[X]	10	[X]	12	[X]	19	[X]	4	[X]	13	[X]	94
Q1 2013	[X]	5	[X]	12	[X]	22	[X]	6	[X]	16	[X]	94
Q2 2013	[X]	3	[X]	19	[X]	20	[X]	3	[X]	15	[X]	94
Q3 2013	[X]	3	[X]	18	[X]	19	[X]	0	[X]	15	[X]	94
Q4 2013	[X]	4	[X]	10	[X]	19	[X]	1	[X]	15	[X]	95
Q1 2014	[X]	4	[X]	19	[X]	14	[X]	1	[X]	11	[X]	86
Q2 2014	[X]	5	[X]	14	[X]	10	[X]	1	[X]	14	[X]	86

Source: CMA analysis.

Table 2: Total number of gas accounts (millions) included in the tariff data,¹⁵ and proportion of these accounts excluded from the analysis, by supplier in each quarter

	<i>Centrica</i>		<i>EDF Energy</i>		<i>E.ON</i>		<i>RWE npower</i>		<i>Scottish Power</i>		<i>SSE</i>	
	m	%	m	%	m	%	m	%	m	%	m	%
Q1 2012	[X]	11	[X]	8	[X]	20	[X]	0	[X]	6	[X]	95
Q2 2012	[X]	7	[X]	16	[X]	21	[X]	1	[X]	5	[X]	95
Q3 2012	[X]	5	[X]	18	[X]	22	[X]	2	[X]	6	[X]	94
Q4 2012	[X]	11	[X]	14	[X]	22	[X]	5	[X]	7	[X]	94
Q1 2013	[X]	5	[X]	9	[X]	26	[X]	7	[X]	10	[X]	94
Q2 2013	[X]	4	[X]	19	[X]	23	[X]	3	[X]	9	[X]	95
Q3 2013	[X]	4	[X]	18	[X]	21	[X]	0	[X]	10	[X]	100
Q4 2013	[X]	5	[X]	10	[X]	21	[X]	1	[X]	12	[X]	94
Q1 2014	[X]	5	[X]	23	[X]	16	[X]	1	[X]	10	[X]	94
Q2 2014	[X]	6	[X]	14	[X]	11	[X]	2	[X]	14	[X]	94

Source: CMA analysis.

Preliminary results

29. This section summarises the initial results of our quantitative analysis of potential gains from switching in two ways.
30. We note that, at this stage, we have summarised potential savings available at the mean consumption level. As detailed in paragraph 40, in the next stage of this analysis we plan to produce further summary statistics that make use of the full data we have available on the consumption distribution.

Summary statistics of potential savings – all tariff types

Proportion of domestic customers who could gain from switching

31. Table 3 shows the proportion of customers who could gain from switching, as a range across the Six Large Energy Firms,¹⁶ in each scenario. The figures

¹⁴ We note these numbers exclude some types of customers, for example, Independent Gas Transporter (IGT) accounts. See Appendix B for an explanation on the methodology underlying these figures.

¹⁵ We note these numbers exclude some types of customers, for example, Independent Gas Transporter (IGT) accounts. See Appendix B for an explanation on the methodology underlying these figures.

¹⁶ Excluding SSE in twin fuel and single fuel gas data in Q3 2013.

reflect the percentage of all dual fuel accounts in the cleaned dataset that are subscribed to tariffs for which the potential savings are larger than zero.

Table 3: Proportion of customers of the Six Large Energy Firms who can save by switching (at the mean consumption level, simple average over the Relevant Period; the range represents results for different suppliers)

		%	
	<i>Dual fuel</i>	<i>Single fuel electricity</i>	<i>Single fuel gas</i>
S1	56–67	57–72	2–64
S2	59–82	67–82	32–81
S3a	58–86	64–95	47–98
S3b	80–94	90–97	78–98
S4	94–99	97–99	91–100

Source: CMA analysis.

32. These results suggest that a large proportion of each of the Six Large Energy Firms’ domestic customers¹⁷ could gain from switching both internally (scenarios S1 and S2) and externally (scenarios S3a, S3b and S4). We observe the following:

- (a) External switching that includes independent suppliers offers savings to the largest proportion of the customer base. Almost all domestic customers of the Six Large Energy Firms we have analysed to date could gain from switching externally. This suggests that there have been low-priced tariffs offered by independent suppliers at each quarterly snapshot in the Relevant Period.
- (b) Internal switching also offers savings to a large proportion of the dual fuel or single fuel electricity customer base, typically over 50%. The proportion of single fuel gas customers who can gain appears to be lower for some suppliers.

