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Report

Price cap – Changes to the wholesale methodology – Distributional impacts

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This report outlines our distributional analysis of moving to quarterly price cap updates, reducing the notice period and updating the wholesale methodology to include backwardation costs. These proposals are outlined in our May 2022 statutory consultation on changes to the wholesale methodology.

Contents

Executive Summary

We are currently consulting on proposals to change the default tariff cap methodology to deal with the unprecedented increase in wholesale price levels and volatility. Our proposal is to move to quarterly price updates and to a shorter notice period of 25 working days between setting the cap level and it coming into effect. We are also proposing to update the wholesale methodology to include backwardation costs. These proposals are set out in full in the statutory consultation.[1]

Our distributional impact analysis based on stochastic modelling of current energy prices forecasted forward shows that customers are expected to be better off under the quarterly updates, reduced notice period and backwardation costs approach compared to the status quo.

The proposed changes to the price cap wholesale methodology result in an average £43 annual energy bill saving, with households in the top income decile saving an average of £55 annually. This reflects generally higher levels of energy consumption relative to the bottom income decile households who save an average of £40 annually. To note, these numbers marginally differ from those presented in Chapter 3 (3.26) of the statutory consultation. This reflects modelling refinements made since the version used for the statutory consultation.

We run the same analysis with an alternative forward curve which describes stable market conditions and found virtually no impact of the changes in wholesale methodology on consumers. This is consistent with the fact that our proposals have greatest effect in times of volatility and high prices, such as those we are currently experiencing.

This document summarises our approach and presents results on the distributional impacts of changes to the wholesale methodology on different consumer groups.

[1] Ofgem (2022), Price cap - Statutory consultation on changes to wholesale methodology. https://www.ofgem.gov.uk/publications/price-cap-statutory-consultation-changes-wholesale-methodology

1. Introduction

Policy context

1.1. The default tariff cap (the 'cap') operates using a 6-2-12 [6] wholesale price indexation formula: a six-month observation window, two-month difference between the close of the observation window and start of the cap period, 12-month hedge and six-month cap period.

1.2. Our proposal is to update the cap quarterly with a shorter notice period using a 3-1.5-12 [3] wholesale price indexation formula: three-month observation window; 1.5 months (30 working days) lag between the end of the observation window and the start of the cap; 12-month price reference period, and three-month cap period.

1.3. We are also proposing to change the cap wholesale methodology to include backwardation costs. Backwardation costs occur when the forward period for the price suppliers can charge is different to the forward period a nominal supplier would use for its hedging. When the market is in backwardation, the forward prices in the later six months are lower than in the first six (the actual cap period). It brings the cap level below the cost to suppliers of purchasing that energy for customers (for that cap period). More on backwardation costs can be found in the statutory consultation as well as in Chapter 3 of this report.[2]

Distributional impact analysis

1.4. In this document, we assess the impact on different consumer groups from moving from the current twice-yearly cap updates under a 6-2-12 [6] index to quarterly cap updates and reduced notice period under a 3-1.5-12 [3] index starting on 1 October 2022 (Chapter 2). We then assess separately the impact on different consumer groups from updating the wholesale methodology to include backwardation costs (Chapter 3) and from assuming an alternative forward curve reflecting a stable market counterfactual (Chapter 4).

[2] Ofgem (2022), Price cap - Statutory consultation on changes to wholesale methodology. https://www.ofgem.gov.uk/publications/price-cap-statutory-consultation-changes-wholesale-methodology

1.5. To this end, Ofgem commissioned NERA to compare the impacts of the changes in the cap wholesale methodology as presented in the statutory consultation on different consumer groups. The distributional impact analysis follows the framework set out in the Ofgem guidance published in May 2020. The 'guidance' hereafter structures the assessments of the quantitative impacts of economic regulation on consumers.[3]

1.6. For this quantitative analysis, we rely on stochastic modelling of current energy prices forecasted forward to appraise how the changes in wholesale methodology affect different customer groups.[4]

1.7. As further explained below, by relying on data on how household consumption varies with income decile, we quantify three metrices: the energy bill impact of the cap change in absolute terms (in pounds); the energy bill impact in percentage terms (bill impact as a % of income); and the "equity-weighted bill impact" (in pounds) by applying distributional weights that allow capturing the fact that an additional pound of income on a low-income household is worth more than to a high-income household, all else equal.

1.8. In line with the Ofgem guidance,[5] we calculate these distributional impacts on the following categories of customers: Statutory groups that GEMA must have regard to when making policy decisions (pensioners; disabled; and those in rural areas)[6] and the 13 consumer archetypes, each representing a typical GB household and grouped together based on common characteristics and socio-economic data. The characteristics include age, disability status, employment status, number of dependents, income, and energy consumption. The archetypes were developed by the Centre for Sustainable Energy in 2014 and updated in 2020.

