A report on Ofgem's proposed changes to the EBIT margin allowance

Prepared on behalf of Energy UK

Non-Confidential Report

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1. INTRODUCTION

1.1. Purpose of this paper

1. Energy UK has retained Charles River Associates (CRA) to examine Ofgem's proposed changes to the EBIT margin allowance in the Default Tariff Cap (DTC) as published in the statutory consultation on 25th May 2023 (the Consultation). As part of the Consultation, Ofgem also published the model underlying its calculation of working capital, providing an opportunity to engage practically with its arguments, assumptions and approach.

2. We have been asked to focus on Ofgem's approach to calculating the capital employed element of the EBIT allowance calculation.

1.2. Structure of this paper

3. Our report covers the following elements:

    - In **Section 2** we consider Ofgem's approach to risk capital and how it affects the overall treatment of working capital;
    - In **Section 3** we review the calculation approach of the working capital model;
    - In **Section 4** we challenge the embedded outcome of the working capital model that results in the notionally efficient supplier operating with zero cash for operations mid-shock;
    - In **Section 5** we present an alternative wholesale price scenario for the purpose of assessing the supplier's financial resilience during a price shock; and
    - In **Section 6** we review Ofgem's approach to estimating collateral capital.

- We summarise our conclusions in **Section 7**.

2. RISK CAPITAL

4. The EBIT allowance was introduced by Ofgem as part of the DTC and is intended to provide a normal rate of return for an efficient supplier serving standard variable tariff (SVT) customers. The EBIT allowance is calculated by assessing the capital employed by a "notionally efficient" supplier alongside its Cost of Capital (CoC). This report focuses on capital employed.

5. Ofgem defines capital employed as the sum of three components:

   - Working capital (estimated as an average of working capital maintained by a notionally efficient supplier under a 1-in-20 level of resilience scenario, therefore incorporating a measure of risk capital)
   - Collateral capital; and
   - Fixed assets.

2.1. Ofgem accounts for risk capital within working capital

6. The working capital component of the EBIT allowance is estimated using an optimisation model originally developed by CEPA and adapted by Ofgem for the purpose of reviewing the EBIT allowance calculation.

7. The model considers the financial position of a notionally efficient supplier over a period of two years, and optimises its opening shareholding funding to generate the average level of working capital maintained by the supplier under the following constraints and conditions:

   - The supplier represents an existing company (enters the period with a set of opening balances);
   - The customer direct debit balance averages zero over each annual cycle (i.e., the supplier does not rely on those balances to finance its operation); and
   - Over the period the supplier's balance sheet balances (i.e., net assets equal the amount available in shareholder funds).

8. Risk capital is embedded within the working capital model through the underlying assumptions of wholesale price volatility and an unexpected demand shock, reflected in the modelled wholesale energy cost, backwardation cost, and volume risk cost.[1]

2.2. Definition of risk capital

9. In the August 2022 consultation, Ofgem introduced a new more granular definition of capital employed to calculate the EBIT allowance to include[2]:

   - Working capital to cover timing differences in payments and receipts;
   - Collateral capital to cover;
     - Wholesale trading activities;

1 Consultation, p. 26.

2 Consultation on amending the methodology for setting the Earnings Before Interest and Tax (EBIT) allowance, August 2022, para 4.45.

- Network liabilities, CFDs and FiTS; and
- Energy balancing liabilities.

- Risk capital to cover losses from holding open risks such as wholesale energy price volatility, shaping and balancing costs, bad debt and unexpected weather events.

10. In its November 2022 consultation, Ofgem narrowed its definition of risk capital to exclude shaping and imbalance costs and bad debt costs as it considered they would be already covered under dedicated allowances in the cap to avoid double counting.

11. Some parties had noted in response to the August consultation that risk capital would vary by price level. Although Ofgem included the volume implications of energy price volatility in the proposed calculation approach, it excluded wholesale energy levels. It thought the ability to accurately hedge, given the high proportion of SVT customers, had improved and so was not a risk to suppliers if they would follow the wholesale indexation.[3]

12. As risk capital is not shown on suppliers' balance sheets, we agree with Ofgem that the reflection of unobserved risk capital (in the context of the EBIT allowance) might be estimated by calculating the additional equity financing required for a range of market circumstances.[4] We note, however, that it is not clear (as reflected by our discussion in Section 5 on Ofgem's approach to modelling market risk) whether extreme non-market risk events are in fact being accounted for appropriately in the treatment of risk capital within the model - as would be required in a shock scenario. For example, extreme weather events require significant capital to enable suppliers to withstand it, and such requirement would not be covered under dedicated allowances.

2.2.1. The treatment of risk capital is incomplete

13. In the current consultation, Ofgem notes varied responses to its proposed approach and in particular the difference between risk capital and collateral.[5]

14. Generally, whereas a company might set aside reserves (and recognise them on its balance sheet) to cover an expected loss, risk capital is the capital designed to absorb unexpected losses that might occur to some specified level of confidence. For example, a company might expect a loss of £50 but if that loss could turn out as much as £200 then risk capital might be measured by £150 (£200-£50). Of course, companies would rarely hold sufficient capital to cover the full extent of any possible loss. It is more frequently the case that companies consider potential losses at some low probability level.[6]

15. Broadly, we think firms encounter three kinds of risk:

- **Market risk** - arising from pricing and demand outcomes in the market place;
- **Credit risk** - arising from exposure to the risk that a company's customers and suppliers renegue on supply/payment obligations; and

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3 Further consultation on amending the methodology for setting the Earnings Before Interest and Tax (EBIT) allowance, November 2022, para 4.55.

4 Further consultation on amending the methodology for setting the Earnings Before Interest and Tax (EBIT) allowance, November 2022, para 4.72.

5 Consultation, para 4.83.

6 See discussion in Section 5.1.

- **Operational risk** - arising from exposure to non-market risk affecting the company's core business activities.

16. Market risk is considered by Ofgem in this consultation. We discuss in Section 5 some perspectives on how this has been implemented. We share the view that risk capital is affected by overall price levels (and not just volatility). We believe, however, that Ofgem's approach is too narrow and so misrepresents the true level of risk capital required to absorb unexpected losses. In particular, Ofgem's approach underestimates the risk capital required to compensate for credit risk and completely neglects risk reflected in operational expenditures. Ofgem's approach doesn't account for unexpected change; for example the opening cash balance is optimised by the model to withstand the period of volatility perfectly for what it can predict, without testing for the impact of any further unforeseen circumstance(s).

Credit risk

17. Credit risk is only partially considered by Ofgem. The risk faced by utilities from bad debt in its customer book is considered in the allowance for bad debt.

18. Utilities are required to post capital (sometimes) to counterparties to cover the risk that they default on their supply and/or payment obligations in a transaction. It is correct, therefore, that collateral should be considered as it must be maintained as a cost of doing business in the wholesale energy market. In the past, as we discuss in Section 6, collateral requirements have been a very significant operating issue. However, it seems from Ofgem's description that collateral arrangements reported by stakeholders is varied.

19. The risk faced by utilities trading in the wholesale market from credit risk of other parties is, however, not directly covered. In a rising market, for example, a utility buying physical forwards is exposed to the risk that the seller does not deliver its promised volumes and the replacement cost of the transaction being defaulted upon is higher than what it had previously agreed. To the extent this is not collateralised - as can be the case in OTC markets - the utility is bearing credit risk itself. This is not considered, at all, in the calculation of the EBIT allowance.

20. Furthermore, Ofgem's approach negates the impact of collateral received by a utility (to account for its counterparty's credit risk) by using it to offset its calculation of collateral needing to be provided to third parties.

21. The failure, for example, of a major electricity generator in the UK market is not unprecedented. Previous incidences of bankruptcies of Enron, TXU Europe, and British Energy (in the early 2000s) had significant impact on trading conditions in the UK market at the expense of other utilities in the UK. It is also quite possible to imagine in different circumstances that a large electricity generator could have failed within the context of the last year's energy market crisis (and not subject SAR or SOLR). As currently designed, the working capital model does not consider this kind of risk even though it recognises credit risk with third parties in its considerations around financial resilience.[7] It seems unusual to have excluded the context of this consultation.

22. Illustratively (only), if the notional supplier hedges 80% of its next years' electricity volume (4.2 TWh)[8], with a counterparty of an average credit rating of BBB (with a default probability

7 Strengthening financial resilience, 2022.

8 Takes overall 2024 consumption from working capital model.

of 0.1%)[9] and a weighted average replacement cost of £150/MWh this would result in an expected loss of about £0.36/customer per year. This is only a representation of short run cost to immediately purchase replacement wholesale market hedges. In reality, recoveries can be made through contractual routes, collateral or other credit arrangements which may be held which will defray the cost in the longer term. This (at a cost of capital of 12.2%) would equate to a need for about £3 per customer of working capital. We do not claim this specific amount should be added to working capital but rather that Ofgem should conduct a credit risk analysis for the notional utility (under stressed market conditions) to confirm its working capital assumptions can absorb such a credit loss.

