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# Proposed Reforms on Protecting Credit Balances and Renewables Obligations – Evaluating Cost and Benefits

Prepared for Ofgem

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# Executive Summary

## Introduction

When suppliers fail, current regulatory arrangements typically appoint a Supplier of Last Resort (SoLR) to take responsibility for supplying its customers. The SoLR also honours customer credit balances, takes on liability for paying the Renewables Obligation and charges the customers of the failed supplier a price no higher than the Default Tariff Cap (DTC). The SoLR is reimbursed by a levy on the generality of domestic customers. A Special Administrator runs failing suppliers who are too big to pass through the SoLR process and assumes similar liabilities to a SoLR, funded by a levy on domestic customers.

Following a wave of supplier failures in the second half of 2021, Ofgem launched an action plan in December 2021 to strengthen the financial resilience of suppliers. This report analyses the likely impacts of two of those reforms: Ofgem's proposals to require suppliers to protect (i) positive customer credit balances (CCBs) and (ii) anticipated payments made to Ofgem under the Renewables Obligation (RO) (the **proposed interventions**). Following those reforms, failing suppliers would meet credit balances and outstanding RO payments from protected sources of capital rather than relying on the generality of customers to fund these obligations.

## The Current Market Arrangements Result in Excessively Risky Suppliers and Excessive Default

Market participants must face the social costs of their actions in order for markets to deliver efficient outcomes. The current regulatory arrangements surrounding supplier failure in Great Britain gives failed suppliers and their customers access to three sources of unpriced capital, funded by the generality of customers:

- *Gross* customer credit balances;
- RO payments due in respect of that supplier's customers; and
- Hedging costs comprising any losses incurred by supply at the DTC compared to contemporaneous wholesale prices.

The provision of this free capital leads to excessive risk taking by suppliers, often referred to as "moral hazard" in the economic literature. Suppliers take excessive risk because they share the downside risk (of being unable to fund the above three obligations) with the generality of customers but receive the full benefit of upside risk.

Customers may also find it challenging to assess the credibility of and risks taken by their supply business. As a result, even were customers incentivised to select reliable suppliers for themselves, they may be unable to do so – a market failure known as "adverse selection".

## Modelling Framework and Underlying Assumptions

We estimate the costs and benefits of Ofgem's proposed interventions (the requirement to protect credit balances and RO payments) by identifying the transfers between customer groups and market participants in a world without and with the policy interventions (the **pre-policy** and **post-policy** worlds, respectively).

Our pre-policy world is informed by the historical pattern of supplier bankruptcies and their impacts over a **Reference Window** between January 2016 and December 2021. We selected 2016 on the basis that it was the final year of the Competition and Markets Authority investigation into the energy market. The Competition and Markets Authority imposed market remedies which changed market conditions, including a price cap for PPM customers in 2016, and 2016 saw the first supplier failure in over a decade. It also marked the beginning of a period in which small suppliers began to have a more material share of the domestic market.[1]

In principle, one could rely on evidence from alternative windows. On the one hand, the DTC was introduced only in January 2019, which may materially affect both the probability and cost of failure and which would suggest a shorter window may be appropriate. On the other, the most recent period since Autumn 2021 has witnessed high gas prices by historical standards which has prompted around half of all SoLR events and a large proportion of hedging costs from SoLR events in particular. We present a sensitivity in the Appendices to this report that instead assumes that 2021 is a one in 20-year event and all other years experience similar default rates to 2019 and 2020.[2] The results are directionally similar, albeit that the benefits we model are approximately 30-50 per cent lower, depending on the scenario.

Whilst informed by events in the Reference Window, we estimate the costs of supplier failure in the **pre-policy** world using two perspectives:

- A **historical view** of the world, where we capture costs actually incurred by the industry and mutualised through the SoLR process, and assume that they will continue in perpetuity in the future (under the assumption that the Default Tariff Cap remains in place);
- An **equilibrium view** of the world, where we capture what costs would be expected in ongoing circumstances under the set of policies and state of competition and average wholesale market conditions applying during the Reference Window. In other words, whereas the historical view replicates the *costs* of the pre-policy world going forward, the equilibrium view replicates the *conditions* of the pre-policy world, and estimates the expected costs of those conditions.

  The equilibrium view is less sensitive to extreme historical events than the historical view, though it is impossible to entirely remove the influence of current conditions on our expectations of future conditions. For example, we rely on an expected default rate which reflects average default rate during the Reference Window (including the defaults of 2021).

The historical view and the equilibrium view together provide a range of outcomes in terms of the benefits of the proposed interventions. We refer to these as the **High** and **Low** case outcomes.

Ofgem is, in tandem with its measures to promote supplier resilience, undertaking a package of reforms to the structure of the price cap. These reforms include proposals for a revised

[1] Entrant suppliers achieved a 14 per cent combined market share in March 2016. Ofgem (3 August 2016), Retail energy markets in 2016.

[2] See Appendix B (section B.3).

structure for the wholesale cost allowance under the price cap that will allow a faster pass-through of changing wholesale market conditions. In order to isolate the change in hedging costs due to the **proposed interventions**, we have assumed that the changes to the DTC currently proposed in the open Statutory Consultation are in place both with and without the **proposed interventions**.[3]

Our post-policy world assumes that the **proposed interventions** will reduce risk taking behaviour and supplier default rates, by putting the capital of suppliers' investors at risk when suppliers fail rather than the capital of the generality of customers. The benefits of the proposed interventions are driven in part by the extent to which the interventions are effective at resolving market failures and hence reducing the likelihood of supplier failure. In pricing the impact of changes in default risks, we have relied on assessments that credit rating agencies undertake of the creditworthiness of businesses and the long-run associated risks of default.[4]

We define a **Partial Effectiveness** scenario, in which small supplier default probability falls to one consistent with a typical B-rated firm, and a **Full Effectiveness** scenario, in which small supplier default probability falls to one consistent with a typical BBB-rated firm. A BBB-rated firm is less likely to default and is the credit rating held by the larger historical incumbents in the supply market.

We consider two **proposed interventions**: the protection of CCBs and the protection of RO payments. Both interventions resolve some of the moral hazard which comes from suppliers being able to mutualise the cost failure. Reliable data on supply businesses is scarce, especially for the suppliers most likely to fail, and the impact of the proposed interventions. The precise impact of what would be only partial fixes to the underlying market failure may differ by firm. We have not therefore sought to separate the impact of the proposed interventions on default rates quantitatively. However, we can draw the following directional conclusions:

- Simply implementing one of the proposed interventions and not the other would limit the extent to which the market failure is resolved, and hence the reduction in the default probability. This would tend to point towards the **Partial Effectiveness** scenario rather than the **Full Effectiveness** scenario; and
- Even with both **proposed intervention**s in place, there remains some residual market failure, because suppliers will still be able to mutualise other costs of failure, in particular the cost of purchasing replacement wholesale energy.

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[3] In the Reference Window, Ofgem's price cap provided for a wholesale cost allowance based on a 6-2-12 [6] structure, i.e. a six month observation window, two months prior to the start of the delivery period, of electricity and gas contracts for delivery over the follow twelve months and with tariffs updated every six months. Ofgem is consulting on replacing the 6-2-12 [6] structure for the price cap with 3-1.5-12 [3]. Source: Ofgem (16 May 2022), Price cap – Statutory consultation on changes to wholesale methodology.

[4] Credit rating agencies assess companies according to the risks debt investors would face were they to invest in the business. Lenders use these credit ratings to assess the necessary rate of interest. The nomenclature of the three main rating agencies varies (Standard and Poor's or "S&P", Moody's and Fitch). For instance Standard and Poor's scale runs from AAA to D, where double or triple letters represent lower credit risks. Standard and Poor's ratings of AAA, AA, A and BBB are "investment grade" and represent high quality investments with low risk of default (the Moody's equivalent ratings are Aaa, Aa, A and Baa). Whilst ratings of BB, B, CCC and below would constitute "non-investment grade", Moody's equivalents are Baa, Ba, Caa.

Throughout the report, we assume that supply markets are competitive, at least for the engaged segment of the market, and changes in costs for suppliers ultimately feed through to customers. We also assume that Ofgem will increase the DTC to take account of any costs of the proposed interventions on market participants.[5]

## Benefits of the Policy Come from Aligning Costs with Parties Who Drive Them, as Well as through Reduced Rates of Supplier Failure

The high-level impacts of the proposed policy interventions are:

- *Cost of insurance:* The generality of consumers and disengaged customers in particular will transfer less money to the customers of failed suppliers due to the protection of credit balances and the RO when default occurs. This will be seen through a reduction in the SoLR levy (paid for by all customers), offset in part by increases in bills to cover suppliers' costs in protecting the relevant balances.
- *Hedging:* The generality of customers and disengaged customers in particular will transfer less money to the customers of failed suppliers to cover differences between wholesale prices and allowances under the DTC, due to the lower frequency of default.
- *Cheaper tariffs:* Customers of failed suppliers will face higher prices. The removal of subsidised capital from the suppliers who are most likely to fail results in those suppliers increasing their prices. Additionally, tariffs for all suppliers will increase to account for suppliers' cost of protecting CCBs and the RO (which should be explicitly allowed in the DTC), though this will be offset by a reduction in the SoLR levy.
- *Switching costs:* Customers of failed suppliers, and suppliers themselves, will see reduced switching costs due to a reduced failure rate, and hence reduced rates of forced switching (e.g. after a SoLR process).
- *Administrative costs of the policy:* Customers will have to pay for the additional implementation and enforcement costs that Ofgem will incur in administering the policy, and for costs suppliers may incur in ensuring compliance with the policy (e.g. the indirect costs of raising the adequate finance, as opposed to the direct cost of capital itself). We have not included estimates of these costs.

## We Find that Net Benefits to Consumers Could be as High as £559 Million per Annum

We present our results in the Tables below:

- Table 1 presents each of seven impacts denominated in pounds million per year for High and Low cases, across three different customer groups and in total, assuming that the proposed interventions are *partially effective*;
- Table 2 presents the same results assuming that the proposed interventions are *fully effective*; and

[5] In practice, to the extent that the DTC already contains sufficient allowances for capital to partly or wholly offset these costs, Ofgem may not increase tariffs by the full costs of the proposed interventions and the benefits to consumers would be larger than our results indicate. We have not appraised the sufficiency of the allowances under the DTC in this report.

- Table 3 summarises the total impacts on customers across the partially effective, fully effective and high and low cases.

The benefits of the proposed interventions primarily come from reducing the extent of transfers from disengaged customers to engaged customers of failed suppliers.

The costs and benefits fall upon different customer groups with different socio-economic characteristics. We add two lines at the bottom of the tables to reflect Ofgem's guidance on treating the costs and benefits of different socioeconomic groups. In particular, disengaged customers are more likely to be lower income than engaged customers, so a policy that redistributes value from engaged to disengaged customers will tend to be more socially beneficial than the pure transfers of money would suggest.[6]

By adding up the total impact on the three different customer groups (customers of failed suppliers, engaged customers with non-failed suppliers, and disengaged customers), we estimate the net benefit of the policy for consumers.

[6] Based on an Ofgem survey on engagement in the energy market, alongside Ofgem guidance on the value of £1 spent in each decile income group, we calculate that a £1 benefit for disengaged customers is worth £1.04 in terms of the social benefit, and a £1 benefit for engaged customers is worth £0.96 in terms of social benefit.

**Table 1: Benefits of the Proposed Interventions by Customer Group – Partial Effectiveness (£ million)**

| | Customers of Failed Suppliers | | Engaged Customers with non-Failed Suppliers | | Disengaged Customers | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Low | High | Low | High | Low | High | Low | High |
| Cost of Insurance through SoLR Levy - CCB | 7 | 9 | 32 | 41 | 46 | 58 | 86 | 107 |
| Cost of Insurance through SoLR Levy - RO | 6 | 6 | 29 | 29 | 41 | 42 | 76 | 78 |
| Cost of Insurance through Tariffs - CCB | -9 | -9 | -19 | -19 | -12 | -12 | -40 | -40 |
| Cost of Insurance through Tariffs - RO | -10 | -10 | -22 | -22 | -14 | -14 | -47 | -47 |
| Hedging | 3 | 27 | 16 | 126 | 22 | 179 | 41 | 332 |
| Additional Tariff Increase | -30 | -21 | -44 | -28 | 0 | 0 | -75 | -49 |
| Switching Costs | 39 | 77 | 3 | 4 | 4 | 6 | 45 | 87 |
| Admin Costs of Policy | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total (unweighted)** | **6** | **79** | **-6** | **130** | **87** | **258** | **87** | **467** |
| (£ per affected customer) | 3 | 34 | *-1* | *12* | 6 | 17 | 3 | 16 |
| **Total (Social Weighting)** | **6** | **76** | **-6** | **125** | **90** | **269** | **90** | **469** |
| (£ per affected customer, socially-weighted) | 2 | 33 | *-1* | *12* | 6 | 17 | 3 | 16 |

*Source: NERA Analysis*

**Table 2: Benefits of the Proposed Interventions by Customer Group – Full Effectiveness (£ million)**

| | Customers of Failed Suppliers | | Engaged Customers with non-Failed Suppliers | | Disengaged Customers | | Total | |
|---|---|---|---|---|---|---|---|---|
| | ***Low*** | ***High*** | ***Low*** | ***High*** | ***Low*** | ***High*** | ***Low*** | ***High*** |
| Cost of Insurance through SoLR Levy - CCB | 7 | 9 | 32 | 41 | 46 | 58 | 86 | 107 |
| Cost of Insurance through SoLR Levy - RO | 6 | 6 | 29 | 29 | 41 | 42 | 76 | 78 |
| Cost of Insurance through Tariffs - CCB | -2 | -2 | -9 | -9 | -12 | -12 | -23 | -23 |
| Cost of Insurance through Tariffs - RO | -2 | -2 | -10 | -10 | -14 | -14 | -27 | -27 |
| Hedging | 4 | 33 | 19 | 154 | 27 | 220 | 50 | 408 |
| Additional Tariff Increase | -45 | -34 | -67 | -50 | 0 | 0 | -112 | -85 |
| Switching Costs | 44 | 88 | 3 | 5 | 5 | 7 | 52 | 100 |
| Admin Costs of Policy | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total (unweighted)** | **12** | **98** | **-2** | **160** | **92** | **300** | **102** | **559** |
| (£ per affected customer) | 5 | 43 | *0* | *15* | 6 | 20 | 4 | 20 |
| **Total (Social Weighting)** | **12** | **94** | **-2** | **154** | **96** | **313** | **106** | **561** |
| (£ per affected customer, socially-weighted) | 5 | 41 | *0* | *14* | 6 | 20 | 4 | 20 |

From the Tables, we draw the following conclusions by customer group:

- **Customers of failed suppliers:** These customers are only marginally better off for our low case assumptions. This is in line with our expectations because this group of customers benefited from disengaged and other active customers insuring their credit balances, hedges and RO payments whilst receiving cheaper tariffs. However, these customers are better off because each customer in this class is also responsible for paying the cost of mutualisation, irrespective of whether their supplier fails. Thus, they benefit from avoiding the process of mutualisation as much as other customer groups do. They also incur fewer switching costs in the post-policy world.

- **Engaged customers with other non-failing suppliers**: These customers are worse off as a result of the policy in the Low case outcome because some of them are served by smaller, less creditworthy suppliers. We assume that those suppliers will need to increase prices materially to meet their obligations following the proposed interventions. Those customers within the engaged category of customers served by large suppliers are better off because they are no longer responsible for insuring the credit balances and RO payments of failing suppliers.[7]

- **Disengaged customers:** Disengaged customers are better off relative to the pre-policy world. These customers were providing free insurance to the customers of failed suppliers, in the form of SoLR levies, whilst not benefiting from the lower tariffs enjoyed by the other customer groups. This group also includes vulnerable customers. There may be important equity and distributional considerations when assessing policy impacts, that may give additional weight to the policy above the net benefits for society as a whole.

We summarise the total impacts across the Partial and Full Effectiveness scenarios in Table 3 below.

**Table 3: Summarised Final Results in £million per annum**

| | Partial Effectiveness | | Full Effectiveness | |
|---|---|---|---|---|
| | *Low* | *High* | *Low* | *High* |
| **Total (Consumers only, unweighted)** | ***87*** | ***467*** | ***102*** | ***559*** |
| (£ per customer) | *3* | *16* | *4* | *20* |
| **Total (Consumers only, socially-weighted)** | ***90*** | ***469*** | ***106*** | ***561*** |
| (£ per customer, socially-weighted) | *3* | *16* | *4* | *20* |

*Source: NERA Analysis.*

As can be seen from the Table, we find that the **proposed interventions** could have an unweighted net effect on consumers of between £87 million per annum (approximately £3 per customer) and £559 million (£20 per customer). Weighting for different socio-economic characteristics of different customers group slightly increases net benefits.

[7] Our analysis assumes that there is no tariff increase beyond the amount required to comply with the proposed interventions (i.e. their suppliers' tariffs are not influenced by unsustainable tariffs offered by failed suppliers). We assume that remaining competitors in the market provide sufficient competitive tension to ensure that suppliers continue to offer the lowest cost-based tariff possible. We examine the impact of assuming that prices increase for all engaged customers in the post-policy world above the cost of complying with the proposed interventions in Appendix B (section B.4) below.

The benefit ranges for the partial effectiveness and full effectiveness cases are wide and overlapping. The relatively large degree of overlap demonstrates that uncertainty over the input assumptions (particularly hedging costs) between our Low and High cases has a larger impact on benefits than the variation in default rates that we model. In part, the relative closeness of the Partial and Full Effectiveness cases reflects the larger drop in default rates from current market arrangements to that assumed in our Partial Effectiveness case (of 11.6 per cent per year to 2.2 per cent per year) than between our Partial and Full Effectiveness cases (of 2.2 per cent per year to 0.06 per cent per year). It also reflects conservative assumptions made in this report that reduce the extent to which customers benefit from the reduction in financing costs that accompany lower-risk business models. Those conservative assumptions may indicate that the likely levels of benefits are higher than those set out in the tables above.

The Tables above exclude some potential categories of benefit that might be attributed to the proposed interventions. These include:

- **Bill stability:** The proposed interventions reduce the cost for the generality of customers of reimbursing credit balances, RO payments and hedging costs (to the extent that it reduces default) at the point of supplier failure, which can lead to very large bill increases in periods when wholesale prices are high. In place of this, the proposed interventions will require customers to pay in advance for the cost of protecting credit balances. Accordingly, the policy smooths out costs currently experienced in times when customer bills are high. Customer benefit from that smoothing but we do not separately account for it in this report.