33. We note that these proportions include any domestic customer who could gain at least £1 a year from switching. In the next stage of our analysis we intend to summarise the distribution of the size of potential savings in more detail.

Average potential savings for those domestic customers who could save

34. Table 4 shows the weighted average potential annual savings (expressed in GB pounds or as a percentage of the current annual bill) available to domestic customers of each of the Six Large Energy Firms,¹⁸ by scenario. The average is a simple average across all the quarters. Within each quarter the weighted

¹⁷ Excluding SSE in twin fuel and single fuel gas data in Q3 2013.

¹⁸ Excluding SSE in twin fuel and single fuel gas data in Q3 2013.

average is calculated for the mean consumption level, and the weights reflect the number of accounts that belong to each tariff with positive potential savings.¹⁹ These figures exclude domestic customers who cannot gain anything from switching.

Table 4: Weighted average potential savings for customers of the Six Large Energy Firms (mean consumption)

	£				%	
	<i>Dual fuel</i>	<i>Single fuel electricity</i>	<i>Single fuel gas</i>	<i>Dual fuel, % of bill</i>	<i>Single fuel electricity, % of bill</i>	<i>Single fuel gas, % of bill</i>
S1	44–95	34–50	10–42	3–7	5–8	1–6
S2	69–144	44–84	22–80	5–10	7–13	4–11
S3a	46–91	35–74	18–74	4–7	6–11	3–11
S3b	111–153	55–96	43–99	9–12	8–15	7–14
S4	158–234	92–141	87–171	13–17	15–22	13–24

Source: CMA analysis.

35. We note that for those customers who could gain from switching, potential savings are larger in scenarios which include tariffs offered by independent suppliers (ie S3b and S4). By way of illustration, the average potential annual savings from switching internally within the same supplier among the Six Large Energy Firms (ie S1 and S2) could fall in the range of £44–£144 (representing savings of between 3% and 10% of the current bill). Switching externally to a tariff with the same characteristics (ie S3a and S3b) offers potential annual savings between £46 and £153 (representing savings of 4 to 12% of the current bill). Switching externally to any tariff type (ie S4) could potentially save customers between £158 and £234 (representing savings of 13 to 17% of the current bill).

Summary statistics of potential savings – standard variable tariffs

36. Table 5 shows the weighted average potential savings (expressed in GB pounds or as a percentage of the bill) for dual fuel and single fuel customers subscribed to standard variable (evergreen) tariffs (SVT) offered by the Six Large Energy Firms²⁰ in each of the switching scenarios. The method of calculating the weighted average has been explained in paragraph 31. We note that in the majority of scenarios and quarters all SVT customers could save by switching.

¹⁹ In this way, tariffs with more accounts receive a proportionally larger weight in the average than tariffs with fewer accounts.

²⁰ Excluding SSE in twin fuel and single fuel gas data in Q3 2013.

Table 5: Weighted average potential savings for customers subscribed to standard variable (evergreen) tariffs of the Six Large Energy Firms

	£				%	
	<i>Dual fuel</i>	<i>Single fuel electricity</i>	<i>Single fuel gas</i>	<i>Dual fuel, % of bill</i>	<i>Single fuel electricity, % of bill</i>	<i>Single fuel gas, % of bill</i>
S1	52–102	28–51	8–42	4–8	4–8	1–6
S2	81–169	45–86	21–83	6–11	7–14	4–12
S3a	42–97	36–75	15–73	3–7	6–12	2–10
S3b	110–168	54–99	36–99	9–13	8–15	6–14
S4	183–278	91–146	84–168	14–19	15–23	14–24

Source: CMA analysis.

37. Average potential savings from switching internally (ie S1 and S2) available to domestic customers subscribed to the SVT fall within the range of £52 to £169 per year (representing around 4 to 11% of the current bill). These figures partly reflect the average discount that the Six Large Energy Firms' non-standard tariffs²¹ offered compared to their standard variable tariff. The average potential savings from switching externally to a tariff with the same characteristics (ie S3a and S3b) are between £42 and £168 a year (or 3 to 13% of the current bill). Switching externally to any type of tariff (ie S4) could save domestic SVT customers between £183 and £278 a year.
38. We note that a comparison of savings available to the SVT customers illustrated in Table 5 to all customers' savings illustrated in Table 4 may not be a like-for-like comparison, because, for example, a larger proportion of non-standard tariffs customers could be paying by direct debit (and thus already receiving larger discounts). We intend to assess the relative difference in savings between customers subscribed to SVT and non-standard tariffs in our regression analysis (see below).