23. We consider some more specific details of the collateral calculations in Section 6.

Operational risk

24. There is no consideration for operational risk in the definition of risk capital. Anything outside of the buying and selling of energy is uncovered in this definition of risk capital. This seems out of line with Ofgem's general approach.

25. 10% of total utility expenditure (according to the working capital model) is operational expense.[10] Utilities are subject to basic business risks - like any other firm - staff, systems, plant and machinery. This risk can be material. For example, npower suffered issues relating to its ability to send accurate bills and handle customer complaints. In 2015 it was fined £26 million by Ofgem, as a result. It would be, of course, inappropriate to capitalise the risk of fines. Not all issues like this are outside the bounds of regulatory requirements or even viewed as being the result of bad behaviour. What is clear, however, that npower's customer business suffered reputational damage which contributed to a decline in customer numbers that under the cap system would not be reflected. Systems break down, accidents/mistakes occur. Some of this would be covered through insurance but impact on overall business would not.

26. We would recommend some reserves be accounted for in the working capital model to allow for shocks in operational expenses. We discuss the implications of this in Section 3.

9 Taken from Ofgem impact assessment model.

10 Calculated as average % of total expenditure that is operating costs (excl. fuel expenditure) across the period.

3. CALCULATION APPROACH

27. In this section, we review Ofgem's working capital model and comment on the approach used within it.

28. The model derives the level of working capital a notionally efficient supplier "would need to maintain in order to remain financeable across a range of wholesale price scenarios".[11]

29. To generate a range of wholesale price scenarios, Ofgem uses a separate stochastic model (the "SWPM") which generates a number of potential pathways for future wholesale electricity and gas prices, backwardation costs, and volume risk costs. It is based on "sampled wholesale prices over the last 14 months".[12] The model is used to calculate a 1-in-20 wholesale price scenario (and related backwardation and volume risk costs). The SWPM has not been made available to stakeholders. The 1-in-20 scenario outputs are hardcoded into the working capital model.

30. The model then identifies the impact of the 1-in-20 price shock on the supplier's financial resilience and optimises the opening supplier's balance sheet position by solving for i) the opening cash balance of the supplier, ii) the amount of additional shareholder equity required, and iii) the amount of customer credit balances the supplier enters the modelling period. It does so such that, over a period of two years, two objectives are met:

    - Customer credit balances held by the suppliers are not used to finance activities over the two-year timeline (i.e., direct debit balances average zero over each annual cycle)
    - The supplier's balance sheet is balanced throughout the two-year period (shareholder funds equal net assets)

31. We have not focussed our attention on the mechanics of the model. However, we would comment on two elements of the optimisation and calculation approach.

3.1. Timeframe

32. Overall, the model optimises the opening balances based on a look forward at the balance sheet over a two-year period. This means the model is optimising shareholder equity and cash positions to cover circumstances over two years.

33. It seems unlikely to us, that utilities optimise their balance sheet over a two-year period not least because of the time and cost required in equity raising. It would be valuable for Ofgem to extend its model to understand the potential outcomes on the average working capital maintained calculated by the model.

34. We will discuss in the next section the choice of average vs peak working capital as a benchmark; however we note over the period of the model average working capital maintained has an upward trend. It is not clear if this is driven by the mechanics of the model, or the underlying assumptions used.

11 Working capital model documentation and user guide, p. 4.

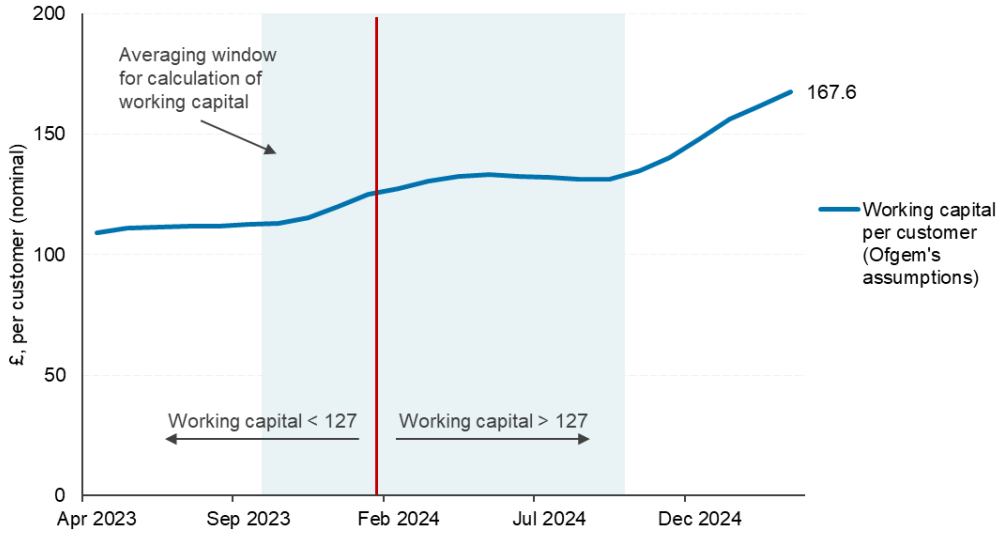
12 Consultation, p. 84.

3.2. Peak vs Average

35. In calculating the average working capital from the model, Ofgem chooses to average over the one-year price shock period.

36. In Figure 1 below, we show the inconsistency in time periods used in the modelling to optimise the notionally efficient supplier's financial position, which is done over the two-year period, and to average the working capital maintained, which is done over the price shock annual cycle (October 2023 to September 2024).

Figure 1: Evolution of working capital maintained by the notionally efficient supplier throughout the modelled period



37. We understand that the model is not set up to optimise the average working capital maintained; it is optimising the shareholder equity requirements given the need to balance the balance sheet. According to Ofgem's analysis, the resulting working capital is £127 per customer. However, the EBIT allowance formula assumes suppliers hold cash or liquid assets to meet this level of working capital. Ofgem should consider the possibility that suppliers would need to hold the working capital required to withstand liquidity issues during the latter part of the period. We view working capital as a way of managing cash liquidity risk. Cash liquidity risk typically manifests itself on the margins rather than in the average.

38. Ofgem sets out that the averaging over the price shock period ensures that it is capturing the supplier's ability to withstand the shock. We think this is wrong for two reasons:

- Firstly, the periods before, and after, a shock are important determinants of a supplier's ability to withstand the shock itself. In fact, the lead in period provides significant information as it relates to the supplier's financial position as it enters the shock. The lead out period, provides information regarding the supplier's ability to continue operating following a shock that will, most likely, have affected its financial position. This information should be accounted for by Ofgem in its calculation.

- Secondly, as described above, the model optimises the supplier's financial position across the full two-year period. Therefore, each month, the level of working capital is generated based on the supplier's resilience across the full two years (including the lead in and lead out periods). Averaging working capital across October 2023-September 2024 therefore ignores valuable insight into the supplier's resilience to a price shock.

39. Furthermore, it is worth noting that over both the two-year period, and the averaging period (October 2023 – September 2024), the utility in fact holds higher working capital than the average of £127 calculated.[13] In particular, working capital is higher than £127 per customer in 14 of the 24 months modelled, and in 8 of the 12 months averaged under Ofgem's approach, reaching £168 per customer by the end of the modelled period.

40. For the reasons set out above, instead of using the price shock period, Ofgem should consider the full period it models to optimise the supplier's financial position. Implementing this approach, at the very least, means averaging across the two-year period, increasing the average working capital maintained figure to £129 per customer.