- **Dynamic benefits of competition:** The Tables above do not attribute benefits or costs resulting from the impact of the proposed interventions on competition over time. In principle, the dynamic benefits for competition could lean in either direction. On the one hand, current policies subsidise unsustainable entrants, which over the long term could undermine investment in the sector. On the other hand, under current circumstances, failures in the capital market could, at least in principle, undermine efficient retail entry absent an offsetting subsidy to entrants. Arguably, the balance of evidence points to the potential dynamic benefits of the proposed interventions: A subsidy funded by disengaged customers to customers of entrant suppliers, regardless of the degree of innovation, does not appear likely to be an efficient solution to promote innovators. Neither does the historical pattern of entry suggest that wider entry barriers have suppressed entry under existing arrangements. We present sensitivities in the Appendices of this report which account for potential impacts on competition in the market for disengaged customers and increased financing costs of established suppliers.[8]

[8] See Appendix B (sections B.2 and B.6).

# 1. Introduction and Context

Following a wave of supplier failures in the second half of 2021, Ofgem launched an action plan in December 2021 in order to "strengthen the financial resilience of suppliers, to ensure that risks are not passed inappropriately to consumers".[9] As part of that action plan, Ofgem has assembled a team dedicated to Financial Resilience and Controls (FRC).

NERA Economic Consulting ("NERA", "we") has been commissioned by Ofgem to support its Impact Assessment on a range of policy interventions designed to ensure the financial resilience of the energy retail supply industry, including:

- **Protecting customer credit balances (CCBs):** Suppliers would be required to insure or otherwise protect credit balances that they hold on behalf of customers. At present, failing suppliers will tend to use that source of money until they fail, and then the costs of reimbursing those credit balances are mutualised.
- **Protecting RO costs:** At the end of each year, suppliers are required to present an obligated volume of Renewable Obligation Certificates (ROCs), or pay a buy-out price for any shortfall. At present, failing suppliers will tend to avoid procuring ROCs (or instead sell their existing ROCs) until they fail, and the costs of meeting the obligation are then mutualised. Under this policy measure, suppliers would be required to either hold a certain amount of the obligation during the year, or protect an amount of cash equivalent to the unmet obligation.

We refer to the above as the **proposed interventions**.

This report proceeds as follows:

- Chapter 2 sets out the market failures and problems to be addressed by the policy intervention;
- Chapter 3 describes the policy interventions assessed in this report;
- Chapter 4 describes our structure and overarching methods for assessing the impacts of the proposed policies;
- Chapter 5 describes our estimation of each individual impact; and
- Chapter 6 presents our final results and concludes.

Ofgem's proposed policies to promote financial resilience in the sector have complex effects on market participants and consumers. In estimating these impacts we have necessarily made a series of simplifying assumptions in this draft report. The high-level assumptions that we have made that are most likely to have had a material impact on our results are:

- **Reference Window:** In assessing the likely impact of the interventions we have relied on the evidence available from the prior performance of the retail market in Great Britain. On the one hand, more recent evidence provides clearer insight into the market failures that have occurred and the potential costs and benefits of resolving those market failures: Prior to 2016, the smaller suppliers arguably at most at risk of failure held less than 20 per cent of the retail market and Ofgem imposed the market wide default tariff cap which

9 Ofgem (15 December 2021), Action plan on financial resilience

puts an upper limit on prices to domestic customers from January 2019. On the other hand, the most recent evidence also includes a period of unusually high wholesale prices which have contributed to supplier failures. For the purpose of this report, we have relied on a Reference Window of January 2016 to December 2021. We discuss the choice of this Reference Window in more detail and present a sensitivity in Appendix B (section B.3), which broadly confirms the results presented in the main body of this report.

- **Changes to the Default Tariff Cap (DTC):** The choice of Reference Window makes implicit assumptions about the existence and design of the DTC and the risks it imposes on market participants. We are aware that Ofgem is currently working on the design of the future price cap and that Default Tariff Act 2017 provides for the price cap to be in place until the end of 2023. For the purpose of this report we have relied on the implicit price cap structure in the Reference Window but for two exceptions: (1) We assume that the wholesale cost allowance structure changes to a shorter-term hedge structure (known as "3-1.5-12 [3]") as has been proposed by Ofgem and (2) we assume that the costs incurred by market participants in delivering the proposed interventions will be passed through to consumers.
- **Effectiveness of the interventions:** Our approach to identifying the benefits of reform is to identify the impact of the market failures resulting from current arrangements relative to a world where policy interventions resolve those market failures. This report presents results based on alternative assumptions about the extent to which the policy interventions designed to resolve those market failures actually do so.
- **Transactions costs and the cost capital:** We have assumed for the purpose of this report that the risks surrounding recovery of CCBs and the RO determine the rate of interest payable. We use credit ratings associated with different rates of default to identify the cost of capital for insuring and/or protecting risky cash-flows.

  Absent any change in business strategy, we have assumed that the fair price for insuring the risk to CCBs and the RO remains the same whether it is insured by the generality of customers or suppliers are required to protect them. Without a change in business strategy, it is no more costly for suppliers to protect capital than it is for consumers to insure it implicitly. Given a change in business strategy to manage risk more effectively, the fair price for insuring the risk to CCBs and RO payments will fall. Higher (/lower) estimates of the cost of capital would increase (/decrease) the magnitude of the transfers between customer groups, but not the overall direction of the results. We present a sensitivity to the cost of capital in Appendix B (section B.4).

  Our report does not assess the transactions costs associated with raising capital in detail except insofar as those are already manifested in the payments to providers of that capital to benchmark companies of a given credit rating. Neither does it assess any excess cost to consumers of paying for mutualised costs at times when energy bills are high.
- **Intensity of competition:** Except where otherwise stated, we have assumed in this report that obligations and costs imposed on suppliers, particularly entrant suppliers, will feed through to prices paid by customers due to competitive pressures in the active customer segment of the retail market. We similarly assume that changes in the costs faced by creditors feed through into prices paid to those creditors due to competitive pressures in the market for capital.

- **Transition:** This report is primarily focused on what the impact of the proposed policy interventions would have been in the Reference Window and/or in equilibrium assuming that general wholesale market and regulatory conditions were in the Reference Window. This report does not address the impact of the policy interventions during a transition period.

# 2. Market Failures and Problem Statement

The energy supply market in Great Britain delivers an essential service through decentralised provision by competing suppliers. To protect consumers from additional costs or potential interruption of supply, one of two processes operate in case of supplier failure: (1) Ofgem appoints a Supplier of Last Resort (SoLR) or (2) a Special Administrator Regime (SAR) takes effect to run the business.

In the stylised competitive markets of economic theory, consumers and firms make efficient decisions when they are fully exposed to the consequences of their actions. Both the SoLR and SAR have the effect of protecting the consumers of the failed supplier at the expense of customers whose supplier has not failed. The generality of customers are not party to the transaction between a failed supplier and its customers and are unable to protect their interests over the terms struck and risks taken.

In particular, the regime gives failed suppliers and their customers access to three sources of capital without charge to the failed supplier or its customers. These sources of capital include provision for:

- the CCBs of the customers of the failed supplier;
- payments due on behalf of the customers of failed suppliers under the Renewables Obligation;
- the difference between wholesale prices contemporaneous to the point of failure and the prices at which suppliers are obliged to sell under the Default Tariff Cap.

The provision of this free capital leads to excessive risk taking by suppliers, often referred to as “moral hazard” in the economic literature. The challenge for customers of assessing the credibility and risks taken by their supply business also suggests that even were customers incentivised to select reliable suppliers for themselves, they may be unable to do so – a market failure known as “adverse selection”.

This chapter proceeds as follows:

- Section 2.1 provides a brief overview of the SoLR and SAR processes;
- Section 2.2 explains how those processes give rise to market failures; and
- Section 2.3 succinctly states the problem to be addressed by the policy interventions considered in this report.

## 2.1. Overview of the SoLR and SAR Processes

In competitive markets, suppliers may suffer financial distress and exit in circumstances where they are not able to cover their cost of capital. In order to ensure that no customer goes without energy supply in cases of financial distress or market exit, Ofgem introduced arrangements to appoint a Supplier of Last Resort (SoLR). In particular:

- When a supplier fails, other suppliers bid to be appointed as the SoLR, who will then act as the supplier for all of the customers of the failed supplier, until (and unless) the customers each choose to switch to a different supplier;

- Potential suppliers may include a required Last Resort Supplier Payment (LRSP) in bidding to be appointed as the SoLR. The LRSP designed to cover the costs that they incur in becoming the supplier of the new customers. The bidder may choose not to include an LRSP in its bid if it deems that the benefit of gaining new customers exceeds the costs in doing so. The costs of taking on a new customer through the SoLR process generally comprise:
  - Repaying any positive credit balances on direct debit customers of the failed supplier. Any negative credit balances (i.e. where the customer *owed* money to the supplier) would be payable to the creditors of the failed supplier.
  - Purchasing ROCs on behalf of the annual consumption of the customers, to be presented to Ofgem at the end of the year. Any ROCs procured by the failing supplier would not transfer to the new supplier.
  - The cost of purchasing wholesale energy for the new customers over and above the cost that is allowed for through the Default Tariff Cap (DTC), i.e. the maximum price that the SoLR may charge its newly-acquired customers. These wholesale energy costs could be negative as well as positive, though set of supplier failures that occurred in late 2021 did so when shorter-term wholesale prices were considerably higher than allowed for through the DTC.
  - Administrative costs of participating in the SoLR process, such as the bidding process and integrating customers into their systems.
- If a positive LRSP is awarded to a SoLR, the costs are mutualised across all domestic customers through network charges and explicitly pass-through in the network cost allowances under the DTC.

As an alternative to the SoLR process, a failing supplier may be put into the Special Administration Regime (SAR), where an administrator steps in to continue the operation of the supplier, with customers continuing to be supplied under the same name as before. The Secretary of State may provide grants, loans, indemnities or guarantees to enable the administrator to finance the supplier's activities. This requires the Secretary of State to secure Treasury consent.[10]

Provisions are made to recover the costs from the company. Should a shortfall arise, the Secretary of State can recover the costs through charges imposed on the industry.[11] The costs borne by the administrator and hence passed on to customers are broadly equivalent to those borne through the SoLR process, except that in the case of the SAR the administrator will continue to run the suppliers as a going concern.

As a result, any assets held by the business (such as negative credit balances and remaining hedges that are in the money) may partly offset the liabilities (positive credit balances and obligations to supply below cost). Customers ultimately pay for the ongoing administration of the business which may be more or less costly than the alternative of a SOLR.

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10 Energy Act 2004, Sections 165, 166 and 167

11 Energy Act 2004, Section 169

## 2.2. Market Failures Present Under the Current Design

While they minimise disruption for customers of failed suppliers, the current arrangements create a range of inefficiencies, market and regulatory failures, which lead to additional costs, borne by the generality of customers. We describe these market failures below.

First, **moral hazard** occurs when decision makers do not bear the full cost of their actions, leading to excessive risk-taking. In the case of the energy supply industry, this occurs because suppliers have access to cashflows that they do not have to pay back if they fail. In particular, a supplier may take on risky business strategies supported by the working capital provided by (a) standing customer balances; and (b) the ability to defer purchasing ROCs or sell existing ones.

If a supplier fails, the value of these mutualised costs are paid by the generality of customers, meaning that the failed supplier does not have to pay back lenders before failure, or accept a larger loss to equity holders. As a result, the supplier has an inefficiently large incentive to take risks: equity holders share the downside with the generality of customers and have sole ownership of the upside. Unlike commercial debt, equity holders in suppliers pay no rate of interest, are not subject to the strictures of competition in a functioning capital market and do not have a subsidiary claim on the assets of the business given default.

Suppliers' business strategies are typically not observable or understood by the general public. Customers cannot easily therefore discern whether a supplier has a viable business model or not. The most observable characteristic of a supplier is the price it offers, and risky strategies (such as hedging less energy) are generally cheaper when they do not result in failure. Moreover, the existence of the SOLR regime limits customers' incentives to monitor supplier behaviour: when a supplier fails, customer credit balances are not at risk. As a result, customers have incentives to switch to the cheapest (potentially high risk) suppliers irrespective of the probability of failure.

The inability to distinguish between well-run suppliers and poorly-run suppliers and the tendency for riskier suppliers to offer lower prices creates a problem of **adverse selection**, where suppliers must adopt riskier strategies in order to be able to compete with other risky suppliers.

Between these two core market failures, industry arrangements support an excess in risk-taking by poorly-run suppliers, with customers expected to pay for risk-taking through periodic SoLR levies. This is effectively a free loan, that the lender (the generality of customers through the SoLR levy) will forfeit from time to time.

These market failures create several costs borne by customers:

- The industry supports business models which are inefficiently risky.[12] Thus, customers will be expected to pick up the bill of supplier failure more often than is efficient, and they are not remunerated for the risk they bear in doing so.

[12] Depending on whether one believes that there is asymmetric information in capital markets, the existence of a high failure rate may also make the industry as a whole seem riskier, even the suppliers which do not adopt risky business strategies. In such circumstances, there would also be the costs of contagion across all suppliers.

- Suppliers compete on prices that may reflect differences in wholesale hedging strategy, rather than underlying differences in costs. For instance, suppliers pursuing riskier business models may hedge less, which leaves them exposed when wholesale prices rise. The risky suppliers supported under the current arrangements are not necessarily the least cost, once risks are taken into account, meaning that the competitive process does not necessarily lead to the least cost mix of suppliers.
- Because many of the costs of failure are mutualised, prospective suppliers may enter into the market without a viable strategy for long-term success. There are administrative costs to entry and exit which are effectively wasted each time a supplier enters and exits the market.
- After the SoLR process, customers of the failed supplier will be served by a supplier that they did not choose. There are costs associated with them searching out and switching to a new supplier, and the SoLR process may undermine confidence in the market.

## 2.3. Problem Statement

The failures of the current arrangements described above lead to a single problem statement, across both credit balances and the RO:

*Under current market arrangements, suppliers have the ability to take risks, without oversight, using free money provided or protected by customers (through positive credit balances and unprocured ROCs), which when combined with the mutualisation of these costs if they fail, means that risky business models are sustained and even encouraged, at the expense of consumers of energy.*

In the remainder of this report, we assess the benefits of policy options which would require suppliers to bear the full cost of their risk taking, ensuring that the generality of customers are protected from bearing the consequences risk-taking behaviour.

# 3. Assessed Policy Design

Ofgem proposes to introduce policies that would require suppliers to protect their customer credit balances and Renewables Obligation. In both cases, the protection could come either from placing the required funds into an escrow account (which cannot be used for another purpose other than to repay the credit balance or purchase ROCs) or to secure a Letter of Credit (LOC) or equivalent protection from a third party, which would pay out as necessary in the event of the supplier's failure.

The direct effect of either design is that, in the event of a failure, the protected funds would be paid out as appropriate: protected customer credit balances would be returned to customers or transferred to the new supplier; protected RO funds or the ROCs themselves would be transferred to the new supplier, which could then present them to Ofgem at the end of the year. As a result, the generality of customers would not bear the cost of suppliers' business strategies through their tariffs.

By requiring suppliers to internalise the costs of financing, suppliers would have an incentive to operate with a reliable business model, and to convince sources of capital that they have a viable business plan with a lower rate of default.

Sections 3.1 and 3.2 below describe the policy designs we have assessed in this report in further detail.

## 3.1. Protecting Credit Balances

Over the course of a year, many customers pay their suppliers a different amount than they are billed based on their consumption. Generally, this is to smooth out energy bills over a year: domestic users generally consume more electricity and (especially) gas during the winter months than during the summer months, and so would pay higher bills during those months if they paid as billed. Instead, these customers may pay a flat amount per month, intended to equal their annual bill over the course of the year.

As a result, customers build up a positive credit balance during the summer months, offset by negative credit balances in the winter months. At present, the money held by suppliers is available to use to finance the business's activities. When a supplier fails, these balances are assets of the equity holders and are not returned to customers. However, credit balances must still be honoured by the SoLR, and this can be a substantial cost to the SoLR and ultimately to the generality of consumers when those costs are mutualised.

The policy under consideration is to require suppliers to protect CCBs by either placing them into an escrow account or obtaining an LOC from a third party that protects them. Upon a supplier failure, the instrument would pay out, either back to customers who have their balances redeemed, or to the SoLR which could then avoid claiming CCBs through the mutualisation process. The precise details of what level would require protection, and hence the policy which we assess in this report, is as follows:

- *100 per cent of credit balances should be protected:* Suppliers will be required to protect 100 per cent of credit balances, as opposed to protecting only the **surplus** credit balances – i.e. only where a supplier receives more than its expenses from a consumer beyond the normal shape of bill smoothing.

- *Gross credit balances:* Customers can either have positive or negative credit balances. In the event of a failure, the *positive* credit balances will be mutualised, but the creditors to the failed supplier still have a claim on the negative credit balances. Thus, the assessed policy requires suppliers to protect gross positive credit balances, instead of net credit balances. In other words, suppliers would not be allowed to settle positive and negative credit balances and only protect the remaining difference.
- *Unbilled consumption:* At some point following the SoLR process, a meter reading will be taken and the customer will be billed for the energy they consumed after their last meter read before the failure. This unbilled consumption at the time of failure is borne by the customer in question and is not ultimately mutualised. Suppliers will therefore be required to protect credit balances net of the cumulative unbilled consumption from customers with a positive credit balance.
- *Peak credit balances:* The level of credit balances varies across time, with balances highest in the summer and autumn due to lower billed consumption in the preceding months. Ofgem's minded to position is for suppliers to protect an amount equal to gross credit balances net of unbilled consumption. Ofgem's current preference is for suppliers to protect an amount of credit balances calculated on a monthly or quarterly basis.[13] However, the final policy has not been determined with respect to which level of credit balance must be protected, but we understand the following options are under consideration:
  - Each supplier must protect the maximum amount of total credit balances (gross of negative balances and net of unbilled consumption) that the supplier will accumulate during a 12-month period.
  - On a biannual basis, aligning with the price cap periods, each supplier must protect the maximum total credit balance within that price cap period.
  - On a quarterly basis, each supplier must protect the maximum total credit the maximum total credit balance within that quarter.

  The effect of these more granular requirements is that they require suppliers to protect a lower amount on average over the course of the year, though there may be some additional administrative costs in adjusting the level of protection periodically throughout the year which we have not assessed.