[3] Ofgem (2020), Assessing the distributional impacts of economic regulation. Link: https://www.ofgem.gov.uk/sites/default/files/docs/2020/05/assessing_the_distributional_impacts_of_economic_regulation_1.pdf
[4] Stochastic modelling is a form of statistical modelling that uses one or more random variables to estimate the probability of various outcomes under different conditions.
[5] Ofgem (2020) Assessing the distributional impacts of economic regulation, paragraph 5. https://www.ofgem.gov.uk/sites/default/files/docs/2020/05/assessing_the_distributional_impacts_of_economic_regulation_1.pdf
[6] (2020) Impact Assessment Guidance https://www.ofgem.gov.uk/publications/impact-assessment-guidance

Your feedback

General feedback

1.9. We believe that feedback is at the heart of good policy development. We are keen to receive your comments about this report. We'd also like to get your answers to these questions:

1. Do you have any comments about the overall process of this report?
2. Do you have any comments about its tone and content?
3. Was it easy to read and understand? Or could it have been better written?
4. Are its conclusions balanced?
5. Did it make reasoned recommendations for improvement?
6. Any further comments?

Please send any general feedback comments to pricecapchanges@ofgem.gov.uk

2. Quantitative impact on consumers from moving to quarterly updates

Section summary

We find that energy bills will be reduced from updating the cap to follow the quarterly updates approach. Average consumers will save £46 annually, although low income households benefit less (£43) than high income households (£56). For further analysis we include results weighted by income distribution to understand the marginal utility across income deciles and we consider the impacts against the consumer archetypes.

Overview

2.1. In this section, we quantitatively assess the impact on different consumer groups from moving to quarterly updates from 1 October 2022 relative to maintaining the status quo (twice-yearly updates) for the typical low, medium and high domestic consumption values (TDCVs) for gas and electricity, as published by Ofgem.[7] [8]

2.2. Our analysis suggests that the introduction of quarterly updates decreases on average energy bills of households with a medium TDCV (2,900kWh for electricity and 12,000kWh for gas) by £44 annually, equivalent to £0.0029 per unit of energy. In percentage terms this equates to around a 1.7% saving.[9]

2.3. It follows that the changes in wholesale methodology proposed in the statutory consultation lower the per unit price of energy for all consumers on default and standard variable tariffs, such that the total absolute level of savings is increasing (or decreasing) with energy consumption. On the assumption that households do not adjust their energy consumption in response to energy price changes and based on the latest data on energy

[7] Ofgem (2020) Decision on revised Typical Domestic Consumption Values for gas and electricity and Economy 7 consumption split. Decision for Typical Domestic Consumption Values 2020 | Ofgem
[8] Ofgem (2021) Decision on postponing the update of the Typical Domestic Consumption Values for gas and electricity and Economy 7 consumption split.
[9] This value slightly differs from the average value reported below. This is because this value is calculated using the TDCVs, whereas in comparison the below average is calculated as a average across different groups of consumers.

expenditure published by the ONS,[10] we estimate that savings correspond to a 4% reduction in the energy bills of default and standard variable tariff customers, on average.[11]

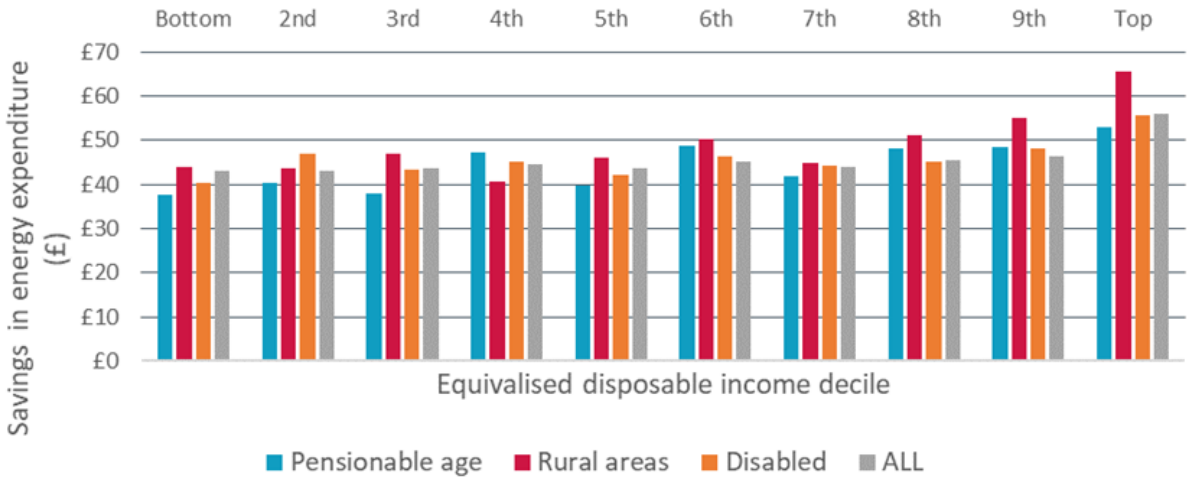
Distributional impacts on statutory consumer groups

2.4. Using the latest data from the ONS Living Costs and Food Survey on energy expenditure by income, we estimate the total £ saving in energy expenditure across each statutory consumer groups.