13 See sheet "Summary", row 35.

4. OPERATIONAL RISK

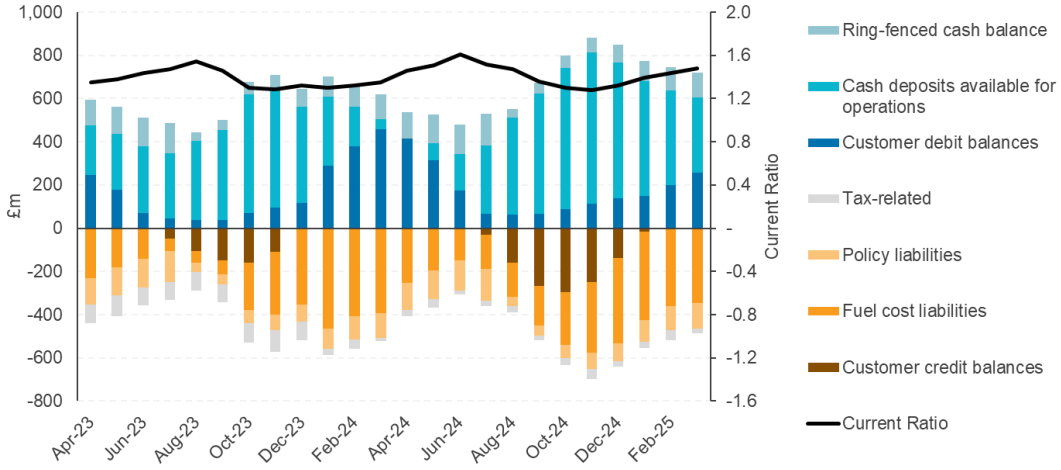
4.1. The assumption on cash balances is unrealistic

41. In the model, working capital, as a function of current assets minus current liabilities, accounts for multiple sources of cash income as current assets. The largest of these sources are customer debit balances (i.e., earned revenues that the customer portfolio has paid for through direct debit instalments), cash deposits available for operations, and ring-fenced cash balances from RO obligations.

42. Current liabilities are made up of customer credit balances (i.e., direct debit balances from customers that exceed earned revenues to date, hence putting the customer 'in credit' with the notionally efficient supplier) as well as other cost obligations such as fuel, policy, network-related, and tax.

43. Figure 2 below shows the composition of current assets and liabilities across the months of the period.

Figure 2: Breakdown of the supplier's current assets, current liabilities, and current ratio[14]



44. The seasonal fluctuation in customer debit and credit balances is modelled whereby customer credit balances are accumulated during the warmer months of the year in which the supplier expects lower earned revenues, and debit balances then offset this credit in the colder months where earned revenues are expected to be higher than monthly debit payments.

45. In calculating average working capital maintained over the period, the model applies the constraint that the notionally efficient supplier will "never run out of cash" due to sufficient shareholder equity injection at the beginning of the period.[15]

46. Whilst the model's methodology is logical, the conditions of the model then optimise the amount of shareholder equity injection based on the notionally efficient supplier's cash available for operations never falling below zero; but allowing this figure to nevertheless reach zero during the 1-in-20 price shock period.

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14 Note that the current asset categories "deferred tax assets" and "other current assets", as well as current liability category "network cost liabilities", are not shown due to their negligible contribution to the overall totals

15 Page 11, Working capital model documentation and user guide, Ofgem

47. The model also sets the notional supplier’s opening cash balance to the amount required to ensure that the average direct debit balance, across the two-year period, is zero. Realistically, an operating supplier would not be able to choose its opening cash balance at the beginning of a period in question, so to ensure it is not reliant on customer credit balances to finance its activities.

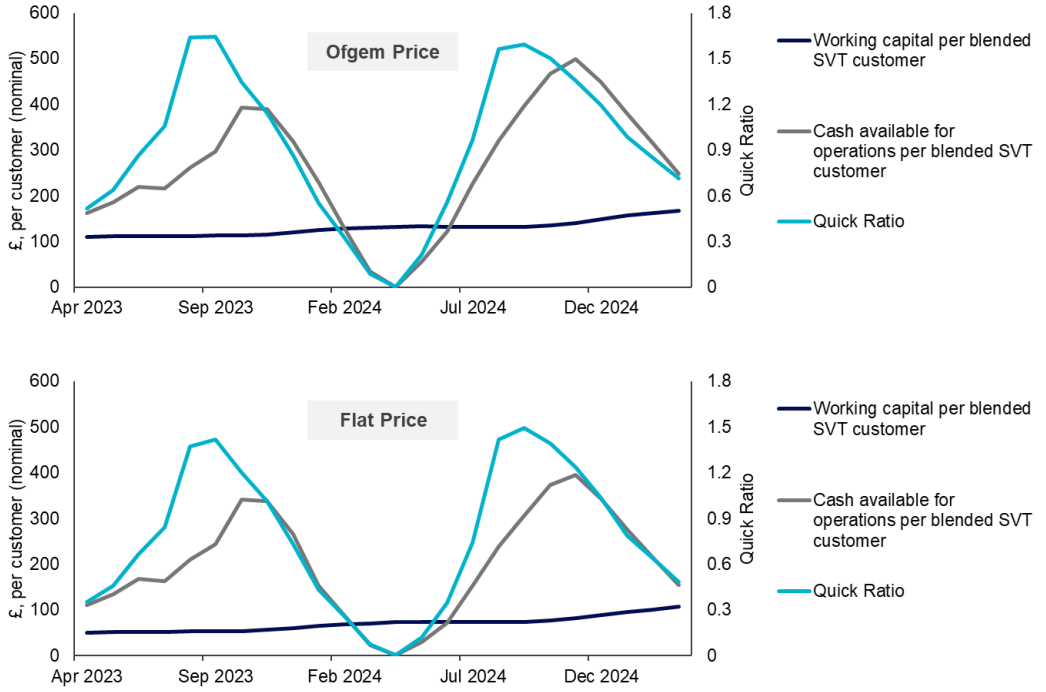
48. Further to this, one must consider the lag effect between increases in operational expenditure due to higher commodity costs and the adjustment of direct debit incomes to compensate for this. The current functionality of the model does not do this and, instead, immediately reflects the expected increase (or decrease) in direct debit balances as a result of changing wholesale prices.

49. Regardless of the wholesale electricity and gas price assumptions applied in the model, the optimisation generates an average level of working capital maintained figure based on the notionally efficient supplier reaching the lowest (i.e., zero) allowable cash balance position of zero in the month of April 2024 of the two-year period – this is illustrated in Figure 3 below.

50. The top graph in Figure 3 shows the working capital maintained and cash available for operations across the period under Ofgem's wholesale price assumptions (for reference, see Figure 5 above). The bottom graph shows the same but applies a flat price projection using electricity and gas prices from the 2nd quarter of the period, onwards.

51. Understandably, the flat price scenario would demand a lower level of average working capital maintained throughout the period but, in both cases, the supplier reaches a cash balance for operations of zero about halfway through the assumed averaging period for working capital.

Figure 3: Cash available for operations under different scenarios[16]



52. The maximum monthly working capital maintained by the notionally efficient supplier across the 12-month averaging window happens at around the same time as the supplier having a zero cash balance – its working capital comprising at that time of customer debit balances, and ring-fenced cash only.

53. The assumption that a supplier would allow its cash balances available for operations to reach zero is not realistic, or at least problematic. Therefore, under Ofgem's assumptions, in April 2024 the supplier instead can, to cover its short-term liabilities, look to:

- Customer debit balances
- Ring-fenced cash balances
- Other current assets[17]

54. However, the sources listed above are not 'cash in the bank' nor accessible (ring-fenced) and can therefore not be used to cover short-term operational expenditure.

55. In any case, Ofgem also makes an explicit assumption that customer credit balances should not be relied on to finance activities,[18] and in fact, even in that month, there are none, so they are not used. Hence, the absence of cash available for operations, alongside no customer credit balances in April 2024 would, in the event of an unforeseen short-term obligation, put the supplier under significant pressure.

16 Flat price scenario (lower chart) assumes that the wholesale price stays constant from Q1 2024 onwards. However, regardless of the price assumption applied, the cash position will always reach zero in April 2024. To model the flat scenario, we have set backwardation costs to zero.

17 Refers to deferred tax assets and deferred backwardation recovery assets (i.e., outstanding balance of backwardation costs to be recovered in the future).

18 Working capital model documentation and user guide, p. 9.

56. This is confirmed when assessing the notional supplier's quick ratio shown in Figure 3, which, over the majority of the period in both scenarios, does not surpass one. The quick ratio is an indicator of whether a company is equipped to enough "liquid" assets to enable it to pay off its total current liabilities with immediate, or almost immediate, effect. In this case, "liquid" assets have been taken to be a total of (a) cash deposits available for operations and (b) customer credit balances.

57. Ideally the notional supplier should have a quick ratio higher than one at all times indicating it can instantly dispose of its liabilities with "liquid" assets available. In both scenarios, over the majority of the period, the supplier is not able to do this and would need to seek additional capital. In reality, suppliers would never solve, or optimise in such a way to reach zero cash for operations. It is important that Ofgem reflects that reality in its modelling. We discuss the impact of doing so in the next section.

4.2. Applying a cash constraint significantly increases the average working capital maintained

58. With respect to Ofgem's ongoing consultation regarding appropriate ringfencing of customer credit balances (CCBs)[19], one can argue that customer credit balances currently offer a form of liquidity to cover short-term obligations. However, the current proposals outlined in the Strengthening Financial Resilience consultation propose a Cash Coverage Trigger approach to ensure responsible financial management of CCBs.