In general across this policy design, we assume that suppliers will be capable of demonstrating to Ofgem that they comply with the policy.

## 3.2. Renewables Obligation

Under the RO scheme, suppliers must present to Ofgem a certain number of ROCs pertaining to energy supplied during the preceding financial year (April to March) before 1 September following the end of the financial year.[14] If they do not present the requisite amount, they

13 Open Letter to domestic energy suppliers – Financial Resilience, dated 14 April 2022

14 The Renewables Obligation Order 2015, para. 67.

must pay the buy-out price on the shortfall. In 2022/23, suppliers must present 0.491 ROCs per MWh supplied, or pay a buy-out price of £52.88 per missing ROC.[15]

After a supplier fails, the supplier which takes on its customers will ultimately be responsible for presenting the requisite number of ROCs at the end of the financial year, or to buy out of the requirement at the buy-out price. The proposed policy would require suppliers to protect the value of ROCs in an escrow account or through a third-party LOC.

15 Ofgem (15 February 2022), Renewables Obligation (RO) Buy-out Price, Mutualisation Threshold and Mutualisation Ceilings for 2022-23

# 4. Overall Approach

Based on the policy designs described in Chapter 3 above, we assess the economic impact of protecting CCBs and RO through an escrow account or a third-party letter of credit. In this chapter, we describe our overall estimation strategy and underlying assumptions.

This chapter proceeds as follows:

- In Section 4.1, we discuss our overall approach to viewing the period before and after the implementation of the policy;
- In Section 4.2, we define the range of stakeholder and customer groups which could be affected by the policy; and
- In Section 4.3, we discuss the difference between transfers and social costs; and
- In Section 4.4, we provide a schematic overview of the impact of the policy on transfers and social costs.

## 4.1. Pre-policy vs Post-policy Modelling

To assess the impact of the proposed policy, we compare the total costs of a world without the policy to a world with the policy, allocated across a range of stakeholder groups. By taking the difference between the costs of the two worlds, we can measure both the total net benefit of the policy as well as the net benefit to individual groups. In particular, given Ofgem's principal objective to "protect the interests of existing and future consumers in relation to" the supply of electricity and gas,[16] we focus particularly on the costs and benefits that would be experienced by energy consumers.

### 4.1.1. Historical vs equilibrium modelling

When considering the world in the absence of the policy, we adopt two different approaches:

- The *historical view* effectively measures the costs which have actually materialised in recent years. For example, current arrangements mutualise positive credit balances and RO costs of customers of failed suppliers across the generality of customers. In effect, the generality of customers are insuring one another against the risk that their supplier fails, and the historical amounts paid in LRSPs and to support Bulb (in Special Administration) represent the pay-out on that insurance. The out-turn (ex post) value of this pay-out is a cost to the generality of customers (i.e. all domestic customers) under a historical view of the pre-policy world.
- The *equilibrium view* effectively measures the average and ongoing cost of the pre-policy world, based on the cost of financing the risk taken on by supply businesses. For example, in the case of the implicit insurance provided on customer credit balances, the cost to the generality of customers would be the foregone return commensurate with the level of risk taken. The equilibrium view represents our estimate of what returns market participants would have required (ex ante) to insure customer credit balances given the level of risk implied by outturn events. We still estimate the risk profile of the industry based on its historical performance.

16 Ofgem (19 July 2013), Our powers and duties

In both cases, we use the period from 2016 to 2021 to calibrate the costs of the pre-policy world. This is because this period represents the longest window for which we have consistent data, and where smaller suppliers make up a significant market share (i.e. greater than 10 per cent in aggregate). The period prior to 2016 may not be representative because there were few small suppliers and no defaults for over a decade prior to 2016. In some cases (e.g. pass-through of lower tariffs to retail customers), our historical view and our equilibrium view are the same insofar as historical outturns (i.e. ex post) are the best available evidence of impacts that could have been estimated in advance (i.e. ex ante).

However, this calibration period is an imperfect view of an equilibrium going forward. In the period before 2019 no price cap was in place. The price cap may have contributed to recent failures and their costs and therefore including years 2016 to 2018 may understate the benefits of reform. On the other hand, 2021 was characterised by very high wholesale energy prices and ensuing supplier failures which circumstances may not occur frequently (e.g. in one year in a six year sample) in gas and electricity wholesale markets in future. As a result, including 2021 may overstate the benefits of reform. We include a sensitivity to the Reference Window in Appendix B section B.3, below, which results in benefits of around 20 per cent less than our main results.

In general, the historical view yields a higher benefit to the proposed intervention, because the events of 2021 were particularly expensive relative to what we model as an equilibrium going forward. Thus, we generally refer to the historical view as the *High case outcome* in our modelling results, and the equilibrium view as the *Low case outcome*. However, for some categories of costs and benefits, the distinction between the historical and equilibrium view is not relevant, and so we draw on other sources of variation between the High and Low case outcomes.

## 4.2. Categories of Affected Parties

We assess the costs and benefits of the policy on a range of different parties who would be affected by a change from the status quo:

- *Customers of failed suppliers*: In advance of a supplier failure, these customers may benefit from cheaper tariffs supported by their supplier’s risky business strategy, but will also bear the costs of switching to that supplier as well as switching away from the SoLR assigned to them. Based on the average customer based of suppliers that have failed since January 2016, we estimate this group to contain 2.3 million customers.
- *Generality of customers*: In the event of a supplier failure, domestic customers in general bear the cost of mutualising their credit balances and renewables obligations, as well as other administrative costs of the SoLR process (e.g. administrative costs of the process). After the policies are introduced, the generality of customers will pay higher tariffs because the explicit cost of protecting credit balances and the RO will pass through to consumers either through the price cap or through the dynamics in the competitive market for fixed tariffs. The generality of customers includes customers of failed suppliers, but also include:
  - *Engaged customers with other suppliers*: Ofgem’s 2021 Consumer Perceptions of the Energy Market survey finds that 13.1 million customers are engaged (i.e. they have switched suppliers before). By definition, all customers of small suppliers (failed or otherwise) are “engaged”, but so too are some customers of large suppliers. Based on

the survey results, plus the average customer base of small suppliers since 2016, we estimate that 3.4 million customers are engaged and with a small supplier, and therefore that 7.4 million customers must be engaged and with a large supplier (and the remaining 2.3 million engaged customers are with failed suppliers and hence not part of this group).

  – *Disengaged customers with other suppliers*: Ofgem estimates that 15.4 million customers are disengaged, i.e. they have never switched suppliers. We assume that all of these customers are with large suppliers.

- *Failed suppliers*: In the event of a supplier failure in the pre-policy world, failed suppliers and their equity holders will face losses but are not obligated to return credit balances or present ROCs for the energy already supplied. However, they receive the full upside of their success if they do not fail. We assume that there is strong price competition among the types of suppliers that are most likely to fail, and hence the benefit of asymmetrical risk is largely passed through to their customers, except for any excess costs faced by the failed suppliers in e.g. raising credit or operating the business. We have assumed no dividends in excess of the cost of capital are paid to the equity holders in failed suppliers due to competitive pressure in the engaged segment of the retail market.
- *Generality of suppliers*: In the post-policy world, the generality of suppliers would be required to take on the cost of protecting their own credit balances and renewables obligations. For customers served by default tariffs, the DTC would include an explicit allowance for financing costs. For customers not served by default tariffs, we assume that price competition will mean that customers ultimately bear the cost of insuring their own credit balances, and hence the cost will pass through to the generality of customers.
- *Creditors and insurance markets*: In the pre-policy world, customers implicitly provide insurance for credit and RO balances, so there is no explicit role for creditors and insurers. In the post-policy world, suppliers would have to engage directly with third parties to either insure their balances or to provide working capital in its place (if it is placed in an escrow account). In a competitive credit and/or insurance market, we assume that these products would be priced fairly (and equivalently) to reflect the risk and expectation of pay-out (in the case of an insurance product) or default (in the case of a line of credit to cover working capital requirements).

## 4.3. Social Costs and Benefits vs Transfers

Many of the costs and benefits which we assess between the two cases are actually transfers from one group to another. For example, while the generality of customers pays for the risky business models supported under the current arrangements, the customers who are served by these suppliers themselves *benefit* from the low tariffs that they receive before failure.

By limiting the ability and incentive of suppliers to offer below-cost tariffs supported by implicit insurance from the generality of customers, customers will no longer have access to these rates. However, the generality of customers will also expect to cover the costs of fewer SoLR events, saving them money in the process. This represents a transfer between customer groups.

By contrast, another set of costs can be thought of as true economic costs. These relate to activities that happen only because of the proposed interventions or lack thereof. For example, in the pre-policy world, there is a higher level of supplier entry and exit than in the post-policy world. Each time a supplier exits, it incurs the administrative cost of exit which would not occur if fewer suppliers failed. Similarly, customers bear switching costs each time they switch because their supplier failed. Any excess of the operating costs of failed suppliers over competitors who remained in the market would indicate inefficiency and further social costs.[17] These costs are reduced if the incidence of supplier failure reduces.

A policy that stops or reduces the extent of transfers alone may still be a worthwhile outcome on equity grounds: one group of customers generally should not have to pay for the benefit earned by another. This is particularly the case if the burden of transfers falls on disengaged and vulnerable customers.

There is also a dynamic benefit to implementing the policy and eliminating these transfers between groups in fostering a market where competition functions effectively, rather than the distorted competition that takes place due to the prevalence of moral hazard. In its current guise, the distortion to competition is more likely to lead to bankruptcies during period of high wholesale prices and places a burden of costs (and transfers) onto consumers in periods where they are already experiencing rises in the cost of living. For instance, customers face a £68 SoLR levy from the 2021 bankruptcies at the same time as the price cap is increasing by £693 due to rising wholesale costs.[18]

In summary, creating a policy that solves the issue of moral hazard may result in benefits over and above the economic costs to society as a whole that we estimate in this paper, for at least two reasons. Firstly, there may an equity-based consideration in that one set of consumers, particularly more vulnerable customers, should not have to pay for the benefit earned by another through distorted and inefficient competition. Secondly, the current guise of competition means that these transfers are more likely to be placed onto consumers in periods where they are already facing increased living costs.

## 4.4. Summarised Theoretical Framework

In the charts below, we set out the overall theoretical framework of the model.

Figure 4.1 illustrates the direction of cashflows and commodities in a pre-policy world where a supplier fails.

Broadly speaking, customers of failed suppliers (shown in the centre) provide their supplier (far right) with money to maintain CCBs, meet the RO, and procure wholesale energy (as well as incur other direct and indirect costs unrelated to the policy interventions that are the subject of this report). Instead of fully returning the "product" that the cash given to the supplier is intended to cover (i.e. returning credit balances, procuring ROCs, and delivering energy), the supplier "gives back" a cheaper tariff while wasting some due to an inefficient business model. That missing "product", equal in theory to the size of the price discount plus the waste, is covered by the SoLR (far left) in the event of a failure, and hence by the generality of customers.

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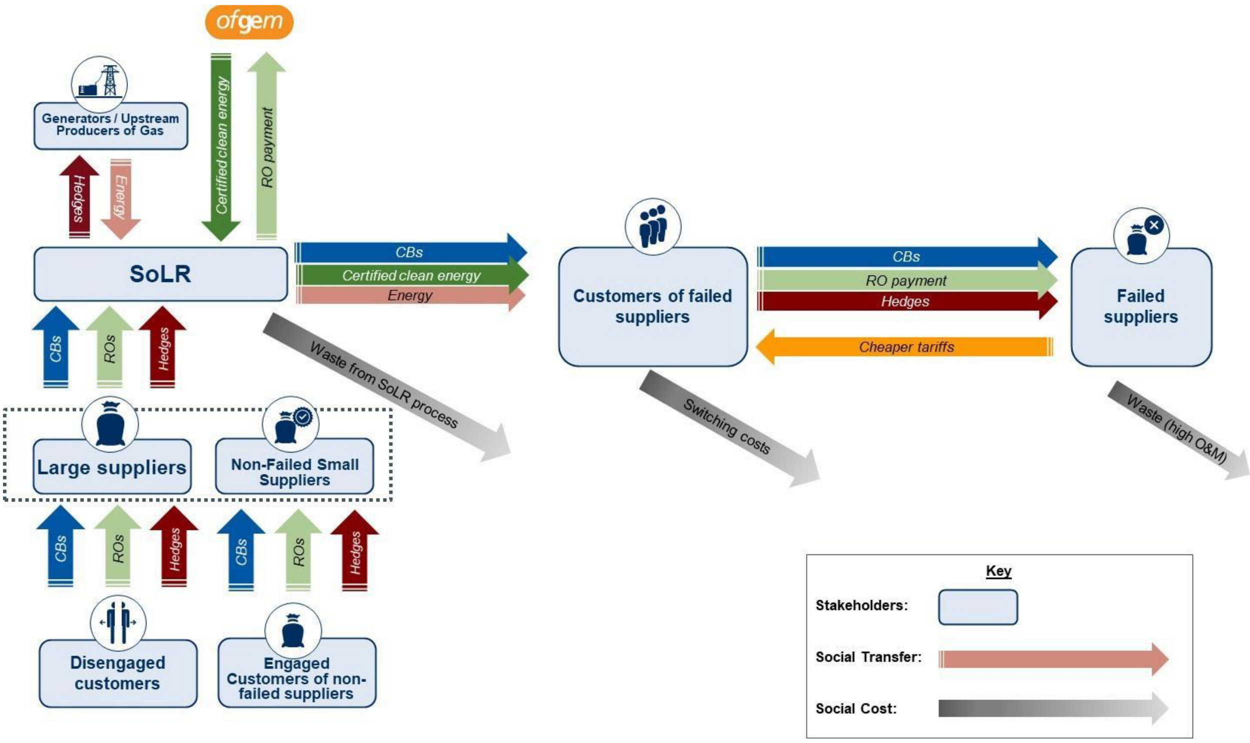
17 In principle, if failed suppliers had lower operating costs than those competitors who did not fail,

18 https://www.ofgem.gov.uk/publications/price-cap-increase-ps693-april

The SoLR buys additional power from generators, makes a payment in respect of the RO to Ofgem (or equivalently, acquires ROCs from a renewable generator and surrenders them) and then reclaims the costs of meeting CCBs, RO payments and hedge exposures from the generality of customers (via non-failed suppliers).

**Figure 4.1: Cash Flows in the Pre-Policy World**



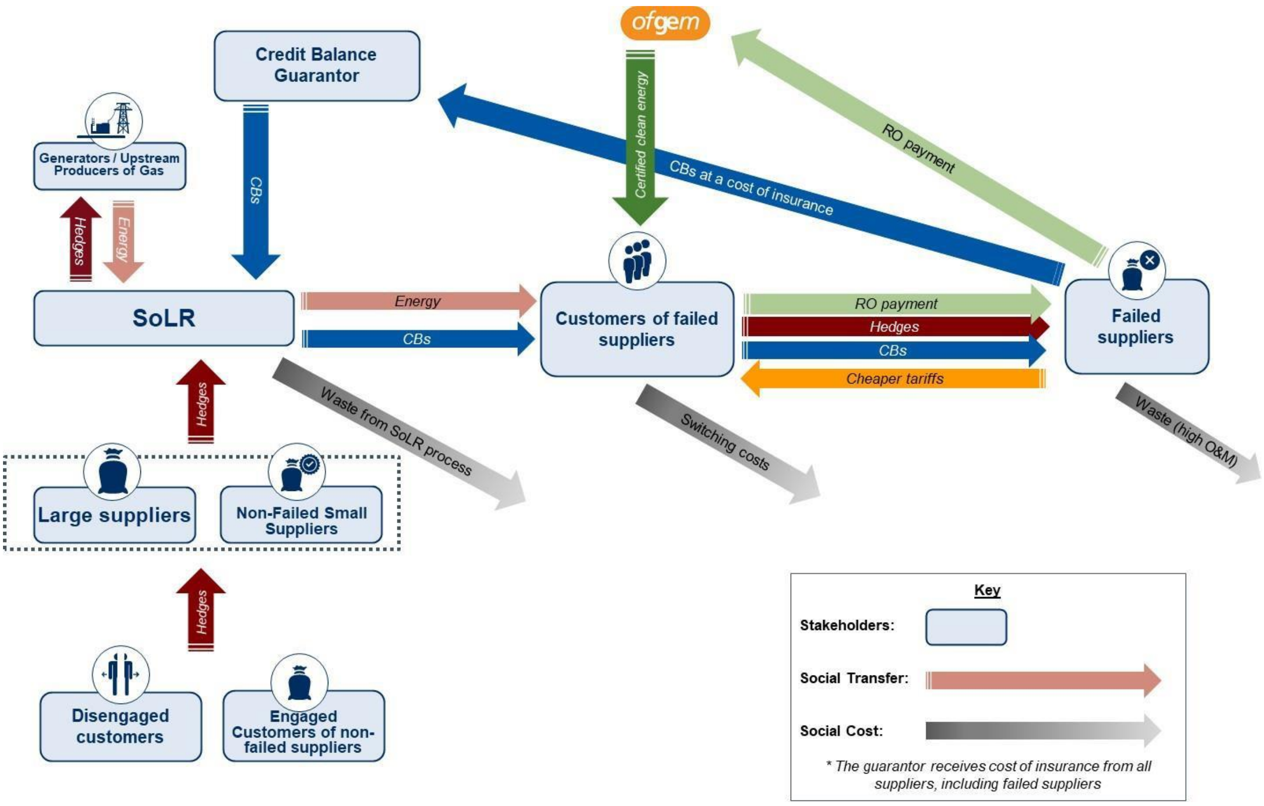

There are three basic "products" which are relevant in this context, which a poorly-run supplier can exploit by taking the cash and instead relying on the generality of customers to deliver the "product":

- CCBs, which should be returned to customers on average over time. When a supplier fails, the SoLR must honour the credit balances that the failed supplier did not, and it recuperates this value from the generality of customers.
- ROCs, i.e. the compliance with the RO scheme. The cost to the supplier of the RO scheme is part of the rate that a customer pays, but if this value is passed back to the customer through cheaper tariffs (or lost in waste) instead of through meeting the obligation on behalf of each customer, then the actual ROCs must be provided through other means, i.e. by the SoLR company and ultimately paid for by the generality of customers.
- Wholesale energy, which is generally purchased from generators using hedged contracts. Irresponsible suppliers may forego fully hedging their needs, but still receive revenues on the assumption that they have. When a supplier fails, the SoLR has to purchase energy from generators (or upstream producers of gas) at potentially high prices, socialising the cost across the generality of customers, via the SoLR levy.