Further work

39. The analysis currently excludes all of SSE's twin fuel data and a relatively large proportion of SSE's single fuel data. We intend to include as much of this data as possible in the next stage of the analysis. Improvements made to the quality of the datasets of other suppliers may also change the figures presented so far.
40. We are considering producing the following additional summary statistics and analysis:
- (a) A more detailed summary of the distribution of potential savings to domestic customers with different levels of energy consumption.

²¹ Excluding SSE in twin fuel and single fuel gas data in Q3 2013.

- (b) A comparison of the range of potential savings available to SVT customers, as compared to non-standard tariff customers.
 - (c) Comparing the potential savings in each region to the suppliers' regional market shares.
41. We may conduct further sensitivity analysis to test the robustness of our results to certain assumptions in the methodology. In particular, we are considering the following tests:
- (a) Accounting for exit fees in the interpretation of estimates of potential gains.
 - (b) Adjusting the assumptions on the joint distribution of dual fuel consumption of Economy 7 customers or standard-meter customers.
 - (c) Excluding tariffs that are about to be withdrawn or have just been introduced from the set of available tariffs on each snapshot date.
 - (d) Adjusting certain dimensions in the scenarios (see paragraph 16 and Table 1). In particular, we may consider the possibility of excluding online tariffs from some switching scenarios. We may also consider restricting the availability of paperless billing discounts in some switching scenarios.
 - (e) We will conduct the regression analysis as set out below.
42. We may also explore the possibility of assessing the potential savings for customers switching from single fuel to dual fuel.

Regression analysis

43. We are scoping a regression analysis which will allow us to determine whether certain tariff characteristics are correlated with the size of potential savings.²² As an illustration, a comparison of overall average savings available to customers subscribed to the SVT tariffs and all other customers may not be a correct quantification of the proportion of potential gains that is driven by higher SVT prices, as the two groups of customers in the comparison could potentially be very different. For example, a larger proportion of SVT customers may be pre-paying customers, and so would have relatively smaller savings available if fewer competitively-priced tariffs are on offer with a pre-payment option. To conduct a like-for-like comparison of savings available to SVT and non-standard tariff customers, one would

²² The purpose of this regression analysis is purely to uncover conditional correlations between tariff characteristics and potential savings. It does not reflect any economic model or causal relationships.

therefore need to compare the potential savings for pairs of customer groups that are similar in all measurable characteristics other than them being subscribed to the standard tariff.²³ Regression analysis does that in a tractable way.

44. We may wish to use the regression approach to test the following propositions:
- (a) Customers subscribed to the SVT have had equally large savings available to them throughout 2012–2014, as compared to the savings available to customers subscribed to comparable non-standard tariffs.
 - (b) Potential savings do not differ between customers paying their bills by different payment methods (assuming that these customers have a preference for their current payment method).
 - (c) Potential savings do not depend on the level of consumption.
 - (d) Economy 7 and standard meter tariff customers have had the same amount of savings available to them.
45. We intend to use ordinary least squares²⁴ to estimate a linear regression where the dependent variable is the estimated potential savings in pounds per year.^{25,26} The main explanatory variables will be as described in the paragraph above. We may then use combinations of the following control variables:
- (a) The supplier's identity.
 - (b) Region identity.
 - (c) Tariff type (variable, fixed and capped) indicators.
 - (d) Payment method indicators.
 - (e) An indicator for the standard variable tariff.

²³ The number of relevant characteristics here is large. There are six suppliers, 14 regions, three payment methods and payment types, different levels of consumption and a number of other tariff characteristics. A like-for-like comparison of savings to customer groups differing in only one characteristic would have to be performed for a very large number of sub-groups of customers.

²⁴ See, for example, Jeffrey M. Wooldridge *Introductory Econometrics: A Modern Approach*.

²⁵ Alternatively, we could use the value of potential savings expressed as a percentage of the current bill as the dependent variable.

²⁶ This analysis would include negative savings. That is, when a tariff is cheaper than any valid alternative in the market, the dependent variable would have a negative value.