59. This approach will require suppliers "to maintain monthly cash (in the bank) balances at a level equal to or greater than 20% of gross CCBs net of unbilled consumption owed to their Fixed Direct Debit customers." This aims to ensure suppliers maintain sufficient capital to weather "a severe but plausible switching scenario and when a high volume of refund requests are received."[20]

60. Reviewing this threshold in the context of model, one can assume that monthly cash (in the bank) balances, as with the quick ratio, consist of (a) cash deposits available for operations and (b) customer credit balances. All other current assets e.g., ring-fenced cash balances cannot be used or liquidated to meet short-term obligations.

61. In response to the ongoing Strengthening Financial Resilience consultation, CEO of Ofgem, Jonathan Brearley, also stated in June 2022:

> *"But if some do still fail, consumer credit balances and green levy/renewables payments will be protected. Currently they are used by some suppliers like an interest free company credit card. Moving forward, all suppliers will have to have enough working capital to run, without putting their customers' credit balances at risk. Today's proposals will make sure that customers' hard-earned money is properly protected so that a company must foot the bill if it fails, rather than consumers picking up the tab."*[21]

19 Statutory Consultation: Strengthening Financial Resilience - ringfencing customer credit balances and introducing a minimum capital requirement, April 2023.

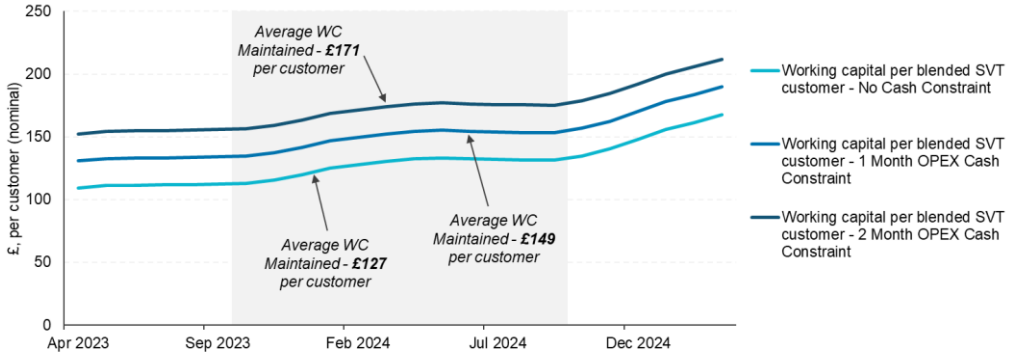
20 Further consultation on amending the methodology for setting the Earnings Before Interest and Tax (EBIT) allowance, November 2022, page 45.

21 "Ofgem announces tough new financial measures to ensure energy suppliers can withstand future shocks - including protection for customers' credit balances", Ofgem, June 2022.

62. This highly illiquid position for the notionally efficient supplier, leaves it exposed to adverse changes in non-market shocks, such as a steep unforeseen rise in operational costs, with the potential for insolvency at a cost to consumers. The model, as it currently stands, would force a notionally efficient supplier to either secure capital from shareholders or other sources at short notice.

63. Using an assumption that the notionally efficient supplier should have enough cash available to cover at least one or two months of operating costs, drives up the average working capital maintained significantly. Figure 4 below shows the movement in monthly maintained average working capital in response to application of cash constraints in the model equivalent to the one and two months of average monthly operating costs[22].

Figure 4: Working capital maintained under different cash constraint levels



64. For every month worth of average operational cost added to the model's cash constraint, the average working capital maintained per blended SVT customer rises by £22.

22 Calculated to be £30.54 million per month; the average monthly operating cost is calculated as the average of the total monthly operating costs across the period under the Ofgem base case price assumptions.

5. MARKET RISK

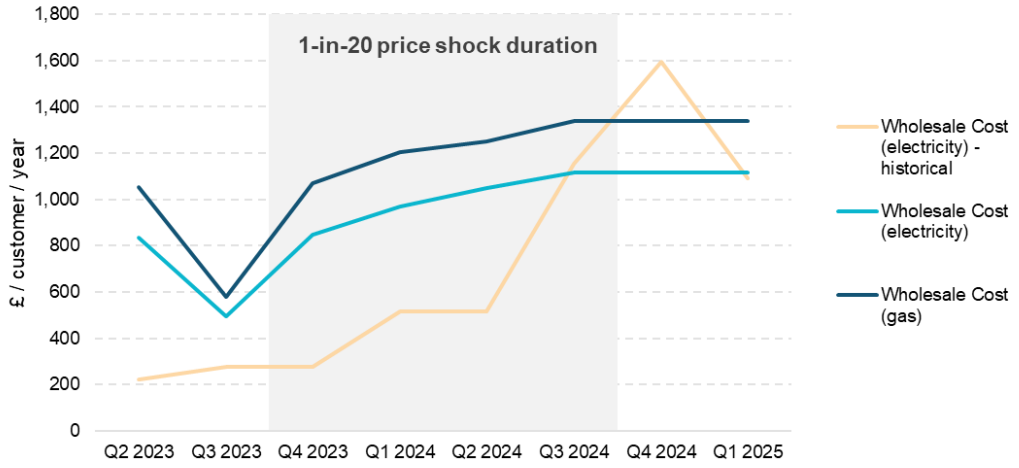
65. For the purpose of determining working capital, Ofgem generates a range of wholesale price scenarios, using a separate model, the SWPM, which produces a number of potential pathways for future wholesale electricity and gas prices, backwardation costs, and volume risk costs. In Section 3, we set out the way the model operates.

66. In this section, we propose an alternative wholesale price shock for Ofgem's consideration. We find that the modelled SWPM outputs may not be representative of a price shock in magnitude (peak reached) or shape (trend in wholesale prices post price shock).

67. In the figure below, we show the wholesale cost component of the DTC from Q2 2023 to Q1 2025, as modelled by Ofgem using the SWPM. We also indicate the period during which the 1-in-20 price shock is modelled to occur.

68. For illustration and reference, we also indicate the evolution of the wholesale cost component of the DTC through 2021/2022, the most recent price shock on record.

Figure 5: Wholesale cost assumption in working capital model



69. Below, we discuss why the selected price shock may underestimate the level of working capital required by a notionally efficient supplier to remain financially resilient at that time.

5.1. Stress testing against a 1-in-20 shock is not standard practice

70. Ofgem stress tests the supplier's financial resilience by determining the range of values representing the 95th percentile of forecasted outcomes, generating inputs for a 1-in-20 price shock.

71. However, there is a breadth of evidence available that shows that scenarios considered when stress testing financial resilience should reflect adequately severe conditions. For example:

- The frameworks set out by the Basel Committee on Banking Supervision[23]; and

23 Stress testing principles, Basel Committee on Banking Supervision, October 2018.

- The risk governance guidelines set out by ICE Clear Europe's committees covering ICE's exchange Energy markets.[24]

72. The Basel framework represents a full set of standards for the prudential regulation of banks, and in particular frames the approach to take to stress test the assessment of capital adequacy. According to the framework, stress testing requires identifying possible events of future changes in conditions that may have unfavourable effects on banks' exposure and assess their ability to withstand it.[25] To that end, the committee sets out the stress testing principles which indicate that, to stress test:[26]

- The scenarios should be sufficiently severe and varied to provide a meaningful test of resilience;
- The scenarios and sensitivities should be reviewed periodically to ensure they remain relevant;
- Consideration should be given to historical events and hypothetical future events; and
- Scenarios not based on historical events may be warranted if new or heightened vulnerabilities are identified, or if historical data do not contain a severe crisis episode.

73. Further to the above, the Basel Framework sets out the standard for back-testing model-generated risk measures against actual outcomes. The standard applied is to test "whether the observed percentage of outcomes covered by the risk measure is consistent with a 99% level of confidence".[27]

74. Therefore, the standard for assessing the modelling of risk-weighted assets for market risk under the Basel Framework is to model a 99% level of confidence.

75. Further, as it stands, Ofgem's results are critically dependent on the outcome of one scenario and subject to the critique that alternative scenarios might be better than the scenario used. Stress testing multiple scenarios in which a shock can materialise as a result of different factors (e.g., demand shock, supply shock, non-market shock, etc), would allow Ofgem to assess the full range of potential risk suppliers have to plan, and capitalise, for, and therefore should be remunerated for.

76. Secondly, ICE Clear Europe uses an approach to calculating initial margin requirements that are "designed to be sufficient to cover the potential cost of a Clearing Member default under normal market conditions",[28] and are calibrated using a filtered historical simulation model using a 99% confidence interval for energy products.