As a result of the above transfers to customers of failed suppliers from the generality of consumers (instead of from the supplier itself), failed suppliers are able to offer cheaper tariffs. Any amount of this value which is not returned to customers in the form of cheaper tariffs is either an increase in profits for the suppliers' investors or wasted costs relative to an efficient company.[19] Assuming a high degree of competition amongst smaller suppliers, we assume that there are no excess profits in a steady state.

In Figure 4.2, we illustrate the direction of cashflows in a world where the policy is effective (i.e. CCBs and the RO are never mutualised) but where a supplier still fails. In this world, the failed supplier bears more of the cost of delivering the "product" itself, and thus limits the level of cost that is mutualised.

**Figure 4.2: Cash Flows in the Post-Policy World**




The key differences between Figure 4.1 and Figure 4.2 are as follows:

- CCBs are no longer mutualised. Any credit balance accrued on a customer account will be paid back by the supplier one way or another: either the supplier returns the positive balance through an increase in bills and avoids failure, or the supplier fails and the customer's credit balance is honoured by a financial instrument held by the failed supplier.
- The failed supplier now must incur the cost of actually procuring ROCs, or of holding the money that would allow it to procure ROCs. Thus, the cashflow associated with ROCs moves into a closed loop between customers, the failed supplier, and Ofgem.

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19 In principle, suppliers could also return more to their customers through cheaper tariffs because they took an inefficient risk in wholesale markets, which happened to pay-off. For the purpose of this simplified schematic, we include this potential pay-off due to good fortune in wholesale markets as "waste".

- Hedging costs still exist as per the pre-policy world, because the current consultation does not include a change in hedging rules. Disengaged customers and engaged customers with non-failed suppliers continue to face the cost of mutualised hedge exposures.
- With the additional resiliency requirements, small suppliers are less able to offer lower tariffs, including the competitors of failed suppliers (signified by a narrower orange arrow in Figure 4.2).
- Because there is less free financing available, the industry supports better business models fewer supplier failures, and there is less waste (signified by narrower grey arrows in Figure 4.2).

# 5. Estimation Methods

In this chapter, we set out our approach to estimating each of the cost and benefit items and summarise our results. We estimate the following cost, benefits and their determinants:

- **Failure rates:** Several of the benefits are driven by a reduction in the rate of supplier failure, assuming that the policies are effective in resolving the market failures that support excessively risky business models. While not itself a quantifiable benefit, we set out our approach to estimating a change in the failure rate in Section 5.1.
- **Cost of mutualising credit balances and the RO:** In the status quo, the generality of customers implicitly provide financing to failed suppliers through the process of mutualising credit balances and the RO. This manifests itself in tariffs when suppliers fail and costs are mutualised through the SoLR levy. In Section 5.2, we describe our estimate of the extent to which this cost is reduced by ensuring that the party on whose behalf suppliers incur the risk pays the cost explicitly through their tariffs. The size of this benefit is sensitive to the assumption on the improvement in failure rates, and, hence, the costs of financing suppliers' activities.
- **Option to pay the price cap rather than procurement cost on supplier failure:** In the status quo, customers of failed suppliers hold an option to pay a price-capped tariff when their supplier fails and prompts a SoLR event, rather than having to pay the contemporaneous price for energy. In the case of a Special Administrator being appointed, customers may continue to pay their prevailing tariff until it expires, which is likely to be lower than the DTC. The generality of customers fund this option through the mutualisation of hedging costs and the funding of the Special Administrator. We estimate the corresponding option value in Section 5.3.
- **Price increases for engaged customers:** The above two items represent a transfer from the generality of customers to customers of failed suppliers under existing arrangements. The customers of failed suppliers benefit in the pre-policy world through cheaper tariffs offered by their supplier. Engaged customers of non-failed suppliers who are less creditworthy may also see cheaper tariffs under existing arrangements where their supplier is taking risk. The benefit to both customers of failed suppliers and engaged customers may disappear or diminish as a result of the policies. We estimate this loss to engaged customers for both failed and non-failed suppliers in Section 5.4.
- **Costs of switching:** There are further economic costs associated with failure which are not transfers from one party to another. In particular, customers and suppliers bear costs when a customer switches suppliers. Where some of these switches occur because of a SoLR process (and the customer wishes to choose their supplier) or because there are unsustainable (but cheap) suppliers in the market, the total costs of switching will decline with the failure rate. We estimate these in Section 5.5.
- **Administrative costs of implementation and enforcement:** There will be costs associated with implementing and enforcing the new policy, but we have not estimated these as part of this report. We discuss these in Section 5.6.

Throughout the chapter, we present a range for each cost and benefit item to reflect low and high case estimates under differences in our assumption of policy effectiveness and to reflect uncertainties in pinpointing exact estimates for some parameters, such as switching costs.

From a theoretical perspective, requiring suppliers to finance their own activities, rather than relying on a source of free capital would be expected decrease the moral hazard problem described in Chapter 2 above, reduce the risks that they take and reduce the rate of default. Although protecting credit balances and the RO would require suppliers to commit capital to the business, whether those measures are sufficient to address the entirety rather than part of the moral hazard problem is not clear *a priori*. Accordingly, our approach has been to adopt a range from "Partial Effectiveness" to "Full Effectiveness", which assume different impacts on default rates.

In pricing the impact of changes in default risks, we have relied on assessments that credit rating agencies undertake of the creditworthiness of businesses and the long-run associated risks of default.[20] In many instances, the range is dictated by flexing our assumption of the default rate under our *equilibrium view* post-policy. For instance, as outlined in Section 5.1.1, the Partial Effectiveness scenario employs a default rate in line that experienced by businesses with a B credit rating over the long term. The Full Effectiveness view employs a default rate in line with that experienced by businesses with a BBB credit rating over the long term.

Our modelling therefore assumes that, following the proposed interventions, default rates for smaller suppliers will fall in line with either B or BBB rated companies. We present analysis showing the reasonableness of that assumption in Appendix D, below, given the likely impact of the policy on qualitative factors and financial ratios that would be likely to affect the rate of default.

The equilibrium view impacts, alongside ranges for key parameters, the low and high ranges for most line items throughout our CBA. However, we also employ the *historical view*, to inform our high estimate for two key items: the cost of insurance and hedging costs. This view analyses what has been mutualised across 2016 to 2021 and estimates how these costs would have differed under lower failure rates.

We analyse each of the key costs, benefits and their determinants in sections 5.1 to 5.6 below.

## 5.1. Change in Failure Rate

While it is not an explicit cost or benefit line item, many of the costs and benefits discussed in this report are driven by a reduction in supplier failures that we assume will occur from resolving the market failures present under the current arrangements. For example, with fewer failures, fewer credit balances will be mutualised, and fewer costly SoLR processes will occur.

Failure rates differ across supplier types: The British energy supply market consists of businesses of different scales with different risk profiles. Five of the current suppliers grew out of the historical fourteen Public Electricity Suppliers and single gas monopolist (British Gas) at the time of privatisation. These suppliers typically have more customers (historically

[20] Credit rating agencies assess companies according to the risks debt investors would face were they to invest in the business. Lenders use these credit ratings to assess the necessary rate of interest. The nomenclature of the three main rating agencies varies (Standard and Poor's or "S&P", Moody's and Fitch). For instance Standard and Poor's scale runs from AAA to D, where double or triple letters represent lower credit risks. Standard and Poor's ratings of AAA, AA, A and BBB are "investment grade" and represent high quality investments with low risk of default (the Moody's equivalent ratings are Aaa, Aa, A and Baa). Whilst ratings of BB, B, CCC and below would constitute "non-investment grade" (Moody's equivalents are Baa, Ba, Caa).

over 10 per cent of the market) and investable credit ratings (see Table 5.2, below) and frequently have diversified business models. None of these larger incumbent suppliers failed in the Reference Window from 2016 to 2021. At its peak, over 60 further suppliers operated in the retail market who had lower market share (under 5 per cent), and 66 failed between 2016 to 2021 (including some which were not present at the peak number of suppliers).

We distinguish between small suppliers and large suppliers, on the basis that the risk of failure and/or the perception of risk around a small supplier may be higher than for an established incumbent. We set a threshold of 5 per cent market share as the distinguishing point between a small supplier and a large supplier.

In principle, we could select alternative thresholds for distinguishing between small and large suppliers in the market. Five percent is a natural cut-off because it has historically been a market share that was only achievable by the incumbent suppliers (in the last two or three years, Bulb, Ovo Energy and Octopus were able to breach that threshold). The upward and downward impacts on total costs of choosing a higher or lower threshold are in any case somewhat offsetting. Were we to select a lower threshold, our estimated failure rate would increase, which would increase average costs but those costs would be applied to a smaller base of customers. We provide a sensitivity analysis including Bulb, Ovo Energy and Octopus in the small supplier category in Appendix B.1.

We summarise our selected assumptions and sources in Table 5.1 for estimating the change in failure rate, with further explanation provided in sections 5.1.1 and 5.1.2.

**Table 5.1: Failure Rate Summary**

| Supplier Size: | Small Firm | Large Firm |
|---|---|---|
| Pre-Policy | 11.61%<br>Average failure rate of small suppliers from 2016-2021. | 0.06%<br>Long-run average failure rate of BBB-rated European firms. |
| Post-Policy | 0.06% (Full Effectiveness) or 2.22% (Partial Effectiveness)<br>Long-run average failure rate of BBB- or B-rated European firms. | |

*Source: NERA Analysis*

In short, we assume that failure rates in the pre-policy world mirror their historical levels for small suppliers, and adjust to either the failure level of a typical B- (under Partial Effectiveness) or BBB-rated (Full Effectiveness) company as a result of the policy.

### 5.1.1. Pre-policy world failure rate

For small suppliers, we measure the average rate of small supplier exits in the period from Q1 2016 to Q4 2021. We find an annual failure rate of 11.61 per cent for small suppliers, weighted by the size of their customer base or about 20 per cent on an unweighted basis.[21]

[21] Data on supplier failures provided by Ofgem. https://www.ofgem.gov.uk/information-consumers/energy-advice-households/what-happens-if-your-energy-supplier-goes-bust

As shown by Figure 5.1 below, according to S&P data on failure rates by credit rating, a failure rate of 11.61 per cent would imply a credit rating of between B and CCC.[22]

Due to the small sample of large suppliers, a historical annual failure rate for large suppliers in the pre-policy scenario is not a reasonable expectation for the future. Bulb exceeded our threshold for a large supplier by the point it entered the SAR, but is not one of the historical incumbent suppliers. If Bulb is included as a large supplier, then the failure rate of large suppliers is arguably higher than would be expected for a large supplier going forward; if Bulb is excluded, this would suggest there is no chance of a large supplier failing going forward, but this is also not a reasonable assumption.

Instead, we assume that the expected failure rate for large suppliers is consistent with other corporations with a similar credit rating. As shown in Table 5.2, credit ratings are publicly available for most large suppliers, which shows that they typically have a credit rating of BBB or BBB+ according to the S&P scale.

These credit ratings will reflect the creditworthiness of the diversified businesses that these companies operate, which variously include gas production and storage, electricity generation and networks.

European corporates with a BBB rating exhibit an annual failure rate of 0.06 per cent as shown in Figure 5.1 below.[23]

**Table 5.2: Most Recent Publicly Available Ratings of Large Suppliers**

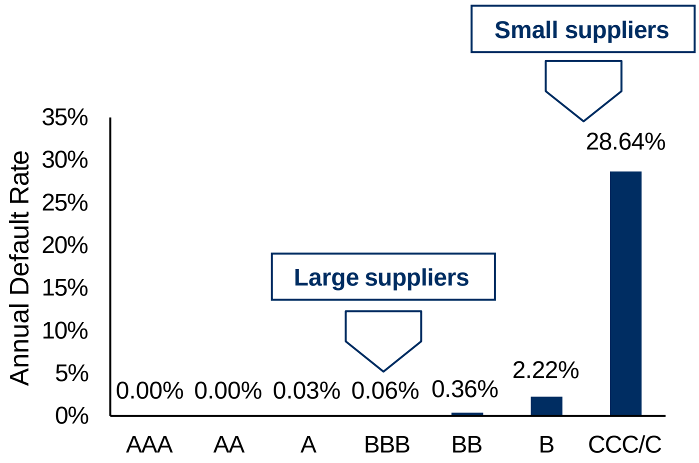
| | Moody's | S&P | Date |
|---|---|---|---|
| Centrica (CAN-GB) | Baa2 | BBB | Both: Dec 2021 |
| EDF (EDF-FR) | Baa1 | BBB | Both: Feb 2022 |
| Iberdrola SA (IBE-ES) | Baa1 | BBB+ | M: Apr 2016/ S&P: Mar 2018 |
| E.on SE (EOAN-DE) | Baa2 | BBB | M: Mar 2020/ S&P: Mar 2017 |
| SSE plc (SSE-GB) | Baa1 | BBB+ | M: Nov 2021/ S&P: Dec 2018 |

*Notes: SSE plc operated a supply business for most of the Reference Window to January 2020. Credit ratings for Ovo, Innogy and Octopus where not available.*
Source: *Moody's and S&P*

[22] S&P Global (2021) 2020 Annual Global Corporate Default and Rating Study, Table 25 – Average Annual Default Rate of European Corporates between 1981 and 2020.

[23] S&P Global (2021) 2020 Annual Global Corporate Default and Rating Study, Table 25 – Average Annual Default Rate of European Corporates between 1981 and 2020.

**Figure 5.1: Annual Default Rate by Credit Rating**




*Source: S&P, NERA Analysis*

### 5.1.2. Post-policy world failure rate

In a post-policy world, we anticipate that failure rates for small suppliers will improve since suppliers will be obliged to protect their exposures and those with riskier business models will not enter the market to the same extent. The precise impact of the proposed interventions on default rates is uncertain. Accordingly, we outline a Full Effectiveness and a Partial Effectiveness scenario.

In the **Full Effectiveness** scenario, we assume that small supplier failure rates will improve to the point where they are consistent with a BBB-rated firm i.e. that the policy would induce all market participants to be as creditworthy as the most creditworthy market participants currently operating. This would equate to an expected annual failure rate of 0.06 per cent.

In the **Partial Effectiveness** scenario, we assume that the reduction in risk is more modest, and small suppliers only achieve a failure rate consistent with B-rated firm. This would equate to an expected annual failure rate of 2.22 per cent, as shown in Figure 5.1.

This range of effectiveness encompasses a spectrum from a rate of default consistent with a fairly marginal improvement of just one credit rating to a material improvement for small suppliers to a rating in line with the largest incumbents. The impact of the proposed interventions on the precise rate of default is challenging to model directly and may differ across firms and strategies. In Appendix D, we present some stylised analysis which shows that some of the quantitative factors and the key financial ratios that underpin credit ratings are likely to improve following the introduction of the policy. In other words, credit rating agencies would view the suppliers are more secure and less likely to default. Our stylised analysis suggests that the impact of the proposed interventions could be material and it is reasonable to anticipate that the benefits will fall within the range we assume.

For large suppliers, our base case assumption is that their failure rate is unchanged from the pre-policy world. However, in practice it is unclear that the largest suppliers would continue to be as creditworthy as they have been historically were the policy not implemented. The current market arrangements effectively subsidise market participants with high-risk business models and distort competition by disadvantaging lower risk business models. Were current arrangements allowed to continue indefinitely, existing incumbents may be forced to respond by themselves taking on riskier strategies, become less creditworthy and incur higher default risks. In Appendix B.2, we analyse a 'what if' sensitivity wherein the market failures inherent in the status quo lead the failure rate of large suppliers pre-policy to fall to the equivalent of a BB-rated firm (0.36 per cent).

## 5.2. Cost of Insuring Credit Balances and ROs

In the pre-policy world, suppliers receive free financing from customers through the ability to hold onto CCBs and forego purchasing their required ROCs until they are due. If a supplier continues to operate, it will eventually return each customer's credit balance, and will purchase ROCs or pay a buy-out price to Ofgem for failing to do so. However, if a supplier fails, its creditors have a claim on any positive CCBs and ROCs, which is effectively an insurance pay-out from the generality of customers through the SoLR levy (baked into tariffs) or bail outs to a company operating under a Special Administrator.

With the new policies in place, insurance (of some form)[24] would be explicitly procured by suppliers through financial markets rather than provided implicitly by customers. In this section, we set out our approach to quantifying the net benefits from explicitly costing the insurance of CCBs and ROCs. These benefits come from the following sources:

- By requiring suppliers to explicitly bear the cost of their own potential failure, suppliers will be less likely to take on inefficient risk, leading to potentially cheaper financing costs. Our method for assessing the change in overall tariffs assumes that cheaper financing costs may be largely offset by possible increases in other costs (e.g. of putting more capital in the business, or additional hedging). That assumption may be unduly conservative and understate the benefits of reform; and
- The cost of a supplier's failure is internalised and paid for by the party that takes on risks (the supplier) rather than being spread across customers who have no connection to the supplier's activities.

The cost of insurance in the post policy world depends greatly on how much suppliers change behaviour and hence how much lower their financing costs fall. We consider two scenarios, based on the effectiveness of the policy in reducing risky business models:

- **Full Effectiveness:** If the policy is effective in reducing risky business models and the cost of capital is equal across all energy suppliers (equivalent to a BBB-rated firm), all customers bear the same share of the cost of insurance.
- **Partial Effectiveness:** If the policy reduces, but does not completely eliminate risky business models, suppliers will have different costs of capital. Customers of suppliers who appear riskier will end up paying a higher share of the cost of insurance than the generality of customers due to the higher cost of capital of their suppliers, equivalent to a B-rated firm.

In both the pre- and post-policy world, customers ultimately bear the cost of the insurance. In the pre-policy world, customers pay through the SoLR levy when suppliers fail; in the post-policy world, suppliers pass on these additional costs to their customers through higher

24 Either through a LOC or by keeping the funds in escrow.

tariffs, and an explicit adjustment would be required to the DTC methodology to allow for these costs.

To provide a cost and benefit range within the pre-policy world, we present both a High case outcome, which is based on the historical view, and a Low case outcome, which is based on the equilibrium view. In the historical (High case) view, we measure the cost of insurance as being the amount of CCB and RO costs which failed suppliers held at the time of default, most of which were mutualised (and some absorbed by the SoLR). In the equilibrium view, we estimate the return that a reasonable investor would require for the risks it bears.