[10] ONS (2020) Disposable income and energy expenditure for different fuel type households and household types, UK: financial year ending 2018. Number of gas and electricity consumers and average disposable income and energy expenditure for various groups of individuals by income quintile and decile, UK, for the financial year ending 2018. The dataset contains energy expenditure (£) levels per equivalised income decile for different categories of consumers.

[11] To estimate the % reduction in energy bills we take the following steps: Step 1) We calculate the bill impact for the average TDCV customer for both gas and electricity. For this distributional analysis, we rely on the mean savings across our stochastic modelling simulations and convert those from 2022 prices into 2017/18 prices using ONS RPI data to ensure consistency with the input data on income and energy expenditure. Step 2) We then estimate the bill impact of the policy for any level of consumption. Using the TDCVs entered in Step 1, we estimate the relationship between savings and consumption using a simple OLS regression. The result in an estimated savings function with a slope parameter equal to 0.0026 and intercept equal to 0.000. Step 3) Given the savings per unit of energy, we calculate the bill impact for the different categories of consumers and income levels by substituting their consumption profiles into the above equation from Step 2. For example, a household of pensionable age in the bottom decile has an implied consumption of 15,599kWh, and so their savings is calculated as £ savings = intercept + slope * consumption = 0 + 0.0026*15,599 = £40. Step 4) Given the bills impacts calculated at Step 3, we can calculate the % impact on energy bills for each consumer group and income decile, as well as the average across customers, by comparing the energy spend pre- and post-policy introduction.

Figure 2.1: Impact of quarterly updates on electricity and gas bills, by categorical group and equivalised income decile, in comparison to the status quo



Note: Values are reported in 2017/18 prices. Source: Ofgem analysis

Bar graph of the impact of quarterly updates across pensionable age, rural area, disabled, and all customers, indicating that those in the equivalised bottom income decile will make savings under the quarterly update methodology.

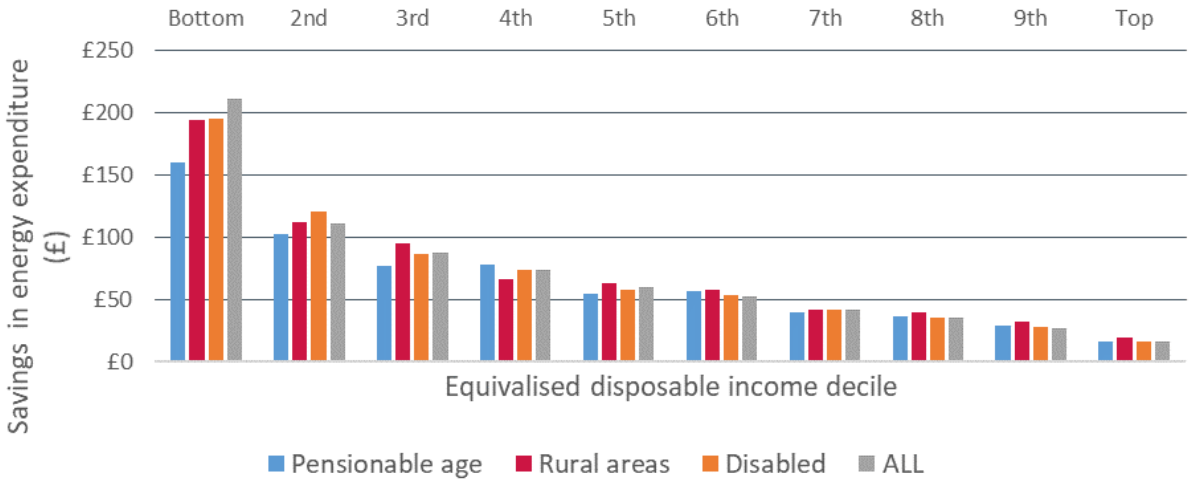
2.5. As Figure 2.1 shows, moving to quarterly updates results in approximately £46 energy bill savings on average across all consumer groups, with households in the top income decile saving up to £56 annually. This reflects generally higher levels of energy consumption relative to the bottom income decile households who save £43 on average annually.[12] Our analysis also suggests that within each decile there is some variation in the savings of the statutory groups of consumers relative to the average. In general, across all deciles we note that consumers located in rural areas save the most in absolute terms (around £49 annually) relative to the other statutory customer groups (pensioners and disabled). However, overall differences across statutory groups of consumers are relatively small.