77. Standard practice, as shown above, is to assess resilience against a 1-in-100 market shock.

78. It is, of course, important to consider the cost of insuring against such an event, as it compares to the cost of the event materialising. Over 2021/2022, the latest observable market shock in UK energy markets, around 30 suppliers failed, at a significant cost to

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24 ICE Clear Europe, Risk Management, accessed at: https://www.theice.com/clear-europe/risk-management.

25 Basel framework p. 382.

26 Stress testing principles, Basel Committee on Banking Supervision, p. 6.

27 Basel Framework, Calculation of RWA for market risk, MAR99 application guidance.

28 ICE Clear Europe, Risk Management, accessed at: https://www.theice.com/clear-europe/risk-management.

customers of £2.7 billion, or £94 per customer.[29] We understand that Ofgem may be assessing the implications of using a 1-in-100 scenario against this cost.

79. However, as set out under the Basel Framework and as we show below, it remains important to ensure financial resilience of suppliers - for the purpose of setting the DTC components - is assessed using available information. As it stands, the 1-in-20 scenario modelled by Ofgem is not representative of a market shock in magnitude, or shape.

5.2. Magnitude of the price shock

80. In this sub-section we challenge the assumption that a 1-in-20 price shock would materialise in a ~30% increase in the wholesale cost component of the DTC, only. There are several examples in the history of energy markets (some very recent) that provide evidence that a price shock in fact results in significant (and unexpected) increases in the price level. For instance, the energy crisis in 2022 resulted in an over 400% increase in the wholesale component of the DTC.[30]

81. While we are not implying that a 1-in-20 price shock would result in a 400% increase in the wholesale price from its Q2 2023 level, it would seem, at least prudent to assess the impact of a shock reaching similar level as it did over the past year. This would be equivalent to a 92% increase in the price level in the working capital model, and more representative of a shock.

82. The price level is an important determinant of working capital and this in fact, can be observed by amending the underlying assumption in the working capital model and examining the effect on the outcome.

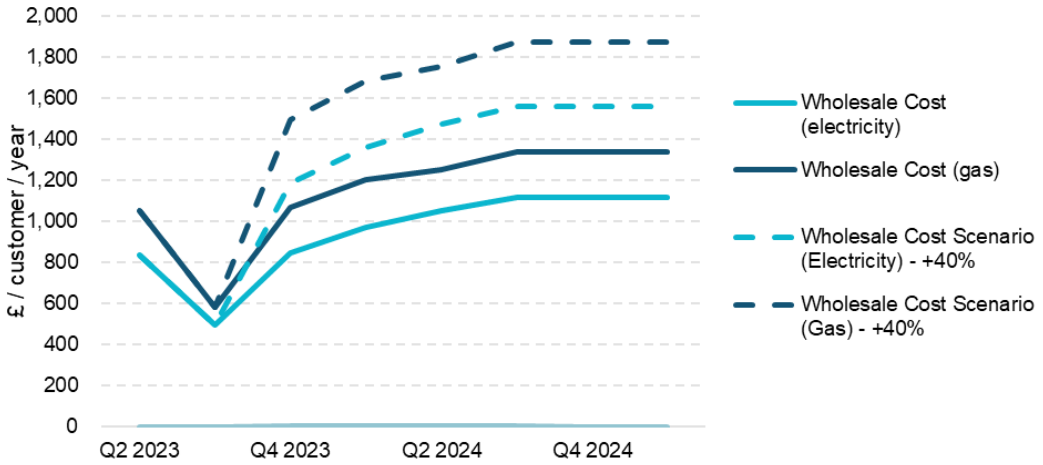
83. This is illustrated in the figure below, where we show the impact of a 40% uplift on Ofgem's wholesale cost assumptions on the determined average working capital maintained by the notionally efficient supplier. We model a 40% uplift as it leads to an increase in prices (at the peak) to levels consistent with those reached in August 2022. We find that changing the price level assumptions increases average working capital maintained per customer, by the notionally efficient supplier, by £27 over the price shock period (to £154).[31]

29 National Audit Office, The energy supplier market, p. 4. We note that a further two suppliers failed between Q3 2022 and Q4 2022.

30 See Default Tariff Cap Model V1.18. increase calculated as the percentage increase between the Direct Fuel component of historical DTC levels.

31 Backwardation costs are assumed to be unchanged, a likely conservative assumption. Correcting for the averaging period used (per Section 3 above), leads to a working capital maintained per customer of £157.

Figure 6: Impact of a 40% increase in the price shock level assumed[32]



Scenario	Average working capital maintained (£ / customer / year)
Ofgem's assumptions	127
CRA alternative scenario	157

84. This analysis aims at illustrating the impact of changing price magnitude assumptions on working capital maintained. We are not opining on whether this scenario is realistic or not. For illustrative purposes, we also tested the outcome of the working capital model using a slightly more conservative assumption of a 10% uplift in wholesale cost levels. We find that this increases average working capital maintained by the notionally efficient supplier by £9 to £136 per customer.[33]

85. In the next section, we show that, alongside the price level, the shape of the wholesale price implied by a shock should include some reversion to the mean, as is currently experienced in UK energy markets.

5.3. Shape of the price shock

86. In this sub-section, we challenge the assumption that, as modelled in the working capital model, a price shock would be followed by a steady state at the peak. Indeed, along with the assumption that the price shock would result in a rather subdued increase in prices, the working capital model also assumes that, after a year of price increase, prices plateau and reach a steady state at the peak. However, the impact of a falling market following a shock is an important consideration to a supplier, as it relates, in part, to its ability to operate.

87. Under Ofgem's assumption, the analysis runs the risk of ignoring significant information relating to a notionally efficient supplier's resilience, by only analysing the effect of a rising market on the average capital maintained. For the purpose of setting a component of the

32 This analysis corrects for the averaging period used (per Section 3 above). Using Ofgem's approach to averaging working capital maintained over the period of the shock only leads to a working capital maintained per customer of £154.

33 This analysis corrects for the averaging period used (per Section 3 above). Using Ofgem's approach to averaging working capital maintained over the period of the shock only leads to a working capital maintained per customer of £134.

capital employed component of the EBIT allowance within the cap, it is imperative that the scenario used is as representative of realistic outcomes as possible.

88. As set out above, the model runs over a period of two years, and solves for the financial position of the notionally efficient supplier in the first month modelled (assuming the supplier is not a new entrant and therefore enters the period with a positive balance of customer balances, cash, and shareholder equity), by optimising the supplier's balance sheet position over the two-year period considered.

89. As part of the Consultation, Ofgem indicates that:

> *"Our EBIT capital employed level [] calculates the desired level for the notional supplier using an average over stress period"*

90. Indeed, as discussed in Section 3 above, the model determines the level of working capital maintained by averaging the working capital position of the notionally efficient supplier over the stress period of October 2023 to September 2024. However, the model in the first instance, optimises the supplier's position over the full period, and therefore, will account, if not at least indirectly or partially, on the price evolution over the last six months modelled.

91. Our review indicates that the model may, in fact, inconsistently account for the lead up to, and lead out of, the price shock. Ofgem assumes that there are "no backwardation costs from the six-month lead-out period taking place in Oct-24 to Mar-25 (given that this period does not feed into the working capital calculations)".[34] However, actual backwardation costs are accounted for in the lead in period.

92. Further, the DTC level (which backwardation costs would feed into) in the lead out period would affect some balance sheet elements which are in fact optimised over the two-year period.

93. As historical and recent events have shown, a price shock (whether a 1-in-20, or a 1-in-100) does not, in any realistic scenario, lead to a steady state equilibrium at the peak. Over 2022, as illustrated in Figure 5, prices increased significantly before reversing towards (not to, as yet) the mean. Below, we propose an alternative to that presented in Figure 6, whereby prices, after reaching a peak, begin reversing.

94. As well as representing a more realistic scenario, it is of the utmost importance for Ofgem to assess the impact of changing assumptions in the latter period of the model. If, as Ofgem states, the lead out period does not feed into the working capital calculation, any assumption made in that period should have no effect on the outcome. However, it does.