We summarise our assumptions in deriving a cost of insurance in Table 5.3 and Table 5.4 below, under the pre- and post-policy world, and in the historical and equilibrium views, with more detail provided in the remainder of this section.

**Table 5.3: Cost of CB Insurance - Summary**

| | | Small Firm | | Large Firm | |
|---|---|---|---|---|---|
| Supplier Size: | | Low | High | Low | High |
| Pre-Policy | Cost insured | £579m<br>Average small supplier gross CCB net of unbilled consumption from Sep-Dec of 2021 | N/A | £1,631m<br>Average large supplier gross CCB net of unbilled consumption from Sep-Dec of 2021 | N/A |
| | Cost of capital for insured sum | 11.61%<br>Return should be at least as big of probability of failure. | N/A | 1.12%<br>Bond yield on a typical BBB company. | N/A |
| | Total cost | £67m<br>Multiplied from the above | £107m<br>Average annual mutualised CCBs '16-'21 (inc. Bulb) | £18m<br>Multiplied from the above | £0 m<br>Average annual mutualised CCBs '16-'21 |
| | Insuring party | Generality of customers, through SoLR levy | | Generality of customers, through SoLR levy | |
| Post-Policy | Cost insured | £440m<br>Peak annual gross CB net of unbilled consumption, assuming they adopt balancing approach of large suppliers. | | £1,763m<br>Peak annual gross CB net of unbilled consumption | |
| | Cost of capital for insured sum | 1.12% (5.38%)<br>Bond yield on a typical BBB (B) company. | | 1.12%<br>Bond yield on a typical BBB company. | |
| | Total cost | £4.9m (£24m)<br>Multiplied from the above. | | £20m<br>Multiplied from the above | |
| | Insuring party | Own firm customers, through higher tariffs. | | Own firm customers, through higher tariffs. | |



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**Table 5.4: Cost of RO Insurance - Summary**

| | | Small Firm | | Large Firm | |
|---|---|---|---|---|---|
| Supplier Size: | | Low | High | Low | High |
| Pre-Policy | Cost insured | £471m<br>Annual maximum amount of ROC to be protected | N/A | £1,889m<br>Annual maximum amount of ROC to be protected | N/A |
| | Cost of capital for insured sum | 11.61%<br>Return should be at least as big of probability of failure. | N/A | 1.12%<br>Bond yield on a typical BBB company. | N/A |
| | Total cost | £55m<br>Multiplied from the above | £78m<br>Average annual mutualised CBs '16-'21 (inc. Bulb) | £21m<br>Multiplied from the above | £0 m<br>Average annual mutualised CBs '16-'21 |
| | Insuring party | Generality of customers, through SoLR levy | | Generality of customers, through SoLR levy | |
| Post-Policy | Cost insured | £471m<br>Annual maximum amount of ROC to be protected | | £1,889m<br>Annual maximum amount of ROC to be protected | |
| | Cost of capital for insured sum | 1.12% (5.38%)<br>Bond yield on a typical BBB (B) company. | | 1.12%<br>Bond yield on a typical BBB company. | |
| | Total cost | £5.3m (£25m)<br>Multiplied from the above. | | £21m<br>Multiplied from the above | |
| | Insuring party | Own firm customers, through higher tariffs. | | Own firm customers, through higher tariffs. | |

*Source: NERA Analysis*


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Estimation
Methods

### 5.2.1. Our High case outcome employs the historical mutualisation of CBs and RO through the SoLR process

We calculate a High case outcome for each cost and benefit item, which for cost of insurance and hedging costs, utilises a historical view of annual mutualisation costs across our observation period in the high scenario.

#### 5.2.1.1. Pre-policy world

In the pre-policy world, the cost of insurance of CCBs is equal to the value that failed suppliers held at the time of failure and for the RO the unmet obligation remaining. This value is the cost that the generality of customers paid to insure CCBs and ROs of customer of failed supplier, paid primarily through SoLR levies.

We estimate the credit balances and ROCs that were outstanding at the time of failure, for all failures between 2016 and 2021. We estimate the full size of CCBs, even if the SoLR has agreed to absorb a portion of it to acquire new customers. In such instances, we assume that customers ultimately paid for the costs of the full credit balances through higher bills than they would have received in the absence of the SoLR process.

For 2021 failures specifically, LSRPs have not yet been finalised and we instead rely on Ofgem estimates for the LRSPs that suppliers will recoup and, in cases when such data does not yet exist, RFI data to inform the average credit balance per customer for the failed supplier.[25] The response rate and quality of failed suppliers in the RFI in the months leading up to failure is often poor. Instead, we estimate the average CCB per customer (net of unbilled consumption) for small suppliers, multiply this with the customer numbers of each failed supplier.

We then calculate the average annual CCB mutualisation between 2016 to 2021, equal to £107 million per annum.

For the RO, we calculate the average annual mutualised RO payments between 2016 and 2021, equal to £78 million per annum.

In the pre-policy world, these mutualised costs are paid for by the generality of customers through the SoLR levy. Ultimately all customers pay for the SoLR levy, including those of the failed suppliers once they have been moved to a new supplier. Once the proposed interventions are in place, we assume that no CCBs or ROs are mutualised: even if the policies are not fully effective in reducing the incidence of failure, we assume that the instrument which protects CCBs and ROs fully covers these costs in the event of failure.

Thus, from the introduction of the proposed interventions, we estimate a decrease in the SoLR levy of £185 million (£107 million plus £78 million) per annum, or roughly £6.5 per customer.

[25] Provided through Ofgem's "Covid RFI".

### 5.2.1.2. Post-policy world

In the post-policy world, all suppliers will be required to explicitly insure CCBs and the RO. There is no "historical" view of these costs, which will be driven by (a) the volume of CCBs and ROs which are required to be protected; and (b) the rate of return those balances are subject to. These costs are passed through directly to customers through an increase in tariffs, including through an uplift to the DTC as appropriate.

We estimate these additional costs in the same way between the High case and the Low case outcome, which we discuss in greater detail in our discussion of the Low case outcome (in Section 5.2.2, because the methodology applies in *both* the pre- and post-policy worlds in the Low case outcome. In summary:

- We assume that small and large suppliers are required to protect their peak CCB during the year, gross of negative credit balances and net of unbilled consumption. They are also required to protect their total annual RO.
- In the Partial Effectiveness scenario, we assume that small suppliers' financing costs are consistent with the typical bond yield of a B-rated firm, or 5.38 per cent. In the Full Effectiveness scenario, we assume that their financing costs are consistent with the typical bond yield of a BBB-rated firm, or 1.12 per cent. In both scenarios, we assume that large suppliers' financing costs are consistent with the typical bond yield of a BBB-rated firm.
- Between CCBs and the RO, suppliers incur an additional £51 million (Full Effectiveness) to £90 million (Partial Effectiveness) in insurance costs which are passed through to their customers as a tariff increase.

### 5.2.1.3. High case outcome – results

The policy reduces the cost of insurance by decreasing the small supplier default risk, and additionally transfers the cost of insurance from the SoLR levy to an explicit part of customers' tariff.

As shown in Table 5.5, the policy reduces the cost of insurance for CCBs by £61 million per annum when the policy is only partially effective at reducing default risk, and by £82 million when the policy is fully effective. Both of these are the net effect of the complete removal of CCBs from the SoLR levy, replaced by an explicit component of tariffs.

**Table 5.5: Cost of Insurance in the High Scenario – Credit Balances**

| | Pre-policy | Post-policy | | Delta Pre- and Post-Policy | |
|---|---|---|---|---|---|
| | | **Partial Effectiveness** | **Full Effectiveness** | **Partial Effectiveness** | **Full Effectiveness** |
| Annual Cost of Insurance – CCBs | £107m | £43m | £25m | £61m | £82m |
| Cost of Insurance per Domestic Customer | £3.8 | £1.5 | £0.9 | £2.3 | £2.9 |

*Source: NERA Analysis.*

Similarly, the policy reduces the cost of insurance for the RO. Table 5.6 shows that the reduction in the cost of insurance ranges from £31 to £51 million per annum depending on the policy effectiveness.

**Table 5.6: Cost of Insurance in the High Scenario – Renewable Obligation**

| | Pre-policy | Post-policy | | Delta Pre- and Post-Policy | |
|---|---|---|---|---|---|
| | | **Partial Effectiveness** | **Full Effectiveness** | **Partial Effectiveness** | **Full Effectiveness** |
| Annual Cost of Insurance – ROs | £78m | £47m | £27m | £31m | £51m |
| Cost of Insurance per Domestic Customer | £2.7 | £1.6 | £0.9 | £1.1 | £1.6 |

*Source: NERA Analysis.*

### 5.2.2. Our Low case outcome employs the equilibrium view based on an assumed default rate

While the historical view focuses on the costs actually mutualised in the pre-policy world, the equilibrium view represents the interest rate suppliers would need to pay at the market for an insurance of the deposited CCBs and ROCs. This represents the fair return on the implicit insurance provided by the generality of customers in the pre-policy world. In the post-policy world, this interest rate represents the explicit costs that suppliers have to pay to protect deposited CCBs and the RO. We treat this is the Low case outcome.

We estimate the cost of this insurance in three steps:

1. identify a fair rate of return for each type of supplier (identical for both CBs and the RO);

2. estimate the balance/principal that is implicitly or explicitly protected (separately for CBs and the RO); and
3. determine who ultimately bears this cost.

For (c), these costs are borne by the generality of customers through the SoLR levy in the pre-policy world. Ultimately this includes all domestic customers, including the customers of the failed supplier via their new supplier, in proportion with their consumption. In the post-policy world, suppliers pass through the cost of insurance for CBs and the RO to their customers through higher tariffs. We discuss (a) and (b) below separately for the pre- and post-policy world.

#### 5.2.2.1. Pre-policy world: Fair rate of return

We estimate the fair return on insurance for default based on a representative credit rating, itself a function of each supplier's expected default rate.[26]

For small suppliers, their historical failure rate implies a credit rating between B and CCC. Bond yields for B-rated companies are 5.38 per cent, and for CCC-rated companies are 10.76 per cent.[27] However, because debt is paid back before equity, debt issuers are likely to receive some of their principal back even in the event of a failure. The generality of customers, paying for the failure through SoLR payments, do not receive any such benefit, and so should earn a higher return. For this reason, we assume that customers should earn back at least the customer-weighted probability of failure, equal to 11.61 per cent.

For a large supplier, we assume that the fair cost of insurance is consistent with the bond yield for a BBB-rated company, or 1.12 per cent, from 2016 to 2021.[28]

These rates of interest are likely to understate the market return for insuring CCBs. CCBs occupy an unusual space in the pecking order of financing instruments. CCBs are a loan from the customer to the supplier and do not benefit from the upside that equity investments do. However, credit balances do not benefit from priority of repayment in the case of default that debt does. Indeed, credit balances have no prospect of repayment in the case of default. As a result, with asymmetric downside risks and no prospect of payment in the case of default, the market rate of return for the risks borne by customer credit balances must exceed the cost of debt and may exceed the cost of equity given a high enough probability of default.

This report seeks to quantify the net impact of a change in policy on consumers groups and total costs. Accordingly, what matters for our conclusion is not the absolute *level* of the costs of financing credit balances in the pre- and post-policy worlds, but the difference between them. For the purpose of this report we have relied on the interest rates implied by different levels of default on the assumption that the *difference* is a reasonable proxy for the *change* in the cost of financing between the pre- and post-policy worlds. In practice, this assumption is

[26] For further discussion see Section 5.1 above

[27] We use data on nominal daily European corporate bond yields by credit rating is provided by ICE for a period of 1 January 2016 until 31 December 2021.

[28] We use data on nominal daily European corporate bond yields by credit rating is provided by ICE for a period of 1 January 2016 until 31 December 2021.

primarily likely to affect the transfers between customer groups rather than the overall benefits of the policy. To measure the extent of potential understatement, we run sensitivities in which the cost of insurance is valued at:

- higher rate of interest to reflect the lack of recovery of CCBs (and exposures under the RO);
- the Weighted Average Cost of Capital (WACC) rather than bond interest rates.

We set out both sensitivities in Appendix B, section B.4.

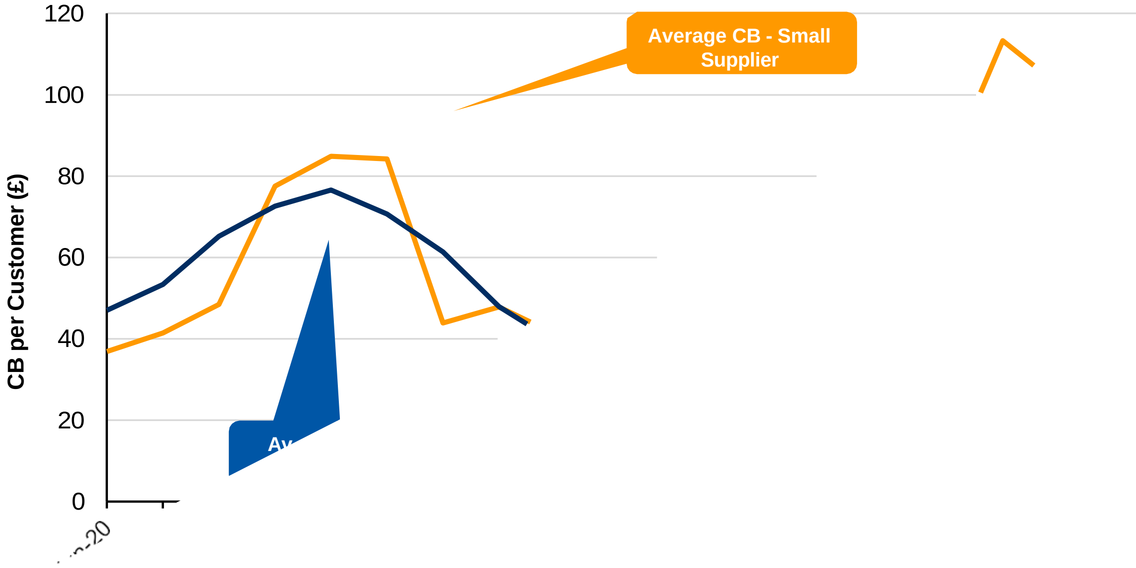
#### 5.2.2.2. Pre-Policy World: Amount of money protected

In the case of CCBs, we apply our assumed rates of return to the average credit balances (gross, net of unbilled consumption) observed between September and December of each year (when failures are most likely). We construct average credit balances for small and large suppliers by calculating a customer-weighted average of credit balances separately for small and large suppliers.

As Figure 5.2 demonstrates, small suppliers tend to reach a higher positive CCBs per customer on average than large suppliers in peak months when supplier failure is most likely. In the pre-policy world, we assume that all small suppliers follow the average profile for small suppliers, with a September-December average of around £102 per customer, and all large suppliers follow the average profile for large suppliers, with a September-December average of around £72 per customer.[29] Thus, the implicit cost of insuring credit balances is lower per customer for large suppliers both because the required return is lower and because amount at stake is lower.

29 For a derivation of the value of the credit balances, refer to Appendix C.1.

**Figure 5.2: Evolution of Credit Balances across the Year**




*Source: NERA Analysis*

For the RO, we assume that customers implicitly protect the maximum amount of ROC throughout the whole year, because a supplier failure is likely to occur at the time when the maximum amount of RO balances is at stake. These are the balances that are implicitly protected by the generality of customers. This is equal to £471 million for small suppliers and £1,889 million for large suppliers.[30]

### 5.2.2.3. Pre-policy World: Cost of insurance in the low scenario

Table 5.7 presents our calculations for the pre-policy cost of insurance for credit balances in the Low case outcome. Combining the cost for small and large suppliers, we find a pre-policy cost of insurance of CBs equal to £86 million per annum.

**Table 5.7: Pre-Policy Cost of Insurance in the Low Case – Credit Balances**

| | Unit | | Small Suppliers | Large Suppliers | Total |
|---|---|---|---|---|---|
| Per customer credit balances | £ | a | 102 | 72 | |
| Customer numbers | m | b | 5.6 | 23 | 28 |
| **Credit balances to protect** | **£m** | **c = a * b** | **579** | **1,631** | **2,209** |
| Interest rate | % | d | 11.61 | 1.12 | |
| **Cost of Insurance** | **£m** | **e = c * d** | **67** | **18** | **86** |

*Source: NERA Analysis*

Table 5.8 presents our estimate of the pre-policy cost of insurance for the RO balance, which is equal to £76 million per annum in the **Low case outcome**.

30 For a derivation of the value of the RO balance, refer to Appendix C.2.

**Table 5.8: Pre-Policy Cost of Insurance in the Low Case – Renewable Obligation**

| | Unit | | Small Suppliers | Large Suppliers | Total |
|---|---|---|---|---|---|
| **RO to protect** | **£m** | **a** | **471** | **1,889** | **2,361** |
| Interest rate | % | b | 11.61 | 1.12 | |
| **Cost of Insurance** | **£m** | **c = a * b** | **55** | **21** | **76** |

*Source: NERA Analysis*

### 5.2.2.4. Post-policy world: The cost of insurance depends on the effectiveness of the policy

There are four fundamental changes to insurance costs that we assume will result from the implementation of the policies:

- We assume that the rate of default by small suppliers will improve to those commensurate with either a B (Partial Effectiveness) or BBB (Full Effectiveness) rating, which would lower their cost of finance;
- Small suppliers will adopt the CCB profile of large suppliers, reducing the peak amount of credit balance accumulated per customer;
- Rather than an implicit balance that is protected by customers, suppliers will explicitly protect their balances according to the policy design and pass these explicit costs through to their customers via higher tariffs; and
- No CCBs or RO balances will be mutualised – the cost of insurance will be explicitly paid by the supplier and passed through to its own customers.

In the subsections below, we discuss both how the policy will change the cost of financing credit and RO balances (Section 5.2.2.1) and how it will change the amount of money that needs to be protected, for CCBs (Section 5.2.2.2) and the RO (Section 5.2.2.3).

We apply these same post-policy cost estimates to the High case outcome, though the cost *change* differs due to differences in the pre-policy view.

To estimate the cost of insurance in the post-policy scenario, we form expectations on how effective the policy will be in reducing the event of failures through the prevention of unsustainable business models. We assume that small supplier default probabilities will fall to those consistent with a B or BBB-rated firm, i.e. 2.22 per cent and 0.06 per cent, respectively. Large supplier default probabilities remain unchanged compared to the pre-policy scenario.