2.6. We present 'distributionally weighted' results to reflect the decreasing marginal utility of income, such that a £1 increase in income for a low-income individual is worth more than the same increase for a higher income individual. This is based on the principle

[12] Note all £ values are reported in 2017/18 prices, unless otherwise stated.

that the value of an additional pound of income may be higher for a low-income recipient than for a high-income recipient. Distributionally weighted analysis allows for an alternative measure of the benefit from the changes in the wholesale methodology. Here, we consider the income value added from the change in cap update approach as opposed to the absolute monetary benefit expressed in section 2.5. These weights have been calculated in line with HMT's Green Book guidelines, where more on distributional weights can be found.[13]

Figure 2.2: Impact of quarterly updates on electricity and gas bills, by categorical group and equivalised income decile (equity adjusted results)



Note: Values are reported in 2017/18 prices, but it should be noted that these figures are not real pounds, but adjusted savings to capture the higher value of an additional pound of income to a low-income household than a high-income household. Source: NERA / Ofgem analysis.

Equity adjusted bar graph of the impact of quarterly updates on savings in energy expenditure across pensionable age, rural area, disabled, and all customers, indicating that those in the equivalised bottom income decile will make the greatest savings under the quarterly update methodology.

[13] HM Treasury, The Green Book: Appraisal and evaluation in central government (2022) Link: https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent

2.7. Figure 2.2 shows that distributionally weighted annual savings for the bottom income decile households are equal to £211 on average, much higher than in previous findings. The number is higher because we account for the differences in the value of an additional pound across income levels, hence the increase from the £43 average annual savings discussed above. This is consistent with the fact that distributionally weighted results increase the absolute monetary benefit for cost to lower income households. However, to note, the absolute bill saving would still be the original, lower figure presented above.

2.8. Similarly, we find that under the quarterly updates approach, high income households save £16 on average per year. This is compared to the £56 savings discussed above with our non-weighted results (see 2.5). Distributionally weighted results describe alternate impacts of the quarterly updates approach by capturing the decreasing marginal utility of income, hence the reduction in high income households' savings measured here. In other words, an additional £1 is less valuable for consumers in the highest income decile compared to lower deciles.

2.9. Also, applying distributional weights displays a variation in savings within each income decile across statutory groups of consumers. Unlike the unweighted results shown in Figure 2.1 above, we now observe that consumers in the disabled statutory group achieve the highest levels of savings across all income deciles (around £56 on average annually), followed by the pensionable age consumers and then consumers in rural areas.

Distributional impacts on Ofgem's consumer archetypes

2.10. The above analysis presents the distributional impacts for the statutory groups of consumers Ofgem must have regard to when assessing alternative policy options. In this section, we expand this analysis to cover a wider set of consumers grouped into 'archetypes' which differ in a range of socioeconomic and behavioural characteristics and provide a better reflection of the GB energy consumers than the typical average consumer.

2.11. In its latest update in 2020 on behalf of Ofgem, the Centre for Sustainable Energy (CSE) identified 13 archetypes categorised by socioeconomic and attitudinal attributes and information around income and energy consumption.[14] These archetypes are included in

[14] CSE (2020) Consumer Archetypes for Ofgem's vulnerability strategy. Consumer Archetypes for Ofgem's Vulnerability Strategy | Centre for Sustainable Energy (cse.org.uk)

Ofgem's guidance where a full description of the consumer archetypes and their attributes can be found.[15]

2.12. Following the approach outlined above, we calculate the average savings in £ and as a percentage of income for each consumer archetype from moving to quarterly updates relative to the status quo. We only report results for consumer archetypes whose heating fuel is gas and consume both gas and electricity.

Table 2.1: Annual £ savings per consumer archetype (average and total) from introducing a 3-1.5-12 [3] approach

Archetype	Key attributes	Estimated no. of GB households	Average savings (negative = cost) per household	Average savings (negative = cost) as a % of disposable income	Total savings (negative = cost) across households (£m)
A1	High incomes, owner occupied, working age families, full time employment, low consumption, regular switchers	2,761,000	£33	0.07%	£92
A2	High incomes, owner occupied, middle aged adults, full time employment, big houses, very high consumption, solar PV, environmental concerns.	2,916,000	£66	0.12%	£192
B3	Average incomes, retired, owner occupied - no mortgage, electric vehicles, environmental concerns, lapsed switchers, late adopters.	3,674,000	£49	0.17%	£181
B4	High incomes, owner occupied, part-type employed, high consumers, flexible lifestyles, environmental concerns.	2,323,000	£51	0.13%	£118
C5	Very low incomes, single female adult pensioners, non-switchers, prepayment meters, disconnected (no internet or smart phones).	1,922,000	£36	0.24%	£69
D6	Low income, disability, fuel debt, prepayment meter, disengaged, social housing, BME households, single parents.	1,547,000	£42	0.23%	£65
D7	Middle aged to pensioners, full time work or retired, disability benefits, above average incomes, high consumers.	1,205,000	£51	0.15%	£62
E8	Low income, younger households, part-time work or unemployed, private or social renters, disengaged non-switchers.	2,356,000	£40	0.17%	£95
E9	High income, young renters, full time employments, private renters, early adopters, smart phones	3,093,000	£35	0.10%	£109

Note: Values are reported in 2017/18 prices. Source: NERA / Ofgem analysis.