95. In the figure below, we show that considering an alternative wholesale cost scenario - one that is more representative of a price shock in both magnitude and shape - significantly impacts the average working capital maintained by the notionally efficient supplier during the price shock period, resulting in an 11% increase to £141 per customer per year.[35]

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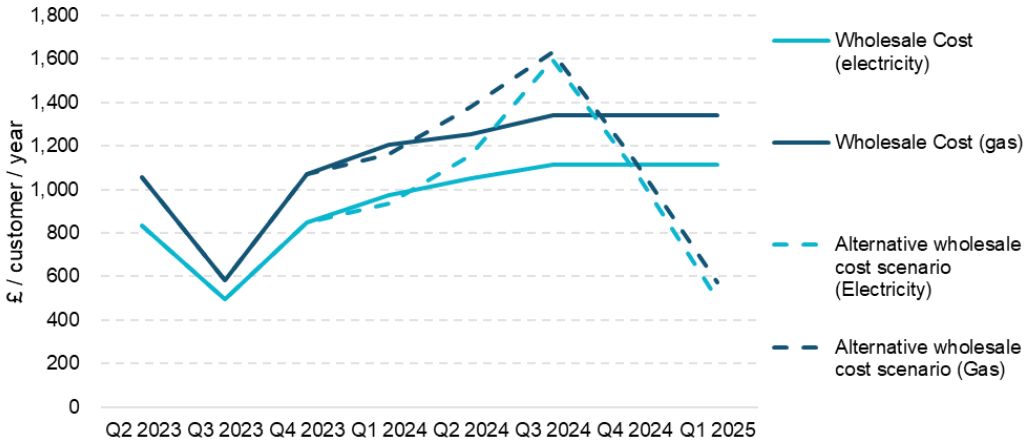
34 Working capital model documentation and user guide.

35 This analysis corrects for the averaging period used (per Section 3 above). Using Ofgem's approach to averaging working capital maintained over the period of the shock only leads to a working capital maintained per customer of £139.

Figure 7: Impact on average working capital maintained of alternative wholesale price shock



Scenario	Average working capital maintained (£/per customer/year)
Ofgem's assumptions	127
CRA alternative scenario	141

96. We note that as we have not seen the underlying SWPM model, which generates Ofgem's wholesale price assumptions. Therefore, we are not able to verify the implication of this changed scenario on the backwardation cost, or the volume risk cost.

97. In the analysis above, we have assumed that backwardation cost remains at the same level as assumed in Ofgem's working capital model. This is likely to be a conservative assumption – as backwardation costs are likely to rise as prices reach high levels[36]. Ofgem's current assumption of zero backwardation costs in the lead out period (last 6 months modelled) is, however, likely to be reasonable in our alternative scenario of decreasing prices during that period (as the market adjusts towards expectations).

98. In the model guidance document, Ofgem provides stakeholders with an overview of the approach used to model backwardation costs. It states that backwardation costs are calculated by "taking the difference between the wholesale price allowance as calculated above, and the average cost of forward contracts for the quarter in question (representing the expected hedging cost for the supplier)".[37]

99. For the purpose of illustrating the impact of alternative backwardation costs in our proposed scenario, we calculate the average cost for forward contracts by subtracting Ofgem's calculated backwardations costs from Ofgem's wholesale cost allowance. We then use this calculated average cost for forward contracts to calculate backwardation costs under our alternative scenario. Backwardation costs are likely to be overstated under the approach, but it provides for a good reference of the impact of changing the scenario's assumptions. We show the impact in the table below.

36 We note that backwardation costs reached significant level during the 2022 price shock. See Price cap – Decision on changes to the wholesale methodology, Figure 2.2, p. 18.

37 Working capital model documentation and user guide, p. 17.

Table 1: Impact of changed backwardation assumptions on CRA alternative scenario

Scenario	Average working capital maintained
Ofgem's modelled scenario	127
CRA alternative scenario (and unchanged backwardation costs)	141
CRA alternative scenario (with changed backwardation costs)	178

100. The approach above relies on a variety of simplifying assumptions, most particularly for the purpose of showing the impact of changed backwardation costs. Given the short timeline to respond to the statutory consultation, and without access to the SWPM model, we were not able to confirm the exact figures. We would therefore recommend that Ofgem reruns the model to obtain a set of assumptions for the price shock to:

- Be more representative of a price shock in magnitude and shape; and
- Reflect the updated price shock trend into realistic backwardation costs.

101. We believe this will enable Ofgem to better reflect market risk in its calculation of the working capital maintained by the notionally efficient supplier.

6. COLLATERAL REQUIREMENTS

103. To estimate the level of collateral to be included as capital employed, Ofgem undertook an RFI to identify historical levels, maintained by utilities in the period October 2020 to October 2022. Having reviewed these submissions and considered the implications of the different responses, given the characteristics of the RFI respondents, Ofgem chose to create an estimate of capital required to support the need for collateral based on the highest monthly average collateral figure reported by a non-vertically integrated utility over the two-year period.

104. This capital amount, however, was itself an estimate based on an assumed capitalisation of observed trading fees paid by the non-vertically integrated utilities with a discount rate of 12.2%. From these estimates, an average of each utilities capital requirement to support collateral needs was calculated and the highest monthly average was selected for inclusion as capital employed for purposes of the EBIT calculation.

105. Ofgem calculated this average capital required as £165 per customer. This implies that £231 million[38] of capital was required by the non-vertically integrated utility.

6.1. Business model

106. The choice of benchmarking the notionally efficient supplier to a utility which uses an intermediary to access the wholesale market is a very significant assumption. It is an assumption that is inconsistent with both the CMA Enquiry (2016) and implicitly, previous iterations of DTC determinations. We accept that there are a multitude of different ways in which utilities access the wholesale market. Some utilities access it directly, through their own trading organisation. Others use trading entities within their wider group of companies. Finally, some access the market through third parties outside of their own organisations (such as bank, trading houses, and other energy companies).

107. The implication is to establish a new benchmark, in which those accessing the market directly may not be able to recoup the cost of the risk capital that they directly employ to create that access. We will show below, that Ofgem's approach underestimates the level of capital required to create that access.

108. Notwithstanding whether this is the right choice, this significant change in approach about the notional supplier deserves a broader discussion than as an assumption in one component of the EBIT allowance calculation.

6.2. Trading fees are not a good proxy for the capital needed to fund collateral requirements

109. Ofgem has made the assumption that trading fees are intended to cover the trading company's credit risk with the non-vertically integrated utility. Therefore, the utility's cost can be an expression of the collateral required were it to have traded itself.

110. Intermediary trading fees will reflect a multitude of factors, the relevance of collateral in the trading fee may not be readily observable.

111. Some arrangements might include provision for credit risk directly; while others might handle it separately in a non-fee structure. Indeed, we understand that some trading agreements provide the intermediaries with recourse to the supplier's business. In such

38 £165/customer * 1.4m customers = £231 million.

instances, reliance on the trading fee as a proxy would be a gross underestimation of the true "collateral" provided by the utility. In an extreme case, the calculation should reflect the capital impact of the foreclosure on the utilities £47 EBIT allowance of value per customer to the already calculated £165 per customer. Other non-fee structures might include commitments on financial resilience. It can be the case for trading arrangements, for example, to trigger the inception or increased provision of capital based on a credit event. This is similar in nature to banking covenants.

112. In addition, some companies may trade with companies that are part of the same corporate grouping and fees therefore may be dependent on the corporation's decision on where to record profit, loss and risk.

113. If credit arrangements are managed away from the trading fee then it is not a good proxy for provision of collateral. Instead, it might be seen more as a service fee.

114. Ofgem recognises this. It states, "We appreciate that trading fees may include different services such as short-term credit facilities. On one hand, this implies that collateral costs from suppliers trading with an intermediary could be lower than trading fees. On the other hand, trading agreements include covenants such as rights for the intermediary over a supplier's business which come at a cost to suppliers. These costs could be deducted from trading fees, suggesting that collateral costs could be underestimated by the fee."[39] Ofgem has assumed that, in the round, the effect of ignoring these factors is neutral on the estimate of capital required. This is speculative as there is no evidence presented this is true.

115. We consider it impossible to properly ascertain collateral requirements from observed trading fees as in effect any estimate must be a residual calculation net of other unobservable commercially sensitive features of the trading agreement. In normal circumstances we would always try to use direct observations instead of proxies, such as trading fees.

6.3. Ofgem has rejected evidence of actual collateral held

116. Ofgem did receive estimates of actual collateral. Ofgem noted, "RFI data showed a wide range of collateral costs between suppliers, with monthly variations exceeding £1,000 of capital employed per customer for vertically integrated suppliers."[40] This is materially higher than the level calculated by proxy through observed trading fees.

117. Accepting that there were difficulties in preparing the estimates of collateral (for example in specifically identifying collateral only for SVT customers), Ofgem rejected this evidence because, "We also anticipate that vertically integrated suppliers have some ability to net off collateral at the group level, hence we consider their estimates are likely to represent theoretical costs for their domestic customers rather than actual costs faced by them."[41] There was a risk, therefore, that including vertically integrated utilities in its collateral calculation would artificially inflate its estimates.