- (f) An indicator for online tariffs.²⁷
 - (g) An indicator for Economy 7 tariffs.
 - (h) The level of consumption in kWh (one variable for either gas or electricity consumption in single fuel regressions, and two variables for consumption in both fuels for dual fuel regressions).
 - (i) An indicator of whether the tariff is a twin fuel tariff (for dual fuel regressions only).
46. We intend to estimate the equation separately for single fuel gas, single fuel electricity, and dual fuel, and in each case separately for each scenario. We propose to conduct the regression analysis by pooling all the quarters together. We consider that this approach is more reliable than estimating the equation for each quarter separately, as it uses more information, and is less affected by the specific set of tariffs that happened to be on offer on a particular snapshot date. However, we acknowledge that the quarterly analysis may be more flexible in that it allows for the possibility that the relative value of tariff characteristics changed over the Relevant Period.
47. We intend to then test the hypotheses set out above by observing the values and statistical precision of the estimated coefficients of the relevant variables.

²⁷ This may be sensitive to the precise definition of 'online' used. We note that the Six Large Energy Firms have used different definitions of online tariffs.

Appendix A: Definitions

1. This appendix lists the definitions used in the three datasets: the supplier tariff data, consumption data and Energylinx data on available tariffs.

Tariffs, accounts and customer types

2. 'Tariff' refers to the product that is being supplied to the customer. It contains a set of characteristics that describe the product, such as: fuel type (single fuel, dual fuel, twin fuel), the terms of the price in the contract (variable, fixed, capped), payment method (direct debit, credit, pre-payment and other), the price of the product, discounts directly associated with the product²⁸ and other relevant characteristics.
3. Where a household purchases both gas and electricity, it would have two 'accounts'. 'Customer' refers to a household which may have one or two accounts with one or two suppliers. Our datasets contain information on the number of accounts rather than customers.
4. We define three customer types with respect to their consumption of electricity and gas:
 - (a) 'Dual fuel' customers have electricity and gas accounts with the same supplier and receive a dual fuel discount.
 - (b) 'Twin fuel' customers have electricity and gas accounts with the same supplier but do not receive any dual fuel discount. For suppliers who do not offer dual fuel discounts or tariffs, all customers who have both electricity and gas accounts with them would be classified as twin fuel customers.
 - (c) 'Single fuel' customers have either an electricity or gas account with a given supplier. This includes customers who have accounts for electricity and gas with two different suppliers, and customers who only use one fuel (electricity).

²⁸ Discounts that are generally available to customers, that is, are not specifically attached to particular tariffs, are not included in this definition. Examples of such discounts include prompt payment discounts that are awarded to any credit customers paying their bill promptly, or paperless billing discounts offered to any customers choosing to view their bills online.

Regions

5. Tariffs and accounts for both gas and electricity have been allocated to the 14 PES regions, as defined in the table below.

Table A1: PES regions of GB

<i>Region</i>	<i>Also known as</i>
East Midlands	
East Anglia	Eastern
London	
Merseyside and North Wales	Manweb
Midlands	
North East	Northern
North West	Norweb
South Wales	SWALEC
South West	SWEB
North Scotland	Scottish Hydro
South Scotland	Scottish Power
South East	Seeboard
Southern	Southern Electric
Yorkshire	

Source: CMA definitions.

Tariff types and characteristics

6. Tariff types and characteristics are defined in the table that follows. We note that many of these characteristics are not mutually exclusive.

Table A2: Tariff types, characteristics and definitions

<i>Tariff characteristics</i>	<i>Definition</i>
Variable tariff	The price of a variable tariff is not guaranteed for any period of time and can be increased or decreased by the supplier. This includes tracker tariffs. Tariffs that have a fixed-term contract but do not include a promise of a certain price level (or up to a certain price level) over the contract period are also classified as variable.
Fixed tariff	A tariff that guarantees a certain fixed price until a defined end date, or for a defined period of time. This does not include tariffs that have an expiration date but allow the price to vary (see 'variable tariff').
Capped tariff	A tariff that guarantees a price no higher than a pre-determined level, until a defined end date or for a defined period of time.
Online tariff	<i>Definition used in the supplier tariff data:</i> A tariff that is available only to those subscribing online. Where the same tariff is available to customers using online and any other distribution channel (such as those contacting suppliers by telephone), these are not defined as online. We note that some tariffs that were marketed as online tariffs would not be classified as such using this definition, as they were also available through other sales channels. <i>Definition applied by Energylinx:</i> A tariff where the customer must supply an email address and complete the application to switch to the tariff online. This does not necessarily mean that the customer will receive paperless energy bills.
Social tariff	These were tariffs that were available to customers struggling to pay their bills. This has now been replaced by the Warm Home Discount (WHD) scheme. This may include other tariffs not mandated by the WHD but available to 'vulnerable' customers, whether it be due to low income, age, illness or disability, at a price which must be at most the same as the cheapest standard alternative for a customer within that region on each payment type.