[15] Ofgem (2020), Impact Assessment Guidance. https://www.ofgem.gov.uk/publications/impact-assessment-guidance

Table of the impact of quarterly updates across 13 consumer archetypes, indicating that those in the most vulnerable consumer groups will make savings under the quarterly update methodology

2.13. As Table 2.1 shows, the introduction of quarterly updates allows consumers with high income and high energy consumption (consumer archetype A2) to achieve the highest absolute £ saving (of around £66 on average annually), reflecting the fact that savings increase proportionally with energy consumption.

2.14. Despite the larger value in absolute terms, the introduction of quarterly updates will benefit the most consumer archetypes with low incomes, on a prepayment meter, that are either pensioners or have disabilities and have no internet connection (see consumer archetypes C5 and D6). As Table 2.1 shows, these consumers will save 0.24% of their disposable income on average per year with the quarterly updates approach compared to only 0.12% for higher income consumer archetypes.

3. Quantitative impact on consumers from moving to quarterly updates including backwardation costs

Section summary

In this chapter, we analyse the impact of moving to quarterly updates and updating the wholesale methodology to include backwardation costs. We use the same approach outlined in Chapter 2 to assess the impact on consumer's energy bills. We find that energy bills will be reduced by updating the cap following the quarterly updates approach with backwardation costs. Overall, consumers save less under this approach than they would if backwardation costs were not included.

Overview

3.1. As defined in Chapter 1, backwardation costs arise from the difference in energy prices between winter and summer. These costs occur when the forward period for the price suppliers can charge is different to the forward period a nominal supplier would use for its hedging. When the market is in backwardation, the forward prices in the later six months are lower than in the first six (the actual cap period). It brings the cap level below the cost to suppliers of purchasing that energy for customers (for that cap period).

3.2. In a stable market, backwardation costs net out against its reciprocal, contango. However, the current market volatility means that may no longer hold true. Given backwardation is a cost that suppliers incur to serve their customers, we propose to include it in the wholesale methodology. As described in further details in the statutory consultation, we propose to calculate backwardation costs using an ex-ante approach, meaning that suppliers can start to recover the cost at the time they incur it rather than waiting for an allowance after the fact.[16]

3.3. We propose to spread the recovery of backwardation costs over a 12-month period by applying the quarterly backwardation figure to four consecutive quarterly cap periods which are calculated as an annualised figure. We propose to set a £9 deadband (£4 for

[16] Ofgem (2022), Price cap - Statutory consultation on changes to wholesale methodology. https://www.ofgem.gov.uk/publications/price-cap-statutory-consultation-changes-wholesale-methodology.

electricity and £5 for gas) to ensure the wholesale methodology does not capture backwardation costs when the market is broadly stable and backwardation is largely offset by contango.

3.4. The deadband is a threshold, which means that if the costs of backwardation are under £9, the wholesale methodology will not include backwardation costs. On the contrary, if the backwardation costs exceed £9, there will be an allowance of the difference.

3.5. In this section, we quantitatively assess the impact on different consumer groups from moving from twice-yearly updates to quarterly updates from 1 October 2022 with backwardation costs. For this analysis, we assume a symmetrical deadband equal to £9 per customer per year for the quarterly updates, and a £16 per customer per year for the twice-yearly updates in line with our February decision.[17] We assume the deadband does not vary by consumption level.

3.6. Following the same approach as set out in Chapter 2, we estimate the £ savings from introducing quarterly updates relative to maintaining the status quo while updating the wholesale methodology to include backwardation costs for the typical low, medium and high domestic consumption values (TDCVs) for gas and electricity as published by Ofgem.[18] [19]

3.7. Our analysis suggests that the introduction of quarterly updates decreases on average energy bills of households with a medium TDCV (2,900kWh for electricity and 12,000kWh for gas) by £39 on average annually, or approximately £0.0026 per unit of energy.[20]

3.8. We note that updating the wholesale methodology to include backwardation costs with a fixed deadband introduces non-linearity in the savings, i.e., the per unit of energy

[17] Ofgem (2022), Price Cap - Decision on the potential impact of increased wholesale volatility on the default tariff cap https://www.ofgem.gov.uk/publications/price-cap-decision-potential-impact-increasedwholesale-volatility-default-tariff-cap.
[18] Ofgem (2020) Decision on revised Typical Domestic Consumption Values for gas and electricity and Economy 7 consumption split. Decision for Typical Domestic Consumption Values 2020 | Ofgem
[19] Ofgem (2021), Decision on postponing the update of the Typical Domestic Consumption Values for gas and electricity and Economy 7 consumption split. Decision for Typical Domestic Consumption Values 2021 | Ofgem
[20] This value slightly differs from the average value reported below. This is because this value is calculated using the TDCVs, whereas in comparison the below average is calculated as a average across different groups of consumers.

saving increases (decreases) with the level of consumption. Hence, consumers using less energy have a lower per unit of energy saving (£0.0022 per unit) and therefore a lower total annual saving (£22) and consumers with a high TDCV benefit from a higher per unit of energy saving (£0.0029 per unit) and therefore a higher total annual saving (£61).