118. There is an inconsistency in how Ofgem has applied its logic to difficulties in interpreting data. We are entirely sympathetic to the idea that it is difficult to estimate collateral given the multitude of company business models and trading arrangements. However, in noting

39 Consultation, para 4.94, p.40

40 Consultation, para 4.89, p.38

41 Ibid.

difficulty around the estimation of collateral from trading fees, the difficulties were assumed to be in aggregate offsetting and so dismissed. There was no evidence that they were offsetting. Difficulties in estimation for vertically integrated utilities meant their data was excluded.

119. Furthermore, Ofgem considers this direct evidence as being theoretical because of opportunities to offset collateral at group level within vertically integrated utilities. This is an invalid approach.

120. A better approach would have been to re-engage with stakeholders to improve the estimates of actual collateral held by those utilities holding collateral and not employing trading agreements. Re-engaging would have also provided Ofgem with information on the impact of falling prices on collateral requirements.

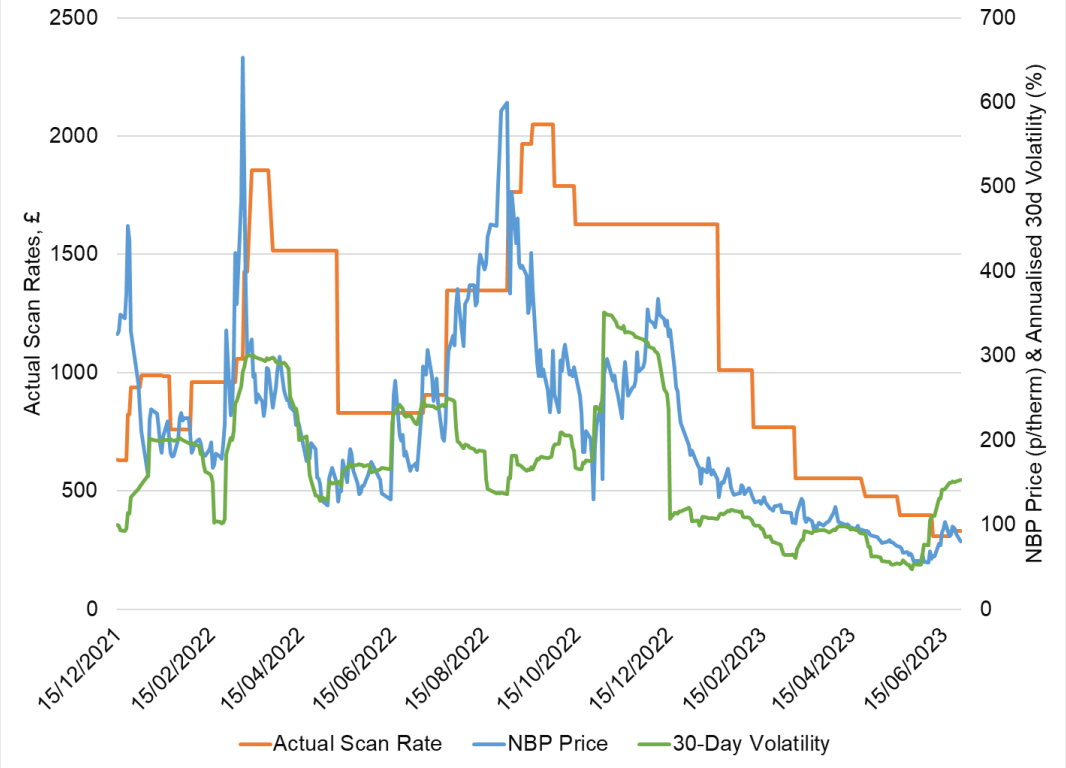
121. We show quantitative evidence to the above in our confidential report, submitted alongside this non-confidential report.

6.4. Price increases and increased volatility restricted trading

122. The RFI approach taken embeds a risk that the collateral levels reported do not reflect an efficient or desired level of hedging. The 2021/22 price shock resulted in significant increases in the amount of collateral required in exchange trading and an increase in the incidence of collateral requirements in OTC markets. This is because collateral is required to cover risk of default and the risk of default is a function of both the price level and the level of volatility. Both factors dramatically increased in 2021/22.

123. The chart below shows the trajectory of ICE scanning rates for the front-month natural gas contract. Scanning Rates are a component of the initial margin required to transact on the ICE. Initial margin is the refundable deposit that accompanies each trade on an exchange and is intended to cover the worst-case loss an exchange might incur in the event of a default by the trading party.

Figure 8: ICE Scanning Rates



124. The Scanning Rates (and so initial margin) reflect both the level of price and also its volatility. It should also be noted that these Scanning Rates tended to rise faster in response to price and volatility jumps than falls. Similar patterns can be observed across futures contracts of different time horizons for natural gas and electricity.

125. By illustration, the following simple example shows the level of collateral which might be required from exchange trading of natural gas on the ICE. We compare initial margin requirement on 0.8 MWh of natural gas (average monthly volume assumed for notional supplier) traded in the prompt month contract. For simplicity we assume no other trades on the exchange.

Table 2: IM Illustration

ICE Scan Rate (£/1000 therms)	Initial Margin, £/customer
2100 Similar to August 2022 peak	£688.05
900 Similar to Dec 2021 peak	£294.88

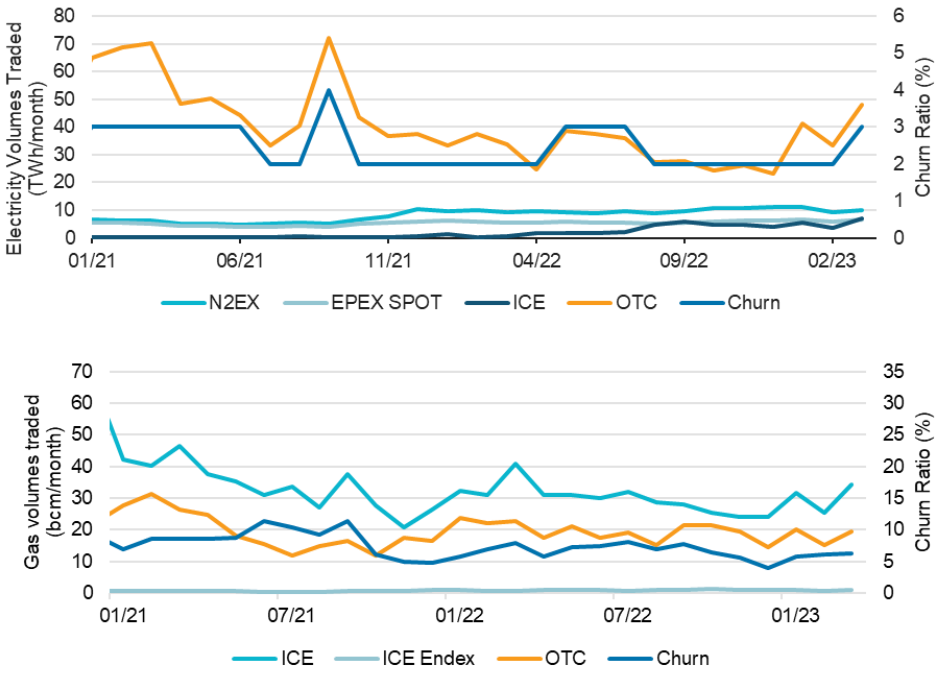
126. Scanning rates are set in relation to the contract's time to maturity and delivery season and so, at any point, the hedging position of a utility would be comprised of a variety of contracts with different, but highly correlated levels of initial margin requirements. None the less, the above table is illustrative of a very significant increase in overall collateral required.

127. There were three responses to the significant increases in collateral requirements, which are well documented in the press and in company reports. These were to:[42]

- Reduce exposure by trading less;
- Switch where possible to collateral free arrangements in OTC markets - where possible; and
- Increase funding for collateral arrangements.

128. The charts below show a general decrease in trading volumes for both electricity and gas.

Figure 9: Trading Volumes[43]



129. This can be seen particularly for ICE in natural gas - where it is the most prominent trading arena and for OTC in electricity markets - which is the main trading arena.

130. In OTC markets, a separate issue affected trading volumes. Some OTC trading arrangements include some provision for total financial exposure. This total financial exposure can be thought of a volume * price. In the high price environment, previously negotiated exposures limits became exhausted. For example, a £1 million limit on electricity exposure at prices of £50/MWh would allow for 20,000 MWh of trade volumes. At £250/MWh this limit falls to 4,000 MWh. OTC trading arrangements are subject to detailed bilateral negotiations and are not simply extended at will. Indeed, in a volatile pricing environment with significant risk of retail utility distress, we understand from our own discussions with traders (during 2022)[44] that credit risk not managed through collateral would have restricted the willingness of parties to extend OTC trading arrangements.