Green tariff	A tariff that comes with a promise by the supplier to either meet the customer's usage with generation from renewable energy sources, or to contribute to environmental schemes. This should include all tariffs whose primary marketed attribute is being 'green' or 'sustainable', regardless of whether the 'green' status of that tariff has been accredited by certain external institutions.
Dynamic teleswitch tariff	Tariff suited for dynamic teleswitching meters (typically designed for households with electric heating).
Tracker tariff	A tariff which is usually set at a percentage above or below a variable tariff or a certain external index.
Economy 7 tariff	A tariff that offers cheaper energy for seven off-peak hours during the night. Available to customers who have an Economy 7 or similar meter.
Time of use tariff	A tariff that offers energy for different prices depending on the time of the day, other than the Economy 7 tariff above.
Bundled tariff	A tariff where additional services or products are supplied, such as boiler maintenance. This does not include bolt-ons that are not attached to specific tariffs.
White label tariff ²⁹	A tariff relating to an energy product produced by a supplier that other companies rebrand and market under their own name.
Win-back tariff	A tariff offered to retain existing customers at risk of switching that is not publicly marketed.
Exit fee	Exit fee applied if the customer changes tariff before it expires.

Source: CMA definitions.

²⁹ Centrica, EDF and SSE provided information on their white label tariffs in their datasets. All white label tariffs were assessed together with other tariffs of that specific supplier.

Appendix B: Data cleaning

1. This appendix summarises the structure of the supplier data (tariff and consumption datasets) and the Energylinx data of available tariffs, and the steps we took in cleaning these datasets for the analysis.

Tariff data

2. The tariff dataset includes information on the majority of domestic gas and electricity tariffs at each end of quarter snapshot from 31 March 2008 (Q1 2008) to 31 June 2014 (Q2 2014).
3. The datasets were constructed such that each row contains the tariff name, information on the number of accounts, prices, discounts, payment method, fuel type and other relevant characteristics of a specific gas or electricity tariff. Each tariff is listed in multiple rows to accommodate the following:
 - (a) Separate rows to indicate dual fuel, twin fuel and single fuel customers, and the associated prices and discounts.
 - (b) Separate rows for each payment method associated with a product (credit, debit, pre-payment or other), and the associated prices and discounts.
 - (c) Economy 7 and other time of use tariffs are also entered in rows that are separate from the equivalent standard meter tariffs, if any.

Exclusions

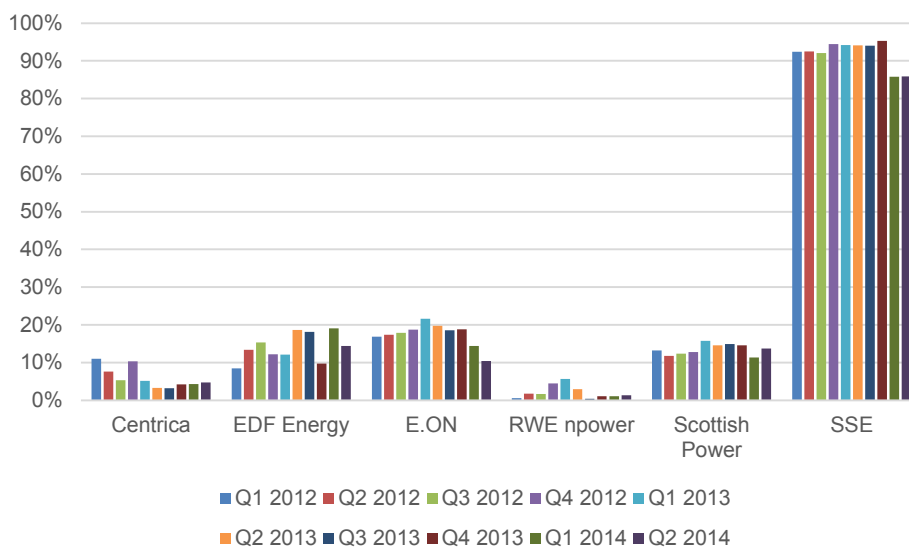
4. We have excluded the following customers from our analysis:
 - (a) All customers subscribed to green tariffs. Customers subscribed to such tariffs are likely to value non-monetary characteristics of the tariff more highly than most other customers.
 - (b) All customers subscribed to social tariffs or other tariffs that are restricted to certain types of (mostly vulnerable) households.
 - (c) All customers subscribed to time of use tariffs other than Economy 7. The pricing structures for these tariffs can vary considerably according to meter type and across suppliers, so in the interests of data tractability we did not collect the full price information of such tariffs.
 - (d) All Independent Gas Transporter (IGT) tariffs.