3.9. On the assumption that households do not adjust their energy consumption in response to energy price change, based on the latest data on energy expenditure published by the ONS[21] we estimate that savings correspond to roughly a 4% reduction in the energy bills of default and standard variable tariff customers, on average.[22]

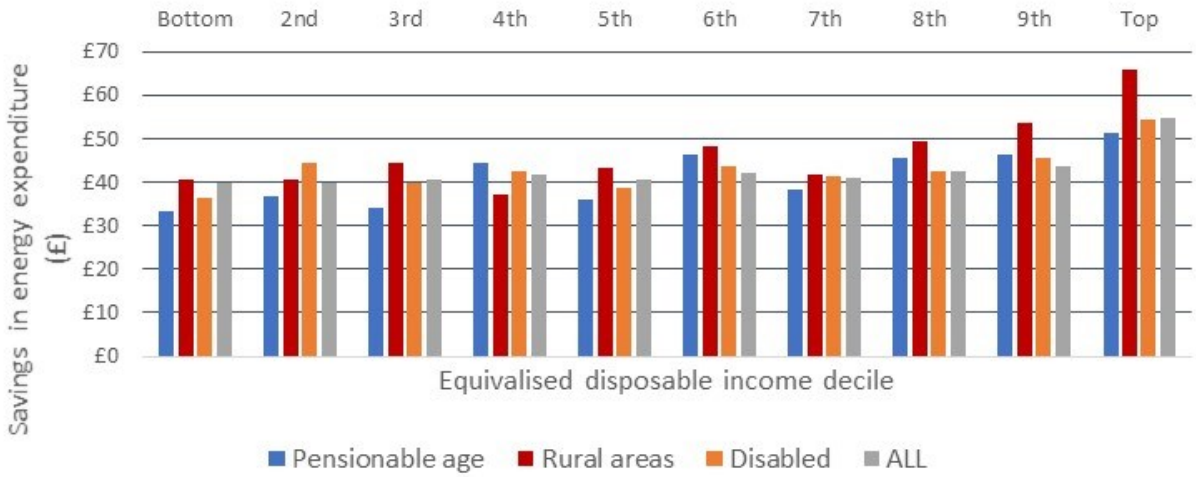
Distributional impacts on statutory consumer groups

3.10. Using the latest data from the ONS Living Costs and Food Survey on energy expenditure by income, we estimate the total £ saving in energy expenditure across each statutory customers groups.

[21] ONS (2020), Disposable income and energy expenditure for different fuel type households and household types, UK: financial year ending 2018. Number of gas and electricity consumers and average disposable income and energy expenditure for various groups of individuals by income quintile and decile, UK, for the financial year ending 2018. The dataset contains energy expenditure (£) levels per equivalised income decile (quintile) for different categories of consumers, including across all consumers.

[22] To estimate the % reduction in energy bills we follow the Ofgem guidance, namely: Step 1) We calculate the bill impact for the average TDCV customer for both gas and electricity. For this distributional analysis, we rely on the mean savings across our stochastic simulations and convert those from 2022 to 2017/18 prices using ONS RPI data to ensure consistency with the input data on income and energy expenditure. Step 2) We then estimate the bill impact of the policy for any level of consumption. Using the TDCVs entered in Step 1, we estimate the relationship between savings and consumption using a simple OLS regression. The result in an estimated savings function with a slope parameter equal to 0.0030 and intercept equal to -10.57. Step 3) Given the savings per unit of energy, we calculate the bill impact for the different categories of consumers and income levels by substituting their consumption profiles into the above equation from Step 2. For example, a household of pensionable age in the bottom decile has an implied consumption of 15,599kWh, and so their savings is calculated as £ savings = intercept + slope * consumption = -10.57 + 0.0030*15,599 = £37. Step 4) Given the bills impacts calculated at Step 3, we can calculate the % impact on energy bills for each consumer group and income decile, as well as the average across customers, by comparing the energy spend pre- and post-policy introduction.

Figure 3.1: Impact of quarterly updates with backwardation costs on electricity and gas bills, by categorical group and equivalised income decile, in comparison to the status quo



Note: Values are reported in 2017/18 prices. Source: NERA / Ofgem analysis.