We follow the same approach in determining the cost of capital as in Section 5.2.2.1, and assume a cost of financing of 1.12 – 5.38 per cent (small suppliers) and 1.12 per cent (large suppliers).

According to the policy design discussed in Chapter 3, we assume that the cost of insuring credit balances applies to the **annual peak** of gross credit balances net of unbilled consumption.

We assume that, in order to limit their costs under the new policy, small suppliers change their strategy to accumulating credit balances to match that of large suppliers. As shown in Figure 5.2 above, large suppliers tend to limit the scale of cumulative credit balances per customer more than small suppliers do.

However, the policy design requires suppliers to protect the *peak* credit balance, rather than just the average over September to December. In the pre-policy world, we assume that large (small) suppliers implicitly protected £72 (£102) per customer; in the post-policy world, we assume all suppliers explicitly protect £77 per customer.

**Table 5.9: Required Credit Balances to Protect**

| | Unit | | Small Suppliers | Large Suppliers | Total |
|---|---|---|---|---|---|
| Per customer credit balances | £ | a | 77 | 77 | |
| Customer numbers | m | b | 5.6 | 23 | 28 |
| **Credit balances to protect** | **£m** | **c = a * b** | **440** | **1,763** | **2,203** |

*Source: NERA Analysis*

Protecting the annual peak of credit balances across the whole year might not be necessary to:

i. Protect the credit balances which are at stake in the event of a supplier failure at a given point in time

ii. Prevent the mutualisation of credit balances in the event of a failure

Credit balances in the period from January to August are typically lower than in the period from September to December. Hence, if a supplier fails between January and August, the credit balances which are at stake are likely to be lower than for a supplier failure in September to December.

The policy could instead be designed to require the explicit protection of peak credit balances within subsets of the year. This would tend to increase the administrative burden of the policy (because it would need to be updated and verified more frequently), while reducing the cost of finance (because the amount protected would be lower on average over the year).

Therefore, we additionally calculate the average amount of money that would be required if credit balances were protected on the basis of their: (a) seasonal peak; (b) quarterly peak; or (c) monthly peak. We present the findings in Appendix B.5.

We assume that the cost of insuring the RO applies to the **maximum annual amount** of the obligation, as is the case in the pre-policy world. Thus, as in Section 5.2.2.1, we assume the small suppliers must pay to protect £471 million per year, and large suppliers must pay to protect £1,889 million. The benefit from the RO policy therefore comes from (a) cheaper financing; and (b) appropriate allocation of the costs to the customers on whose behalf suppliers incur them.

For credit balances, we estimate that the policy will impose a direct cost of financing of between £25 million and £43 million, depending on how successful the policy is in improving the creditworthiness of small suppliers. We show these calculations in Table 5.10 below.

**Table 5.10: Post-Policy Cost of Insurance in the Low Case – Credit Balances**

| | Unit | | Partial Effectiveness | Full Effectiveness |
|---|---|---|---|---|
| CBs to protect - Small Suppliers | £m | a | 440 | 440 |
| Interest Rate – Small Suppliers | % | b | 5.38 | 1.12 |
| **Post-Policy Cost of Insurance (Small)** | **£m** | **c = a * b** | **24** | **5** |
| CBs to protect – Large Suppliers | £m | d | 1,763 | 1,763 |
| Interest Rate – Large Suppliers | % | e | 1.12 | 1.12 |
| **Post-Policy Cost of Insurance (Large)** | **£m** | **f = d * e** | **20** | **20** |
| **Total** | **£m** | **g = c + f** | **44** | **25** |

*Source: NERA Analysis*

For the RO, we estimate that the post-policy cost of insurance will sit between £27 million and £47 million, depending on the effectiveness of the policy, as shown in Table 5.11.

**Table 5.11: Post-Policy Cost of Insurance in the Low Case – Renewables Obligation**

| | Unit | | Partial Effectiveness | Full Effectiveness |
|---|---|---|---|---|
| RO to protect - Small Suppliers | £m | a | 471 | 471 |
| Interest Rate – Small Suppliers | % | b | 5.38 | 1.12 |
| **Post-Policy Cost of Insurance (Small)** | **£m** | **c = a * b** | **25** | **5** |
| RO to protect – Large Suppliers | £m | d | 1,889 | 1,889 |
| Interest Rate – Large Suppliers | % | e | 1.12 | 1.12 |
| **Post-Policy Cost of Insurance (Large)** | **£m** | **f = d * e** | **21** | **21** |
| **Total** | **£m** | **g = c + f** | **46** | **27** |

*Source: NERA Analysis*

In the post-policy world, the costs in the tables above are borne ultimately by the customers specific to each supplier: customers of small suppliers pay the insurance costs of small suppliers, and customers of large suppliers pay the insurance of costs of large suppliers.  The groups we assess as part of this report do not map perfectly to small and large suppliers: customers of failed suppliers are exclusively served by small suppliers, and disengaged customers are served exclusively by large suppliers, but the group of engaged customers with non-failed suppliers comprises customers of both large and small suppliers.

We therefore allocate some of the post-policy costs of small suppliers and large suppliers to this middle group, in proportion with the group's size within the customers of small and large suppliers. We demonstrate this calculation in Table 5.12 and Table 5.13 for each of the effectiveness scenarios.

**Table 5.12: Insurance Cost Allocated to Customer Groups (Partial Effectiveness)**

| | Small Suppliers | | Large Suppliers | |
|---|---|---|---|---|
| Customer Type | Customers w/ Failed Supplier | Engaged Customers w/ Non-Failed small Supplier | Engaged Customers w/ Large Supplier | Disengaged Customers |
| **CCB (£m)** | 24 | | 20 | |
| **RO (£m)** | 25 | | 21 | |
| **Total Insurance (£m)** | 49 | | 41 | |
| | | | | |
| **Customer Numbers (m)** | 2.3 | 3.4 | 7.4 | 15.4 |
| **Insurance Cost (£m)** | 20 | 29 | 13 | 28 |
| **Insurance Cost (£ per customer)** | 8.6 | 8.6 | 1.8 | 1.8 |

**Table 5.13: Insurance Cost Allocated to Customer Groups (Full Effectiveness)**

| | Small Suppliers | | Large Suppliers | |
|---|---|---|---|---|
| | Customers w Failed Supplier | Engaged Customers w Small Non-Failed Supplier | Engaged Customers w Large Supplier | Disengaged Customers |
| **CCB (£m)** | 5 | | 20 | |
| **RO (£m)** | 5 | | 21 | |
| **Total Insurance (£m)** | 10 | | 41 | |
| | | | | |
| **Customer Numbers (m)** | 2.3 | 3.4 | 7.4 | 15.4 |
| **Insurance Cost (£m)** | 4 | 6 | 13 | 28 |
| **Insurance Cost (£ per customer)** | 1.8 | 1.8 | 1.8 | 1.8 |

#### 5.2.2.5. Low case outcome – results

In the **Low** case outcome, the policy reduces the cost of insurance for credit balances by £42 million per annum when the policy is only partially effective (Table 5.14). When the policy is fully effective, the cost of insurance decreases by £61 million per annum. This benefit occurs through a reduction in small supplier default risk.

**Table 5.14: The Low Case Reduction in the Annual Cost of Insurance Ranges from £42 to £61 million per annum for CBs**

| | Pre-policy | Post-policy | | Delta Pre- and Post-Policy | |
|---|---|---|---|---|---|
| | | Partial Effectiveness | Full Effectiveness | Partial Effectiveness | Full Effectiveness |
| Annual Cost of Insurance – CBs | £86m | £43m | £25m | £42m | £61m |
| Cost of Insurance per Domestic Customer | £3.0 | £1.5 | £0.9 | £1.5 | £2.1 |

*Source: NERA Analysis.*

Similarly, the policy reduces the cost of insurance for the RO. Table 5.6 shows that the reduction in the cost of insurance ranges from £29 to £49 million per annum depending on the policy effectiveness.

**Table 5.15: The Low Case Reduction in the Annual Cost of Insurance Ranges from £29 to £49 million per annum for the RO**

| | Pre-policy | Post-policy | | Delta Pre- and Post-Policy | |
|---|---|---|---|---|---|
| | | Partial Effectiveness | Full Effectiveness | Partial Effectiveness | Full Effectiveness |
| Annual Cost of Insurance – CBs | £76m | £47m | £27m | £29m | £49m |
| Cost of Insurance per Domestic Customer | £2.7 | £1.6 | £0.9 | £1.0 | £1.7 |

*Source: NERA Analysis.*

### 5.2.3. Overall Results – Costs of Insuring CBs and the RO

Below, we consolidate our estimates for insuring CCBs and the RO, across the two policy effectiveness scenarios and the range of High vs Low case outcomes. In the pre-policy world, the costs are not explicitly included in tariffs, but appear through the SoLR levy when suppliers actually fail. Once the requirement is made explicit, the costs pass directly through into tariffs, either through the DTC or through fixed price tariff offerings.

**Table 5.16: Results - Credit Balances**

| | Pre-policy | Post-policy | | Delta Pre- and Post-Policy | |
|---|---|---|---|---|---|
| | | Partial Effectiveness | Full Effectiveness | Partial Effectiveness | Full Effectiveness |
| High | £107m | £43m | £25m | £64m | £82m |
| Low | £86m | £43m | £25m | £42m | £61m |

*Source: NERA Analysis.*

**Table 5.17: Results – Renewable Obligation**

| | Pre-policy | Post-policy | | Delta Pre- and Post-Policy | |
|---|---|---|---|---|---|
| | | Partial Effectiveness | Full Effectiveness | Partial Effectiveness | Full Effectiveness |
| High | £78m | £47m | £27m | £31m | £51m |
| Low | £76m | £47m | £27m | £29m | £49m |

*Source: NERA Analysis.*

The pre-policy costs are borne by all customers in proportion to the size of the customer group. The post-policy costs are borne by customers of each supplier. In the Full Effectiveness scenario, there is no difference between insurance costs by supplier size, so all customers pay the same in proportion to the size of the customer group. In the Partial Effectiveness scenario, small suppliers face a higher insurance cost, and so customers of small suppliers (including a proportion of the "engaged customers of non-failed suppliers") pay a higher additional charge than disengaged customers.

The direct costs of insuring CBs and the RO need not be the entire costs of complying with the proposed interventions. In particular, suppliers may need to make further adjustments to their strategies, including attracting more capital in general to the business to finance those obligations cost effectively. We discuss those additional costs that consumers may bear further in section 5.4 below.

## 5.3. Hedging Costs

Under existing regulatory arrangements, domestic customers in Great Britain are subject to the DTC, which sets an allowance for wholesale energy costs, among other cost items. To date, the DTC has set the reference cost of energy based on a 6-2-12 [6] profile:

- Based on the average prices for electricity and gas over a six-month observation window;
- The observation window ends two months before the quarter of delivery of the power;
- The traded contracts used to set the price are for the following four quarters (i.e. for 12 months' power); and
- Prices are set for a six-month season.

However, Ofgem has issued a statutory consultation to move to a new 3-1.5-12 [3] price cap structure such that Ofgem sets the wholesale cost allowance as follows:

- Based on the average prices for electricity and gas over a three-month observation window;
- The observation window ends 1.5 months before the quarter of delivery of the power;
- The traded contracts used to set the price are for the following four quarters (i.e. for 12 months' power); and
- Prices are set for a three-month quarter.

In order to isolate the impact of the proposed interventions on CCBs and ROs, we assume for our quantification that the change to the DTC methodology is in place in both the pre- and post-policy world.

Ofgem's expectation in setting the DTC in this manner is that suppliers will hedge their forward purchases of energy to match the profile of the DTC wholesale allowance.

Domestic customers have the option to switch supplier and/or tariff at any point in time (albeit that in some circumstances exit fees may be due).  As a result, the price cap structure imposes an asymmetric risk on suppliers:

- When the wholesale cost of purchasing power for the remainder of the current season is higher than the wholesale cost allowance in the price cap, suppliers make a loss on at least the wholesale component on any customers who switch to their standard variable tariff (SVT).  Consumers have strong incentives to switch to the SVT in such circumstances.
- When the wholesale cost of purchasing power for the remainder of the current season is lower than the wholesale cost allowance in the price cap, suppliers would make an additional profit on switchers to their standard variable tariff.  Consumers have weak incentives to switch to the SVT in such circumstances because lower, fixed price tariffs are likely to be available.

This asymmetric risk imposes a cost on suppliers and ultimately the receiving suppliers' other customers insofar as they pass on that cost.

The cost of bearing this asymmetric risk for voluntary switches remains whether or not arrangements are in place to strengthen financial resilience. However, in cases of supplier failure, the failed suppliers' customers pass through the SoLR process or are supported under a SAR.  The DTC sets the maximum price that the SoLR or SAR (at the end of any prevailing deal for the customer) can charge to the customers it acquires.  When the cost of procuring wholesale energy is above the wholesale cost allowance in the DTC, SoLRs are able to seek reimbursement of these costs through the LRSP (henceforth "hedging costs").  Supplier failure is most common when the wholesale cost allowance under the price cap is below the contemporaneous cost of procuring energy. As a result, current arrangements transfer hedging costs from the customers of failed suppliers to the generality of customers in the event of default.

As described in section 5.1, we assume that the proposed policy interventions reduce the risk of supplier failure, and therefore the transfer from the generality of customers to the customers of failed suppliers. The following sections describe our strategies to estimate a High and a Low case outcome of the hedging cost and present our results. In both cases, we estimate the hedging cost based on the new 3-1.5-12 price cap structure[31] currently proposed by Ofgem, rather than the 6-2-12 structure which is still in place at present.[32]

### 5.3.1. Our High case is informed by an analysis of the historical hedging costs under a 3-1.5-12 strategy

To define a high case estimate for mutualised hedging cost, we rely upon historical mutualised hedging costs between 2016 and 2021 through the SoLR and SAR process (for Bulb).

To inform our estimate in 2021, where LRSPs have not been finalised, we employ a model that analyses, for each supplier, the difference between current wholesale costs and the wholesale cost allowance within the price cap.

We base our estimates under the new 3-1.5-12 price cap structure proposed by Ofgem, rather than the 6-2-12 structure that was in place throughout 2021. Under this regime, Ofgem sets a new price cap for each three-month period. To allow for the cost of purchasing wholesale energy during each period, Ofgem averages contract prices for wholesale energy during an "observation period" spanning three months, ending a month and a half before the start of the next price cap period. These contract prices refer to deliveries during that price cap period and the three subsequent periods after.

The wholesale allowance is therefore fixed a month a half before the start of each price cap period, and as such, it can only reflect increases in wholesale prices with a lag. When a supplier exits the market, the SoLR is obliged to provide energy to the customers of the exited firm but can only buy the required volumes at current wholesale prices. The SoLR faces exposure to the difference between the historical prices embodied in the price cap allowance and the current price of replacing that volume of energy at short notice.

Figure 5.3 below shows the price cap allowance relative to the cost to the supplier of hedging those exposures at the date of acquiring new customers is given by the price of the forward contracts on the day in question (the yellow line shows that forward price for the "balance of season" contract, one of the relevant hedging contracts). Since the start of 2021, those prices (in combination with the other hedging contracts that make up the wholesale allowance) have sat above the wholesale cost allowance embedded within the price cap (green line). The shortfall (red line) represents the costs that the SoLR cannot recover from its own customers and will therefore need to claim from other customers.

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31 Throughout our analyses of the hedging cost, we apply the 3-1.5-12 approach to both pre- and post-policy estimates to isolate the effect of the policy changes under consideration in this analysis.

32 We provide estimates using a 6-2-12 structure in Appendix C.3.

**Figure 5.3: Costs of Acquiring Hedges for New Customers Spiraled in 2021**


*Source: NERA Analysis*

Combining these estimated hedging losses with the reported details (dates and customer numbers) of the actual supplier failures, we estimate the total cost to SoLRs driven just by differences in wholesale energy prices at the date of failure relative to the hedged prices baked into the price cap. Our analysis suggests that mutualised hedging costs for the failures in 2021 would have been approximately £2.5 billion under the 3-1.5-12 price cap structure. These hedging losses are approximately £0.8 billion lower than the equivalent figures that Ofgem estimated in LRSP decisions given a 6-2-12 [6] hedging profile.

For the failures that occurred in 2016 and 2020, we use Ofgem data regarding the hedging costs that were recovered through LRSPs, scaled to reflect our modelled estimates of a 3-1.5-12 price cap structure versus the 6-2-12 that prevailed at the time. However, the more stable wholesale costs throughout this period means that these costs are much lower, at approximately £1 million.

Applying the estimates outlined above, we estimate the average value of mutualised hedging costs at £410 million (£14 per domestic customer) per annum. This is the value of the hedging costs transferred from the switching customers and their new suppliers to the generality of customers under the historical view of the pre-policy world.

To inform our post-policy estimates under this view, we scale the historical hedging costs by the ratio between the pre-policy world failure rate (11.61 per cent) and the post-policy failure rate associated with the Partial (2.22 per cent) and Full (0.06 per cent) Effectiveness scenarios. Applying this ratio to the annualised hedging costs yields post-policy hedging cost estimates of between £2.1 million (full effectiveness) and £78 million (partial effectiveness).

**Table 5.18: The High Scenario Reduction in Annually Mutualised Hedging Costs Ranges from £332m to £408m**

| | Pre-policy | Post-policy | | Delta Pre- and Post-Policy | |
|---|---|---|---|---|---|
| | | Partial Effectiveness | Full Effectiveness | Partial Effectiveness | Full Effectiveness |

Estimation

Methods

| | | | | | |
|---|---|---|---|---|---|
| Total hedging cost per annum | £410m | £78m | £2.1m | £332m | £408m |
| Hedging cost per domestic customer | £14 | £2.8 | £0.1 | £12 | £14 |

*Source: NERA Analysis.*

### 5.3.2. Our Low case estimate is informed by an analysis of the hedging cost as the option value of switching suppliers

To analyse the benefits of the policy changes in our Low case, we estimate the hedging cost by valuing the option held by customers of defaulting suppliers to switch (or be switched) to DTC should their supplier default, relative to the costs of facing contemporaneous market prices.

The option of switching to the price cap has an **option value** which is composed of two elements:

(1) The intrinsic value of the option, which is the difference between the current wholesale market price and the price cap (the "strike price").

(2) The time value of the option which takes into account the wholesale market prices' expected volatility and the time between the valuation date and every subsequent month in which the option can be chosen by switching to the price cap.