42 Europex, European Banking Association, Financial Stability Board, HM Treasury

43 Ofgem wholesale market indicators.

44 Private discussions held outside of the context of this consultation in the course of other consulting projects.

131. This has a major implication for the collateral calculation in that actual levels of collateral reported may reflect lower than desired levels of hedging in the market. They may be an underestimate of an efficient level of hedging. We would consider this to be a bigger risk for smaller suppliers than larger suppliers.

132. This reinforces our view, presented in Section 6.3, that values reported by vertically integrated utilities in fact can provide Ofgem with valuation information regarding the actual collateral capital requirements of a notionally efficient supplier, facing, as set out above, higher risks in a shock environment.

133. We show quantitative evidence to the above in our confidential report, submitted alongside this non-confidential report.

6.5. Average vs marginal calculations

134. Using data from non-vertically integrated utilities, for each month, Ofgem transformed the trading fees from RFI responses into £'s per customer equivalent values. These were capitalised at a cost of capital of 12.2% (consistent with the proposed EBIT calculation) and summed across 12 months to give the capital needed to meet annual fee payments. For each month this annual capital equivalent fee amount was added onto any other collateral reported by a supplier for that month to generate a total collateral capital employed per customer for each month for each supplier over the time period October 2020 to October 2022.

135. Finally, for each supplier, Ofgem took the average of this monthly series over the two years and selected the highest value by supplier.

136. We would, firstly, remark that by calculating on a monthly average basis, the approach risks missing peak collateral requirements during the month which can be significant. For example collateral requirements from exchanges changed significantly within months.

137. There is, also, a risk that an average collateral calculation (from the trading fee component) will result in under-estimation of the collateral requirement in a rising market or one in which there is a jump in prices and a decline thereafter as discussed in Section 5. Companies would typically choose to secure funding to meet peak collateral requirements, rather than the average. The average levels will be insufficient to meet collateral requirements over the entire period. In considering how to react to the collateral funding requirements of a period of high and volatile prices, it seems prudent to assume that companies will arrange sufficient funding to manage peak requirements. Demands for increased collateral do not come, typically, with a grace period. The experience in the recent price shock was, as shown in Figure 9, of significant and sudden changes.

138. Ofgem might argue that by selecting the highest average cost it is offsetting the risk that insufficient collateral in a period of rising prices because it assumes other suppliers have generally lower collateral. Unfortunately, this logic does not save the selected highest cost supplier from the risk of under-collateralisation in later periods. It is also, not necessarily the case that the highest monthly average collateral figure be greater than the peak collateral requirement of suppliers with lower, on average, collateral requirements.

139. We present some quantitative evidence to the above in our confidential report, submitted alongside this non-confidential report.

6.6. Initial versus variation margin

140. At various points, Ofgem has noted that whilst initial margin requirements increased, they may have been at least offset by inflows of variation margin, given the hedging profile of the notional utilities.

141. Variation margin is paid and received incrementally during the lifetime of a contract to settle mark to market changes in its value ((market price - contract strike price) * volume). In a generally rising market, under a strategy whereby the utility increases incrementally its hedging, earlier executed hedges will by the end of the period be in the money and so due a variation margin inflow. This, Ofgem believe, would offset the potential need for cash to settle demands for initial margin (which as hedging volumes increase over the period) will have increased.

142. This is a misreading of the nature of initial and variation margin. Whilst on the balance sheet they might offset, in practice they cannot be relied on in such a manner.

143. On an exchange, initial margin must be posted for every transaction, according to the rules of the exchange. Whether the price is rising or falling, some amount of initial margin is due on each trade. That amount will increase on all existing trades and new trades as price and volatility increase.

144. Variation margin is quite different. At the inception of any contract, by definition, the expected variation margin over the period in which the contract is held is zero. This is because, the futures price is an estimator of future expected spot prices. On average, therefore, a contract held to delivery ought to be expected to have a zero return.

145. Furthermore, when variation margin reflects swings in the market, it cannot be assumed to be an offset for initial margin or be used for other business purposes as it may be reversed the next day. In higher volatility periods, we would expect significant swings in variation margin. To the extent that actual cash received as variation margin is actually used to pay initial margin requirements or settle other receivables within the business is only a reflection of other funding available to the utility and so does mean actual offsetting has occurred. In effect, a prudent operator would in practice try to ring-fence variation margin to reduce the risk of a variation margin not being met due to re-allocation of funds elsewhere. Variation margin must be posted immediately.

146. It is worth noting in Figure 8 that whilst prices and volatilities are positively correlated with initial margin that correlation was not constant. Initial margin was faster to increase in response to increases in price and volatility but slower to reduce when price and volatility decreased. For example, in the spring of 2022, natural gas prices jumped very significantly but fell sharply afterwards. Initial margins rose quickly but did not return to levels prior to the price spike until much later in the spring. That would have meant initial margin continuing to grow as hedging volumes increased whilst negative variation margins being called on hedges executed whilst prices were high. This example shows why it is difficult to consider variation and initial margins as offsetting.

147. In this regard, Ofgem should consider initial and variation margin requirements as additive.

7. SUMMARY

149. The average working capital maintained determined for the notionally efficient supplier (working capital contribution to the EBIT allowance) in the model, as well as the collateral contribution to the allowance, have been misrepresented due to:

- Inconsistency in time periods used in the optimisation of the supplier's financial position (two years) and averaging of the working capital maintained (one year), and failure to recognise the working capital held by the notionally efficient supplier reaches £167 per customer under its model;
- Unrealistic zero minimum cash requirements for the supplier to continue operating during the price shock;
- Unrepresentative modelling, in magnitude and shape, of the 1-in-20 price shock that the notional supplier could experience;
- Underestimation of the 'real-world' collateral requirements of suppliers due to a discrepant approach to determination of collateral levels.

7.1. Working Capital

150. We find that the approach taken by Ofgem underestimates the working capital requirement of a notionally efficient supplier by misrepresenting operational realities of UK energy suppliers, as well as the magnitude and shape a 1-in-20 commodity price shock is likely to exhibit, when compared to actual historical data.

151. Ofgem models working capital maintained under the assumption that the notionally efficient supplier would optimise its position such that it would operate with zero cash for operations at the peak of the price shock. Under those assumptions, should a shock of at least the magnitude and shape witnessed in 2021/2022 occur, the notionally efficient supplier would i) not be remunerated for the actual capital employed required and/or, ii) fail to meet its short-term obligations, were it not able to secure capital from shareholders or other sources at short notice. Below, we summarise the quantitative impact of our findings on Ofgem's working capital calculation.

152. Independent calculation of the impacts to average working capital maintained when addressing the issues described above and, in detail, throughout this report, have been summarised in Table 3 below.

Table 3: Summary of factors impacting average working capital maintained

Factor	Impact to working capital
Amending the calculation approach for working capital maintained to two years	£2 *(increased to £129)*
Applying a one-month operational cost cash constraint to the model's pre-conditions	£22 *(increased to £149)*
Adjusting the magnitude and shape of the price shock with unadjusted backwardation costs	£14 *(increased to £141)*

153. When applying all the factors summarised in Table 3 above to the model, the average working capital maintained by the notionally efficient supplier increases to £163 per customer; a £36 increase from Ofgem's base calculation of £127.[45]

7.2. Collateral Capital

154. In order to make the working capital model more reflective of the factors raised above, we suggest Ofgem:

- Extend the averaging period for working capital maintained from the period of the price shock (one year) to the full two-year period of the model;
- Introduce a cash constraint to the model to cover potential unforeseen operational expenditure requirements during the peak of the price shock;
- Re-run its SWPM model with a set of assumptions that is more representative of the price shock observed over 2021/2022.

155. In addition, to the factors above, which impact working capital component of the EBIT allowance, the contribution of the collateral capital component to the allowance has also been underestimated. Ofgem's approach to calculating the collateral levels is misrepresentative of real-world capital requirements needed to cover supplier trading positions in that:

- Direct observations of collateral costs are a more accurate estimate of other unobservable features of trading agreements between suppliers and trading companies.
- The averaging approach risk misses peak collateral requirements and conflicts with the more likely approach taken by suppliers to arrange sufficient funding to cover peak requirements, as opposed to the average.

156. In order to ensure collateral capital requirements are accurately represented within the EBIT allowance, Ofgem needs to re-assess its assumption that a notionally efficient supplier would not be able to access the market itself but rather would always do so through an intermediary, as this creates a significant risk of under-funding actual collateral requirement under the cap. In our confidential report, we present further evidence on this matter.

157. To this end, we would strongly encourage Ofgem to re-issue its Request for Information to obtain up to date information on the actual wholesale, and total, collateral requirement of suppliers.

45 We note that the individual effects presented in the table above are not additive. The cumulative impact does not equal the sum of its parts. This is an outcome of the working capital model.