Bar graph of the impact of quarterly updates with backwardation costs across pensionable age, rural area, disabled, and all customers, indicating that those in the equivalised bottom income decile will make savings under the quarterly update with backwardation costs methodology

3.11. As Figure 3.1 shows, moving to quarterly updates with backwardation costs result in £43 energy bill savings on average across all consumer groups, with households in the top income decile saving up to £55 annually. This reflects generally higher levels of energy consumption relative to the bottom income decile households who save £40 annually.[23]

3.12. To note, these numbers marginally differ from those presented in Chapter 3 (3.26) of the statutory consultation. This reflects modelling refinements made since the version used for the statutory consultation.

3.13. Our analysis also suggests that within each decile there is some variation in the savings of the statutory groups of consumers relative to the average. In general, across all deciles we note that consumers located in rural areas save the most in absolute terms (£47

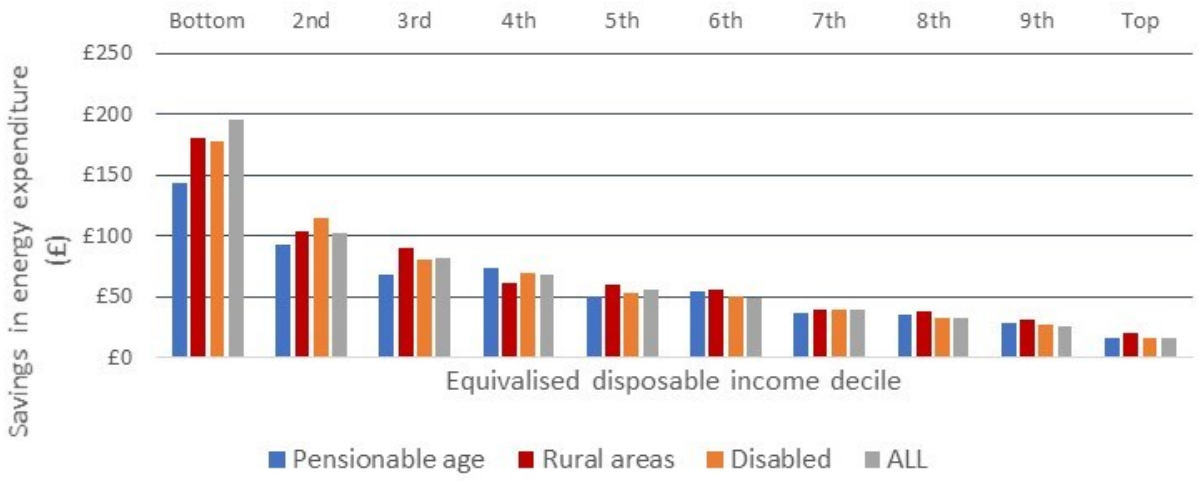
[23] Note all £ values are reported in 2017/18 prices, unless otherwise stated.

annually) relative to the other statutory consumer groups (pensioners and disabled). However, overall differences across consumer statutory groups are relatively small.

3.14. As in Chapter 2, we present 'distributionally weighted' results to reflect the decreasing marginal utility of income, such that a £1 increase in income for a low income individual is worth more than the same increase for a higher income individual.

3.15. Figure 3.2 shows that by applying the distributional weights, we find that the impact of moving to quarterly updates with backwardation costs result in a much higher value of savings for the bottom income decile consumers (£195 on average annually compared to £40 unweighted), relative to the top income decile consumers (around £16 on average annually compared to £55 unweighted). Also, applying distributional weights displays a variation in the savings within each income decile across statutory groups of consumers. Unlike the unweighted results shown in Figure 3.1, we now observe that consumers in the disabled statutory group achieve the highest levels of savings across all income deciles (£52 on average annually), followed by the pensionable age consumers and then consumers in rural areas.

Figure 3.2: Impact of quarterly updates with backwardation costs on electricity and gas bills, by categorical group and equivalised income decile (equity adjusted result)



Note: Values are reported in 2017/18 prices, but it should be noted that these figures are not real pounds, but adjusted savings to capture the higher value of an additional pound of

income to a low-income household than a high-income household. Source: NERA / Ofgem analysis.

Equity adjusted bar graph of the impact of quarterly updates with backwardation costs on savings in energy expenditure across pensionable age, rural area, disabled, and all customers, indicating that those in the equivalised bottom income decile will make the greatest savings under the quarterly update with backwardation methodology.

Distributional impacts on Ofgem's consumer archetypes

3.16. The above analysis presents the distributional impacts for the statutory groups of consumers Ofgem must have regard to when assessing alternative policy options. In this section, we expand this analysis to cover the wider set of consumers grouped into "archetypes", as described in Chapter 2.

3.17. We replicate the analysis from Chapter 2 here and calculate the average savings in £ and as a percentage of income for each customer archetype. We only report results for customer archetypes whose heating fuel is gas and consume both gas and electricity.