A customer's option value is the discounted expected difference between the wholesale price and the wholesale cost allowance in the DTC (see Figure 5.4). The value transferred from the generality of customers to those of a failed supplier for hedging costs is equivalent to the value of the option to switch multiplied by the probability of a default event.

**Figure 5.4: Illustrative Development of Wholesale Price and Price Cap since January 2019**


*Source: NERA analysis*

When wholesale market prices increase relative to the previously determined price cap in any given period, the option value of switching from the contemporaneous fixed tariff to the price cap increases for individual consumers. We quantify this option value with an options model based on the Black-Scholes Model (BSM). We calibrate the model using historical data for the SoLR processes that actually occurred, outturn historical values of wholesale energy market and the price cap (see Appendix C.3 below).[33]

We use the BSM to estimate a customer's option value of switching in any given month from 2016 to 2021 (valuation date[34]) by estimating what the option value would have been given wholesale prices that prevailed of a switch in each of the subsequent months.[35] For example, in April 2021 the overall value of the option for an individual customer in our model is the sum of the monthly values of switching in each month from April 2021 to March 2022.

33 In accordance with the ongoing consultation we are also assuming an 3-1.5-12 optimal hedge strategy in our model. In principle, the price cap arrangements may change in future in a way that reduces or changes the option value for customers of default.

34 The valuation date is the point in time when the option is priced. We assume a monthly valuation of the option to switch which allows us to account for the fact that the option value changes over time, for instance depending on the month of the calendar year in which the valuation takes place and the remaining time until the next price cap period.

35 We consider only the first twelve months after the valuation date, including the month of the valuation date. This is because (1) the option value of the subsequent month is typically close to zero and (2) Black Scholes can only be used to value an option for a fixed strike price. Under the 3-1.5-12 hedging strategy used for the wholesale cost allowance for the DTC, prices are fixed in respect of volumes no more than fourteen months in advance of the season of delivery, but the value in the last couple of months is typically trivial.

Having calculated the option value in each month of the reference window from 2016 to 2021 of a switch in each of the subsequent twelve months, we multiply it by the number of customers experiencing a default event. We use the historically observed number of customers who switched when the SoLR (or SAR) process assigned them to a new supplier because their original supplier went bankrupt in a given month.

Based on the monthly option value of switching for an individual customer and the number of switching customers per month, we estimate the total option value and thus the total hedging costs for each valuation date. The average of the total option values across all valuation dates from 2016 to 2021 returns the estimated total hedging costs per annum borne by the generality of customers.

To inform our post-policy estimates, we use the same approach as for the low scenario for the pre-policy world, but assume the number of customers switching under the SoLR process per annum is reduced by the relative default rates of a B-rated or BBB-rated supplier. As a result of the policies and the reduced default rates for small suppliers, fewer customers will switch to the price cap because their supplier goes bankrupt.

The option value to an individual customer and thus the hedging cost per switching customer is assumed to be the same as in the pre-policy world. The policies only affect the hedging cost by reducing the number of customers who switch through the SoLR process.[36] As in the pre-policy world, the hedging cost is a transfer from the generality of customers to those of a failed supplier.

Our Low case estimates of the hedging costs reduction thus range between £41 million to £50 million per annum. The policies reduce the hedging cost mutualised to the generality of customers depending on the effectiveness of the policies in reducing the rate of default as shown in Table 5.19. In the Partial Effectiveness scenario[37] the mutualised hedging costs are reduced from £50 million to £8.7 million. In the Full Effectiveness scenario,[38] the total mutualised hedging costs reduces to £0.2 million.

For individual customers, the policies reduce the mutualised hedging costs by more than 80 per cent from £1.8 to £0.3 per customer per year in the Partial Effectiveness scenario, and by by about 99 per cent to £0.01 per customer per year in the Full Effectiveness scenario.

[36] Voluntary switches are assumed to be independent of supplier failure and thus net out between the pre- and the post-policy world and are therefore not considered in the analysis.

[37] Improvement of small suppliers‘ credit rating from CCC (associated default rate: 11.61%) to B (associated default rate: 2.22%).

[38] Improvement of small suppliers‘ credit rating from CCC (associated default rate: 11.61%) to BBB (associated default rate: 0.06%).

**Table 5.19: The Low Scenario Reduction in Annually Mutualised Hedging Costs Ranges from £41m to £50m**

| | Pre-policy | Post-policy | | Delta Pre- and Post-Policy | |
|---|---|---|---|---|---|
| | | Partial Effectiveness | Full Effectiveness | Partial Effectiveness | Full Effectiveness |
| Total hedging cost per annum | £50m | £8.7m | £0.2m | £41m | £50m |
| Hedging cost per domestic customer | £1.8 | £0.3 | £0.01 | £1.4 | £1.7 |

*Source: NERA Analysis.*

### 5.3.3. Results: Hedging Costs

By reducing the default risk of small suppliers, the policies reduce the transfer from the generality of consumers to those of failed suppliers. Overall, the benefits resulting from a reduction of the hedging costs mutualised to the generality of customers range from £41 million to £408 million, depending on the effectiveness of the policies and the scenario (Table 5.20).

As can be seen from the Table, the options model shows materially lower values for the cost of covering hedge exposures than the historically-realised outturn. In part, that understatement of the costs of hedge exposures is because the historical outturn payments that would have been made under a 3-1.5-12[6] hedging approach reflect the particular pattern of historical prices which prevailed in 2021. The options model seeks instead to estimate the average *expected* value of the pay-out on the hedges and is therefore less susceptible to the specific path of historically high wholesale prices that materialised.

However, the options approach is likely to understate the financing benefit received by suppliers under current arrangements. Our options model only values the option to switch to the price cap at prices that have already been hedged, because the BSM requires a fixed strike price. In practice, there is option value to switch to the price cap even in periods which have not yet been fully hedged. The BSM also assumes that the returns on the underlying asset are log-normally distributed. In practice, electricity and gas prices may be asymmetrically distributed and positively skewed.

**Table 5.20: The Reduction in Total Mutualised Hedging Cost per annum Ranges from £41m to £408m**

| | Pre-Policy | Post-policy | | Delta Pre- and Post-Policy | |
|---|---|---|---|---|---|
| | | Partial Effectiveness | Full Effectiveness | Partial Effectiveness | Full Effectiveness |
| High | £410m | £78m | £2.1m | £332m | £408m |
| Low | £50m | £8.7m | £0.2m | £41m | £50m |

*Source: NERA Analysis.*

## 5.4. Additional Tariff Increases

In the pre-policy world, customers provide suppliers with a free source of capital through credit balances, the mutualisation of unmet RO costs and the option to switch back to the price cap in case of default. These enable speculative suppliers to take excessive risk without committing the capital to the business necessary to cover the exposures that risk creates. In estimating the costs of the post-policy world, we take into account above how tariffs would need to increase across all customers to reflect the explicit costs of taking out insurance products.

However, in principle, there is an additional tariff impact that comes from the unresolved moral hazard problem itself. One of the manifestations of the excessive risk taken by suppliers could be that failed suppliers offer cheaper tariffs when conditions are favourable. Suppliers may take risk in other ways that may not artificially reduce the level of their tariffs, for instance by not adequately hedging their wholesale costs.

Insofar as the proposed interventions force suppliers to act more prudently and offer tariffs that reflect their costs, their customers will lose the benefit of artificially-low tariffs.

The increase in the tariff resulting from the proposed interventions is bounded by what could be offered by an imprudent supplier that fully complies with the policy design (or else imprudent suppliers would out-compete prudent ones). Even when the policies are fully in place, a supplier could take out insurance on CCBs and ROs at a rate that still reflects its highly risky behaviour. Tariffs for customers of failed suppliers would not increase by more than the cost of complying with the policy with *no* improvement in the default probability. We apply this cap in the Low case outcome.

This cap may itself be too high and plausibly represents an upper bound on the increase in customers' tariffs. The proposed interventions are intended to reduce risky behaviour and reduce the failure rate. The supplier may find cheaper ways to comply with the policy interventions, such as changing its hedging and business strategy. In circumstances where the market for engaged customers remains competitive, tariffs would therefore be expected to increase by less than the full cost of the financing subsidy that suppliers currently receive.

The cost of alternative hedging or business strategies are challenging to assess quantitatively. However, at a minimum, assuming that the policy induces less risky behaviour the supplier and its creditors will save the excess administrative costs of bankruptcy under current arrangements. In the High case we apply a lower cap obtained by subtracting the administrative cost of bankruptcy from the financing subsidy provided by existing arrangements. This cap arguably remains above the tariff increase that is likely to prevail because suppliers may be able to reduce the costs of meeting the proposed policy interventions below insuring their credit balances and RO exposures at a cost of capital associated with a highly risky business.

In section 5.4.1, we set out in more detail our approach to estimating the change in tariffs for customers of failed suppliers, which we estimate as being between £20.5 and £45.2 million per year (see Table 5.21 below). In section 5.4.2, we describe our estimated changes in tariffs for other engaged customers.

**Table 5.21: Additional Increase in Tariffs Summary for Customers of Failed Suppliers**

| Customer Group | Case | Partial Effectiveness | Full Effectiveness |
|---|---|---|---|
| Failed supplier | High | £20.5m | £34.2m |
| | Low | £29.5m | £45.2m |
| Engaged, non-failed supplier | High | £45.9m | £50.2m |
| | Low | £59.2m | £66.4m |

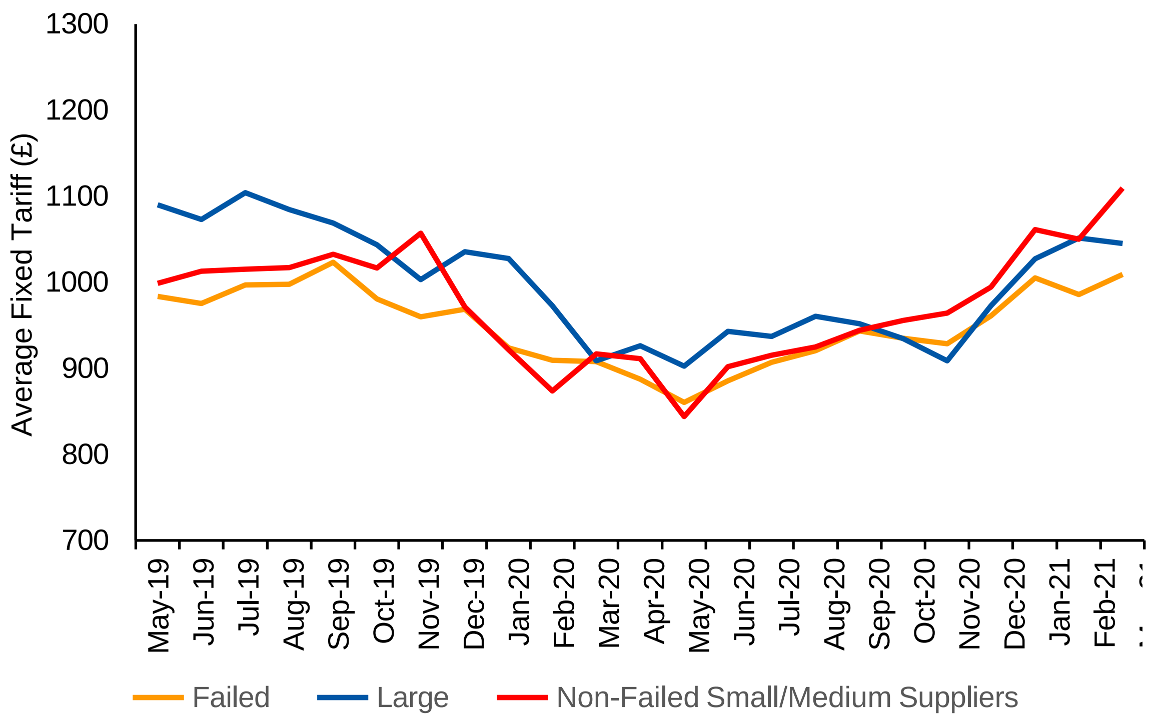
*Source: NERA Analysis*

### 5.4.1. Tariff increases for the customers of failed suppliers

In the pre-policy world, customers of failed suppliers may receive some benefit from cheaper tariffs relative to other customers. We can estimate the size of this benefit by analysing tariffs available to customers of failed suppliers, relative to customers with non-failed small suppliers and large suppliers, respectively. We show this comparison in Figure 5.5, based on fixed-price tariff data provided by Ofgem.

As can be seen from the figure, the tariffs offered by those suppliers who ultimately failed were on average lower over the period than those either of other non-failed small suppliers or the large suppliers in our sample.

**Figure 5.5**: **Failed Suppliers Offered Lower Tariffs on Average than Other Suppliers between May 2019 and March 2021**




*Source: NERA Analysis*

We analyse the average fixed price tariff differential between May 2019 and March 2021. Over the period from May 2019 to March 2021,[39] the average failed supplier offered a tariff saving of between £33 and £51 per customer compared to the average fixed price tariff offered by non-failed small and large suppliers respectively.[40] Multiplying the average tariff discount by the average number of customers with failed suppliers between 2016 and 2021 yields a reduction in tariffs for the customers of failed suppliers of between £76 and £116 million.

In addition to the direct cost of complying with the policy, which we assume will pass through into tariffs for all customers, the tariff differential driven by the risky business practices of failed suppliers could close, to the detriment of their customers.

However, even if the policies are effective in resolving the market failures, the increase in tariff is limited by what could be offered by a supplier that continues to engage in risky business practices, while still insuring CCBs and the RO as required by the policy. We assume that the insurance cost for this supplier would be equal to its default probability, the same 11.61 per cent rate we use in the pre-policy world. We apply this cap in the Low case outcome.

If the policies do actually reduce the failure rate, then a risky supplier would be willing to offer a lower tariff that does not bake in anticipated administrative bankruptcy costs. This level represents a cap on tariff increases in the High case outcome.

Because we already measure *some* tariff increase through compliance at improved default rates, this additional potential tariff increase nets off the amount already seen through the explicit cost of insurance.

As we demonstrate in Table 5.22, we estimate that tariffs for customers of failed suppliers could increase by up to £8.3-£19.7 per customer from the removal of below-cost tariffs offered by suppliers that benefit from the existing market failures. This is in addition to the tariff increases they would see through their supplier's compliance with the policies. Across the 2.3 million customers in this category, additional tariff increases sum to £21-45 million.

39 We do not use tariff data from April 2021 onwards because the increases in wholesale energy prices and threat of exit may have distorted the tariffs offered by failed suppliers

40 This is a simple average within each of the three groups (failed, small and large suppliers) since the customer number and tariff data that we have obtained does not enable us to produce an accurate picture of how many customers benefited from the tariff offered by each supplier in each month.

**Table 5.22: Additional Tariff Increase for Customers of Failed Suppliers**

| Item | | Partial Effectiveness | | Full Effectiveness | |
|---|---|---|---|---|---|
| | | Low | High | Low | High |
| Cost of Insurance for risky supplier (per cust.) | a | 21.5 | 21.5 | 21.5 | 21.5 |
| Reduced Admin Cost of Bankruptcy (per cust.) | b | N/A | 4.8 | N/A | 4.8 |
| Max Tariff Increase (per cust.) | c = a - b | 21.5 | 16.7 | 21.5 | 16.7 |
| Tariff Increase Already Accounted For (per cust.) | d | 8.3 | 8.3 | 1.7 | 1.7 |
| Additional Tariff Increase (per cust.) | e = c - d | 13.1 | 8.3 | 19.7 | 14.9 |
| Number of Customers (million) | f | 2.3 | 2.3 | 2.3 | 2.3 |
| Additional Tariff Increase (£m) | g = e * f | 30.3 | 19.2 | 45.4 | 34.3 |

*Source: NERA Analysis.*

### 5.4.2. Tariff impacts on other customers

Throughout our report, we assume that there are three types of customers:

i. **Disengaged customers:** customers on SVTs which we assume represent roughly 54 per cent of the market;

ii. **Customers with failed suppliers:** these customers directly benefit from the lower tariff costs estimated in section 5.2.1; and

iii. **Engaged customers with other suppliers:** customers who are active in the market (i.e., switch).

Prices for disengaged customers are set by the price cap. Accordingly, their prices are unaffected by any increase in the prices of failed suppliers.

In principle, engaged customers of large or non-failed small suppliers could receive lower tariffs from their supplier in the pre-policy world, due to the competitive pressure provided from failed suppliers. If this competitive pressure is removed, then tariffs could increase by more than just the cost of complying with the policy. This increase, if any, would represent a transfer from the engaged customers to the equity holders of their suppliers, who are now able to charge more without an increase in cost.

It is not clear the extent to which the tariffs for engaged customers are driven by price competition from failed suppliers, and thus how much tariffs could increase in their absence. Competition between non-failed suppliers may be sufficiently healthy that tariffs are already driven by underlying costs, in which case their tariffs would not increase beyond the level required to comply with the proposed interventions. Consistent with our broader assumption that behaviour in the Reference Window provides a reasonable indication of equilibrium behaviour, we assume no impact on the tariffs of non-failed suppliers beyond the increases in costs that they would experience.

In the case of large suppliers competing for the engaged segment of the market we assume no additional increase in tariffs beyond the direct cost of insurance. In the case of small non-failed suppliers, we apply the same method to that shown in Table 5.22 above on a per-customer basis, but we apply it to the customer base of non-failed small suppliers, i.e. 3.4 million. Thus, the additional tariffs on this group sit between £31.1 and £66.6 million.

This represents an upper bound, because prices would be constrained by tariffs offered by large suppliers. As demonstrated above, small non-failed suppliers have offered higher tariffs than failed suppliers, and thus may not be able to increase their tariffs by as much.

As a sensitivity, set out in Appendix B.6, we consider how the end results could change if tariffs for all engaged customers rise from the reduction in competitive pressure. This applies both to small suppliers and the fixed tariffs offered by large suppliers, whose competitive rates are influenced in part by the offerings of small suppliers.

## 5.5. Reductions in Switching Costs

When a supplier fails, customers are transferred through the SoLR process to a new supplier. Each time this happens, customers and suppliers incur a switching cost due to, for instance, the time and effort-based costs a customer bears when switching to a new supplier. In the pre-policy world, the existence of speculative suppliers who would not be able to operate in a world where they cannot finance themselves through the free source of capital that credit balances provide, imposes additional costs on society via switching costs in two ways:

i. An increase in the number of ‘forced’ switches under the SoLR process; and

ii. A higher level of ‘inefficient’ switches due to excess and distorted competition.