- (e) All customers subscribed to tariffs where the price includes a bundle of energy and non-energy products (for example, boiler maintenance).
 - (f) All customers subscribed to tariffs that had less than 1,000 accounts across all regions, within a given quarter.
 - (g) All customers with an uncommon payment method (flagged as 'other').
5. We have also excluded data points that were erroneous or inconsistent:
- (a) Missing data (unknown region, zero unit price).
 - (b) All tariffs that were erroneously recorded in the dataset and not relevant to our analysis (non-domestic tariffs or deemed tariffs).
 - (c) Tariffs where the price structure was inconsistent with the tariff description, or the price was not plausible (for example, extremely high).
 - (d) All tariffs introduced after the date of the quarterly snapshot, or those whose contract ended before the date of the quarterly snapshot.
 - (e) All fixed price and fixed term tariffs where the remaining contract length was less than three months at the date of the quarterly snapshot.
 - (f) All SSE's twin fuel tariffs, and all of SSE's gas data in Q3 2013. We will seek to include this data in the next stage of this analysis.
6. The graphs below summarise the proportion of accounts excluded from the analysis at this stage.³⁰

³⁰ We note that some suppliers excluded a list of tariffs from the datasets they submitted. This explains why for some suppliers (for example, RWE npower) the proportion of accounts excluded from the analysis appears to be smaller.

FIGURE B1

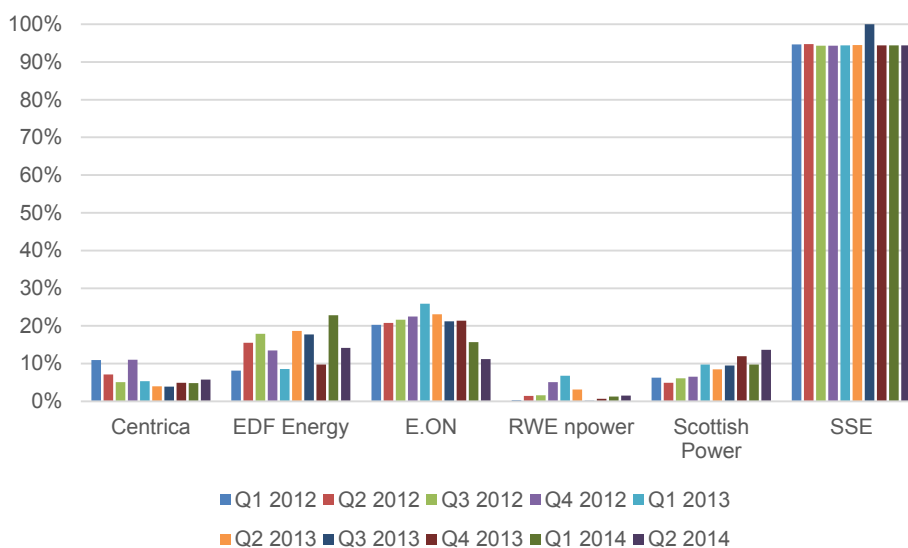
Proportion of electricity accounts excluded from the analysis



Source: CMA analysis.

FIGURE B2

Proportion of gas accounts excluded from the analysis



Source: CMA analysis.

7. We also excluded some tariffs from the dual fuel analysis where we were unable to combine gas and electricity tariffs to form a dual fuel bill. Table B1 shows the number of electricity accounts which we were unable to pair with gas tariffs.

Table B1: Number of electricity accounts which could not be matched to a gas tariff in the data

	<i>Centrica</i>	<i>EDF Energy</i>	<i>E.ON</i>	<i>RWE npower</i>	<i>Scottish Power</i>
Q1 2012	0	65	30	3,192	33
Q2 2012	0	160	37	2,513	22
Q3 2012	0	0	317	976	26
Q4 2012	0	0	623	921	17
Q1 2013	0	0	462	275	18
Q2 2013	0	0	978	271	16
Q3 2013	1	0	1,039	257	18
Q4 2013	5	0	776	81	371
Q1 2014	1	10,318	586	0	173
Q2 2014	2	7,558	166	0	253

Source: CMA analysis

Payment type categorisation

8. Payment types are grouped into four broad categories: direct debit (DD), credit (CR), pre-payment (PP) and Other. Accounts within the latter category were excluded from the analysis. The table below summarises how the categorisation was done in each of the Six Large Energy Firms' data.