Table 3.1: Annual £ savings per customer archetype (average and total) from introducing a 3-1.5-12 [3] cap with a backwardation allowance and deadband

Archetype	Key attributes	Estimated no. of GB households	Average savings (negative = cost) per household	Average savings (negative = cost) as a % of disposable income	Total savings (negative = cost) across households (£m)
A1	High incomes, owner occupied, working age families, full time employment, low consumption, regular switchers	2,761,000	£28	0.06%	£79
A2	High incomes, owner occupied, middle aged adults, full time employment, big houses, very high consumption, solar PV, environmental concerns.	2,916,000	£66	0.12%	£194
B3	Average incomes, retired, owner occupied - no mortgage, electric vehicles, environmental concerns, lapsed switchers, late adopters.	3,674,000	£47	0.16%	£173
B4	High incomes, owner occupied, part-type employed, high consumers, flexible lifestyles, environmental concerns.	2,323,000	£49	0.12%	£114
C5	Very low incomes, single female adult pensioners, non-switchers, prepayment meters, disconnected (no internet or smart phones).	1,922,000	£31	0.21%	£60
D6	Low income, disability, fuel debt, prepayment meter, disengaged, social housing, BME households, single parents.	1,547,000	£39	0.21%	£60
D7	Middle aged to pensioners, full time work or retired, disability benefits, above average incomes, high consumers.	1,205,000	£49	0.14%	£59
E8	Low income, younger households, part-time work or unemployed, private or social renters, disengaged non-switchers.	2,356,000	£37	0.16%	£86
E9	High income, young renters, full time employments, private renters, early adopters, smart phones	3,093,000	£31	0.08%	£95

Table of the impact of quarterly updates with backwardation costs across 13 consumer archetypes, indicating that those in the most vulnerable consumer groups will make savings under the quarterly update with an updated wholesale methodology to include backwardation costs.

3.18. As Table 3.1 shows, quarterly updates with backwardation costs allow consumers with high income and high energy consumption (consumer archetype A2) to achieve the highest absolute £ saving (£66 on average annually), reflecting the fact that savings increase more than proportionally with energy consumption.

3.19. Despite the larger value in absolute terms and the fact that savings scale more than proportionally with energy consumption, the introduction of quarterly updates and backwardation costs still benefits the most consumers with low incomes, on a prepayment meter who are either pensioners or have disabilities and who have no internet connection (see consumer archetypes C5 and D6).

3.20. However, the difference in savings between low income and high income consumers under quarterly updates with backwardation costs is smaller compared to savings under the quarterly updates without backwardation costs (0.16% to 0.21% compared to 0.12% for high income archetypes, see Table 2.1). This reflects the fact that the backwardation costs with a fixed deadband introduces non-linearity in the savings, i.e., the per unit of energy saving increases (decreases) with the level of consumption and therefore households with lower levels of consumption will benefit less.

4. Impact on consumers from moving to a quarterly cap assuming an alternative forward curve

4.1. Under our modelling results presented in the previous sections our initial forward curve used for our stochastic price simulation reflects the baseload and peakload forward curves for seasonal contracts as of 20 April 2022, therefore capturing the current unstable and volatile market conditions.

4.2. We tested our results against an alternative assumption for the initial forward curve that would reflect stable market conditions comparable to those during the first six cap periods since its implementation in 2019. This has been estimated by taking the 5 years average of the historical seasonal forward curves between 2017 and 2021 grouped by winters, summers, peak and baseload for electricity and by deriving gas forward prices based on regression analysis. In this alternative forward curve, we have not considered the latest 2022 historical forward curve data.

4.3. Using the results of this modelling, we can therefore replicate the analysis presented in Chapters 2 and 3. We estimate the £ savings from introducing quarterly updates with and without backwardation costs relative to maintaining the status quo under stable market conditions. We find that:

4.4. **Moving to quarterly updates** has marginal to no impact on average energy bills for households across consumption bands when we use the alternative forward curve. This result reflects the fact that by construction, when using the alternative forward curve, there is virtually no volume risk because of lower energy prices and no basis risk because of stable prices (relative to the base forward curve assumption). Hence, in this scenario, more frequent cap updates are not as pertinent as in the scenario we are faced with today.

4.5. The distributional impact on different consumer groups from moving to quarterly updates without updating the wholesale methodology to include backwardation costs is very limited, if not negligible, when using this alternative forward curve assumption.

4.6. **Moving to quarterly updates and updating the wholesale methodology to include backwardation costs** in line with our proposals set out in the statutory consultation would result in a small increase in consumer energy bills relative to the status quo when using the alternative forward curve. Again, this reflects the fact that by construction backwardation and contango net each other out over a year as they have during the first six cap periods since its implementation in 2019.

4.7. Additionally, we find that additional costs from assuming an alternative forward curve correspond to less than a 1% increase in the energy bills of default and standard variable tariff customers, on average. Therefore, the distributional impact on different consumer groups from moving to quarterly updates and updating the wholesale methodology to include backwardation costs is very limited, if not negligible, when using this alternative forward curve assumption.