Table B2: Payment type categorisation for the Six Large Energy Firms

<i>Supplier</i>	<i>Category</i>	<i>Payment type</i>
Centrica	DD	Direct Debit – VDD, Direct Debit – CPS Standing Order
	CR	CPS – APT (Annual Payment Tariff) CPS – QEP (Quarterly Equal Payments) Cash / Cheque Fuel Direct Pending Fuel Direct
	PP	Pre-Payment
	Other	Magnetic Card
EDF Energy	DD	Budget Direct Debit (Monthly) (DD) Direct Debit Whole Amount (Monthly) (DD-WAM) Direct Debit Whole Amount (Quarterly) (DD-WAQ) Direct Debit Payment Plan Direct Debit Whole Amount
	CR	Cash / Cheque Whole Amount (Monthly) (CC-WAM) Cash / Cheque Whole Amount (Quarterly) (CC-WAQ) Cash / Cheque (Monthly) (CC-M) Cash / Cheque (Quarterly) (CC-Q) Cash / Cheque Cash / Cheque Payment Plan Payment Plan Card Standing Order Payment Plan
	PP	Pre-Payment (PK) Domestic Power Key User

	DD	Fixed Direct Debit Variable Direct Debit
E.ON	CR	On Demand Payment On Demand Unmonitored Payment Card Regular Cash Payment Standing Order Pay Plus
	PP	Pre-Payment Pre-Payment Meter Driven Billing
	DD	Monthly Fixed Direct Debit Monthly Variable Direct Debit Quarterly Variable Direct Debit Legacy Monthly Fixed Direct Debit Legacy Receipt of Bill – Direct Debit
RWE npower	CR	DWP / Fuel Direct Half-Yearly Receipt of Bill Monthly Receipt of Bill Payment Card Easi Pay Quarterly Receipt of Bill Regular Payment Scheme Monthly Regular Payment Scheme Fortnightly Regular Payment Scheme Weekly Legacy Weekly / Fortnightly / Monthly Regular Payment Scheme by Card Legacy Receipt of Bill – Credit
	PP	Pre-Payment Card Legacy Pre-Payment Card
	DD	Direct Debit Bankers order
Scottish Power	CR	Receipt of Bill Direct Debit Cash Card (Monthly) and Card (Weekly) Receipt of Bill Bankers Order Receipt of Bill Cash Receipt of Bill Card Pay in Advance Fuel Direct Pre-Payment
	PP	
	DD	Direct Debit Variable Monthly Direct Debit Annual Direct Debit Standing Order
SSE	CR	Budget Card Booklet Credit Card Cheque Cash Debit Card Direct Credit BACS
	PP	Pay As You Go

Source: Correspondence between the CMA and the parties.

Calculating a dual fuel bill

9. To aid the calculation of dual fuel and twin fuel bills we asked the suppliers to indicate, for each electricity tariff, the gas tariff that was most commonly

subscribed to by dual fuel customers on the electricity tariff.³¹ In a small number of cases the information provided was erroneous (for example, the gas tariff referred to as the most common matching pair did not exist in that quarter or region) and these tariffs had to be excluded from the dual fuel analysis. In a small number of cases, where the corresponding gas tariff could not be found, we assumed that the gas tariff is the standard variable evergreen tariff.

10. Our methodology for combining electricity and gas tariffs assumes that both accounts have the same payment method. Most of the resulting dual fuel bills are also of the same tariff type (variable, fixed or capped), but a small number of accounts have different types for gas and electricity.³² Where this is the case, we use the electricity tariff's characteristics in conducting the search for the cheapest alternative tariff.

Contract length

11. Fixed, capped and variable fixed term tariffs can have either a fixed termination date (regardless of when the customer subscribed) or fixed duration of the contract that takes effect from the time the customer subscribes to the tariff. For tariffs with the former type of contract, we calculated the contract length as the difference, in months, between the date the tariff was first introduced into the market and the date the contract terminates. For tariffs which were in the market for a long period of time, this may overestimate the actual length of the contract.

Consumption data

12. The consumption dataset includes information on annual gas and electricity usage of suppliers' customers at the 10th, 25th, 50th, 75th and 90th percentiles and mean, by PES region, tariff type (variable, fixed, capped), payment method (credit, direct debit, pre-payment) and whether or not the tariff is an Economy 7 tariff (for electricity only). The data we collected does not distinguish between single fuel and dual fuel, and does not include

³¹ The data also indicates which electricity tariff is most commonly subscribed to by customers on a gas tariff. However, at this stage of the analysis we have not used this information.

³² This occurs for Centrica in Q4 2013 (7,444 accounts), Q1 2014 (7,304 accounts) and Q2 2014 (6,546 accounts); EDF Energy in Q4 2013 (247,262 accounts); E.ON in Q1 2012 (231 accounts), Q2 2012 (217 accounts), Q3 2012 (206 accounts), Q4 2012 (876 accounts), Q1 2013 (1,363 accounts), Q2 2013 (1,563 accounts), Q3 2013 (2,444 accounts), Q4 2013 (3,706 accounts), Q1 2014 (4,693 accounts) and Q2 2014 (5,310 accounts); Scottish Power in Q1 2012 (6,648 accounts), Q2 2012 (10,175 accounts), Q3 2012 (8,372 accounts), Q4 2012 (8,768 accounts), Q1 2013 (10,357 accounts), Q2 2013 (8,392 accounts), Q3 2013 (10,333 accounts) and Q4 2013 (8,474 accounts). We intend to verify this and correct it, where necessary, in the next stage of the analysis.

customers on green, social tariffs and tariffs with uncommon payment methods. For Economy 7 tariffs, we also collected regional data on the proportion of total consumption that is consumed during the off-peak and peak periods.

13. All consumption figures are derived from EAC³³ (electricity) and AQ³⁴ (for gas) measures on an annual basis.³⁵
14. When calculating a dual fuel bill, we assume that a dual fuel customer's consumption of each fuel lies in the same part of the consumption distribution for that tariff family. That is, the bill for the 25th consumption percentile uses the 25th percentile of the electricity distribution and the 25th percentile of the gas distribution for that tariff.

Energylinx data

15. The Energylinx dataset lists tariffs offered by all suppliers (the Six Large Energy Firms as well as independents) to domestic customers for electricity and gas at each quarterly snapshot date. The dataset does not include time of use tariffs other than Economy 7, green tariffs and social tariffs. The structure of the dataset is otherwise the same as that of the supplier tariff data.
16. The table below summarises the way payment methods were categorised in this dataset. We have excluded the category 'other' from all switching scenarios.

³³ Estimated Annual Consumption.

³⁴ Annual Quantity.

³⁵ As at 31 December 2012, 31 December 2013 and 30 June 2014.

Table B3: Payment type categorisation and descriptions from the Energylinx dataset

<i>Payment type</i>	<i>Description</i>	<i>Category</i>
Monthly Direct Debit	Equal monthly direct debits based on a set proportion of the annual billing amount.	DD
Quarterly Direct Debit	This effectively is a quarterly bill that is then paid in full, usually around 14 days after it is sent.	DD
Standing Order	Rarely available, this is when the customer sets a specific payment from their account every month.	CR
Quarterly Cash/Cheque	Billed every quarter and paid by cash or cheque.	CR
Prepayment Meter	Where the customer has a meter that requires paying for energy before it is delivered.	PP
Advance Payment	Where the customer pays in advance for their energy delivery.	This does not apply to any tariff within the time frame for the project.
Monthly Card	The customer will pay towards their future energy bills by paying on a monthly basis.	Other
Monthly Debit/Credit Card	Similar to monthly cash/cheque in that the customer is provided with a bill on a monthly basis and payment is made by debit card and continuous payment authority has been provided.	CR
Monthly Variable Direct Debit	Where the monthly direct debit varies on a month to month basis, typically changed due the customer receiving a monthly bill based on actual consumption.	DD
Quarterly Equal Payments	Payment made each quarter, typically in advance, set at one quarter of their expected annual energy spend.	Other
Monthly Cash/Cheque	Also known as 'Cash Cheque Whole Amount Monthly' where the customer is paying for their actual consumption for the month.	CR
Regular Cash	This may be weekly, fortnightly or monthly.	CR
Quarterly Debit Card	Similar to quarterly cash/cheque in that the customer is provided with a bill on a quarterly basis and payment is made by debit card and continuous payment authority has been provided.	CR

Source: Correspondence between the CMA and Energylinx.