In both cases, the cost to society comes from the switch to a supplier that cannot sustain the prices that it offers, though due to data limitations, we instead estimate the cost of *leaving* that supplier, whether that is because of its failure or because of normal churn.

In this section, we set out our approach to estimating the reduction in switching costs that comes from a reduced supplier failure rate. In particular, in Section 5.5.1, we estimate the cost per switch; in Section 5.5.2, we estimate the reduction in the number of switches due to failure; and in Section 5.5.3, we estimate the reduction in switches due to excess competition.

### 5.5.1. Estimated cost per switch

The key challenge in estimating the net benefits of reducing switching costs is that we cannot directly observe the costs a consumer incurs when switching. Furthermore, the cost of switching can vary materially between different types of consumers; they are low for elastic switchers and high for non-switchers.

In the absence of observable switching cost data, we rely upon a revealed preference approach to estimate switching costs to consumers. We assume that a supplier aims to price as high as they can whilst still inducing a customer to switch. Furthermore, the switching costs for the marginal customer will be the difference between the cheapest tariff on the market and the DTC. At this level, the disbenefits of switching for the marginal consumer (in terms of the effort and time costs in identifying and onboarding with a new supplier) equals the tariff saving. Similarly, the benefit of gaining the customer for the supplier exactly offsets the costs that it incurs in offering this tariff.

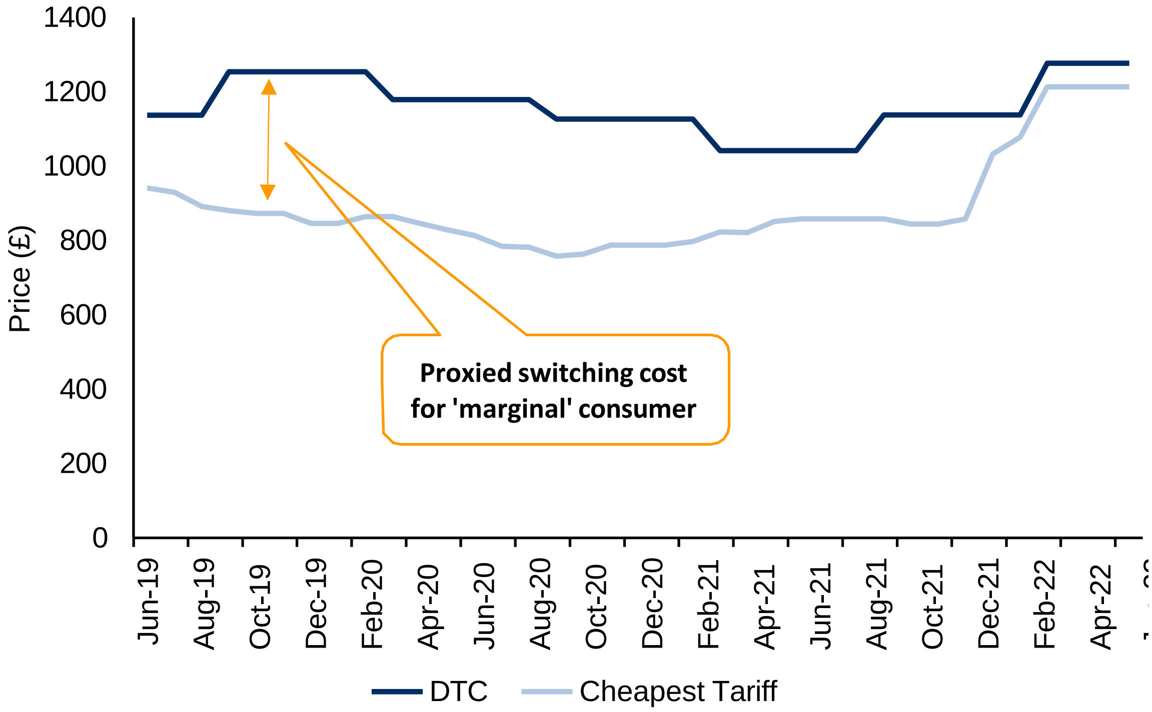
We estimate switching costs for the marginal customer by analysing the difference between the cheapest tariff on the market and the DTC between January 2019 to December 2021, as shown above in Figure 5.6. Under this approach, the switching cost for the marginal consumer is £276.

To estimate switching costs for the ‘average’ customer we scale the marginal customer switching costs by half (Scenario 1) and by quarter (Scenario 2). Scenario 1 assumes that customer switching costs are uniformly distributed between the switching cost for the marginal customer and £0. Given a marginal switching cost of £276, Scenario 1 yields an average switching cost of £138. Scenario 2 assumes that there is a large proportion of customers with very elastic switching costs and a smaller, inelastic proportion that are only induced by the tariff savings offered at the very bottom of the market. This yields a lower average switching cost of £69 per switch.

Estimation

Methods

**Figure 5.6: We Estimate an Average Switching Cost per Customer of between £69 and £138**




*Source: NERA Analysis*

For the switching costs incurred by the *supplier*, we estimate the switching costs in onboarding new customers on the historical onboarding and migration LRSP paid to SoLRs from 2016 and 2020 (i.e., in cases for which data exists). In the High case outcome, we exclude cases where a SoLR did not claim any onboarding and migration costs under the assumption that the benign wholesale prices during this period enabled suppliers to absorb switching costs whilst profitably serving the new customers, yielding an average cost of £31 per customer. In the Low case outcome, we assume that suppliers that did not report any switching costs actually had £0 of switching costs, yielding an average of £21 per customer.

We assume suppliers do not bear any switching costs outside a SoLR event, because we understand that suppliers have highly automated systems which allow for the migration and integration of new customers in the normal course of business.

### 5.5.2. Reductions in switching costs away from an inefficient supplier in a SoLR event

In the pre-policy world, the higher rate of failure relative to the post-policy outcome leads to more customers who are ‘forced’ to switch through the SoLR process each year. In the case of customer switching costs, these are borne directly by the customers of failed suppliers who are mandated to switch to a new supplier. From a customer’s perspective, this switch is costless because it happens automatically. However, the customer would have incurred a cost to switch to that supplier in the first place and may incur an additional switching cost if it decides to switch away from the SoLR, which was chosen for the customer with no input from the customer. Thus, for every customer that goes through the SoLR process, they will undertake one or two switches. We proxy for both additional switches through the number of customers that go through the SoLR process, though this understates the number of excess customer switches.

In the case of supplier switching costs, these are initially borne by the SoLRs. However, under the assumption that the SoLRs can pass through these costs either through the LRSP or to their customer base directly, the costs to suppliers ultimately filter through to imposing costs onto the generality of customers.

By reducing the incidence of failure in the post-policy world to levels associated with Partial Effectiveness or Full Effectiveness, both the customers of failed suppliers and the generality of customers benefit from fewer non-enduring switches occurring.

We apply the following formula to estimate switching costs pre- and post-policy:

$$Switching\ Costs = Failure\ Rate \times Customer\ Numbers\ \times Switching\ Cost\ Proxy$$

We apply the switching cost to change in the failure rate for small suppliers, multiplied by the number of direct debit customers served by small suppliers.

By applying this formula and taking the difference between the pre- and post-policy failure rates, we estimate that the new policy reduces the social costs incurred through forced switching under the SoLR process of between £24 million and £58 million for customers of failed suppliers and £7 million and £13 million for suppliers (which ultimately pass through to the generality of customers). We present the range of net benefits in Table 5.23 below for the two switching cost proxies.

**Table 5.23: The Reduction in Forced Switching Costs Range from £31m to £71m per annum**

| | **Low-case outcome** | | **High-case outcome** | |
|---|---|---|---|---|
| Group | Partial Effectiveness | Full Effectiveness | Partial Effectiveness | Full Effectiveness |
| Reduction in Forced Switches (‘000) | 342 | 421 | 342 | 421 |
| Customer Cost per Switch (/cust.) | £69 | £69 | £138 | £138 |
| Supplier Cost per Switch (/cust.) | £21 | £21 | £31 | £31 |
| Total Cost to Customers | £24m | £29m | £47m | £58m |
| Total Cost to Suppliers | £7m | £9m | £11m | £13m |
| TOTAL | £31m | £38m | £58m | £71m |

*Source: NERA Analysis*

### 5.5.3. Reduction in the number of 'inefficient' switches

The second category of reduced switches relates to the customers who switched to a now-failed supplier and switched away before the supplier failed. Although these customers are not subject to the forced switch from the SoLR process itself, they could have still ended up with their now-current supplier with one fewer switch if they had not switched to the failed supplier in the interim.

Switching activity may be a sign of healthy competition where it reveals the least cost or highest-quality way of delivering the services in question. However, where this competition is driven by factors other than underlying cost or quality, then the switches themselves are inefficient. These costs lie with the customers of failed suppliers both pre- and post-policy since we assume that suppliers do not bear any switching costs outside of a SoLR event.

To estimate the number of inefficient switches, we calculate the (customer-weighted) annual churn rate for failed and non-failed suppliers, based on Ofgem data on total switches away from each supplier between 2017 and 2021. We find that the churn rate is roughly 27 per cent for a failed supplier and 18 per cent for non-failed suppliers.

We assume that post-policy, under sustainable competition practices, that the churn rate falls to that of non-failed suppliers (18 per cent). Using the excess 9 per cent (multiplied by the 2.3 million customer base of failed suppliers) multiplied by the switching cost proxies of £69 and £138, we estimate that the reduction in inefficient switching cost yields benefits of between £15 million and £30 million per annum for customers of failed suppliers.

## 5.6. Administrative Costs of the Policy

There will be administrative costs for Ofgem and suppliers in complying with and enforcing the two proposed interventions. We have not estimated these as part of this exercise.

# 6. Results and Conclusions

In this section, we combine the benefits and costs to analyse the net benefits to society given a range of assumptions on policy effectiveness in tackling the market failure prevalent in the industry. We summarise the net benefits both in total (across society) and for different stakeholder or customer groups.

In Table 6.1 and Table 6.2, we present the net costs and benefits that ultimately fall on each stakeholder group, under the assumption that the policy is **partially effective** (Table 6.1) or **fully effective** (Table 6.2). We assess the effects on:

- The customers of failed suppliers;[41]
- Engaged customers of other suppliers: These customers are able to achieve cheaper tariffs in the pre-policy world but if insurance costs are internalised, may face higher costs where their suppliers are indistinguishable from failing suppliers in the post-policy world;
- Disengaged customers: We assume that this represents the proportion of customers on the DTC.[42] These customers pay higher rates, because they are on default tariffs, and do not engage in the competitive supply market; and

Some costs and benefits may fall on other stakeholder groups initially. For instance, suppliers may initially bear increased costs of insurance from protecting CCBs and the RO but we assume that these are passed through to the generality of customers through the DTC or the forces of competition. The tables show where changes in costs and benefits ultimately sit post-policy across the different stakeholder groups.

Additionally, because the costs and benefits fall on different customer groups with different characteristics, we add two lines at the bottom of the tables to reflect Ofgem's guidance on treating the costs and benefits of different socioeconomic groups. In particular, disengaged customers are more likely to be lower income than engaged customers, so a policy that redistributes value from engaged to disengaged customers will tend to be more socially beneficial than the pure transfers of money would suggest.

Based on an Ofgem survey on engagement in the energy market, alongside Ofgem guidance on the value of £1 spent in each decile income group, we calculate that a £1 benefit for disengaged customers is worth £1.04 in terms of the social benefit, and a £1 benefit for engaged customers is worth £0.96 in terms of social benefit.

[41] We assume that there have been on average 2.1 million customers with failed suppliers each year from 2016 to 2021. We will refine this estimate with better data

[42] We assume that roughly two thirds of the market are on SVTs. We will refine this assumption with the availability of better data

**Table 6.1: The Change in the Costs Borne by Different Stakeholder Groups Creates Winners and Losers Post-Policy [Partial Effectiveness] (£ million)**

| | Customers of Failed Suppliers | | Engaged Customers with non-Failed Suppliers | | Disengaged Customers | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *Low* | *High* | *Low* | *High* | *Low* | *High* | *Low* | *High* |
| Cost of Insurance through SoLR Levy - CCB | 7 | 9 | 32 | 41 | 46 | 58 | 86 | 107 |
| Cost of Insurance through SoLR Levy - RO | 6 | 6 | 29 | 29 | 41 | 42 | 76 | 78 |
| Cost of Insurance through Tariffs - CCB | -9 | -9 | -19 | -19 | -12 | -12 | -40 | -40 |
| Cost of Insurance through Tariffs - RO | -10 | -10 | -22 | -22 | -14 | -14 | -47 | -47 |
| Hedging | 3 | 27 | 16 | 126 | 22 | 179 | 41 | 332 |
| Additional Tariff Increase | -30 | -21 | -44 | -28 | 0 | 0 | -75 | -49 |
| Switching Costs | 39 | 77 | 3 | 4 | 4 | 6 | 45 | 87 |
| Admin Costs of Policy | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total (unweighted)** | **6** | **79** | **-6** | **130** | **87** | **258** | **87** | **467** |
| (£ per affected customer) | 3 | 34 | *-1* | *12* | 6 | 17 | 3 | 16 |
| **Total (Social Weighting)** | **6** | **76** | **-6** | **125** | **90** | **269** | **90** | **469** |
| (£ per affected customer, socially-weighted) | 2 | 33 | *-1* | *12* | 6 | 17 | 3 | 16 |

*Source: NERA Analysis. Note: All figures in £m unless otherwise stated*



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**Table 6.2: The Change in the Costs Borne by Different Stakeholder Groups Creates Winners and Losers Post-Policy [Full Effectiveness] (£ million)**

| | Customers of Failed Suppliers | | Engaged Customers with non-Failed Suppliers | | Disengaged Customers | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *Low* | *High* | *Low* | *High* | *Low* | *High* | *Low* | *High* |
| Cost of Insurance through SoLR Levy - CCB | 7 | 9 | 32 | 41 | 46 | 58 | 86 | 107 |
| Cost of Insurance through SoLR Levy - RO | 6 | 6 | 29 | 29 | 41 | 42 | 76 | 78 |
| Cost of Insurance through Tariffs - CCB | -2 | -2 | -9 | -9 | -12 | -12 | -23 | -23 |
| Cost of Insurance through Tariffs - RO | -2 | -2 | -10 | -10 | -14 | -14 | -27 | -27 |
| Hedging | 4 | 33 | 19 | 154 | 27 | 220 | 50 | 408 |
| Additional Tariff Increase | -45 | -34 | -67 | -50 | 0 | 0 | -112 | -85 |
| Switching Costs | 44 | 88 | 3 | 5 | 5 | 7 | 52 | 100 |
| Admin Costs of Policy | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total (unweighted)** | **12** | **98** | **-2** | **160** | **92** | **300** | **102** | **559** |
| (£ per affected customer) | 5 | 43 | *0* | *15* | 6 | 20 | 4 | 20 |
| **Total (Social Weighting)** | **12** | **94** | **-2** | **154** | **96** | **313** | **106** | **561** |
| (£ per affected customer, socially-weighted) | 5 | 41 | *0* | *14* | 6 | 20 | 4 | 20 |

*Source: NERA Analysis; Note: All figures in £m unless otherwise stated*

From the Tables, we draw the following conclusions by customer group:

- **Customers of failed suppliers:** These customers are only marginally better off for our low case assumptions. This is in line with our expectations because this group of customers benefited from disengaged and other active customers insuring their credit balances, hedges and RO payments whilst receiving cheaper tariffs. However, these customers are better off because each customer in this class is also responsible for paying the cost of mutualisation, irrespective of whether their supplier fails. Thus, they benefit from avoiding the process of mutualisation as much as other customer groups do. They also incur fewer switching costs in the post-policy world.
- **Engaged customers with other non-failing suppliers**: These customers are worse off as a result of the policy in the Low case outcome because some of them are served by smaller, less creditworthy suppliers. We assume that those suppliers will need to increase prices materially to meet their obligations following the proposed interventions. Those customers within the engaged category of customers served by large suppliers are better off because they are no longer responsible for insuring the credit balances and RO payments of failing suppliers.[43]
- **Disengaged customers:** Disengaged customers are better off relative to the pre-policy world. These customers were providing free insurance to the customers of failed suppliers, in the form of SoLR levies, whilst not benefiting from the lower tariffs enjoyed by the other customer groups. This group also includes vulnerable customers. There may be important equity and distributional considerations when assessing policy impacts, that may give additional weight to the policy above the net benefits for society as a whole.

We summarise the key figures across the **partial effectiveness** and **full effectiveness** scenarios in Table 6.3 below.

**Table 6.3: Summarised Final Results (£million per annum)**

| | Partial Effectiveness | | Full Effectiveness | |
|---|---|---|---|---|
| | ***Low*** | ***High*** | ***Low*** | ***High*** |
| **Total (Consumers only, unweighted)** | ***87*** | ***467*** | ***102*** | ***559*** |
| (£ per customer) | *3* | *16* | *4* | *20* |
| **Total (Consumers only, socially-weighted)** | ***90*** | ***469*** | ***106*** | ***561*** |
| (£ per customer, socially-weighted) | *3* | *16* | *4* | *20* |

*Source: NERA Analysis; Note: All figures in £m unless otherwise stated*

[43] Our analysis assumes that there is no tariff increase beyond the amount required to comply with the proposed interventions (i.e. their suppliers' tariffs are not influenced by unsustainable tariffs offered by failed suppliers). We assume that remaining competitors in the market provide sufficient competitive tension to ensure that suppliers continue to offer the lowest cost-based tariff possible. We examine the impact of assuming that prices increase for all engaged customers in the post-policy world above the cost of complying with the proposed interventions in Appendix B (section B.4) below.

In conclusion, we find that the proposed interventions could have an unweighted net effect on consumers of between £87 million per annum (roughly £3 per customer) and £559 million (£20 per customer). Accounting for different socio-economic characteristics of different customers group slightly increases net benefits in the low scenarios.

At the bottom end of this range, we assume that the policies are only partially effective in reducing the failure rate. At the top end of this range, we assume that the policies are highly effective at reducing the failure rate, leading to a large savings in the financing costs of the sector. We also assume that price competition remains unchanged for engaged customers.

The figures in Table 6.3 represent an estimate of the expected annual benefit of the policies, or an average between many years where there would be no failures even without the policy and a few years where there are many failures which can be prevented by the policy. For example, while the failures of 2021 were high-profile and expensive, we would not expect to see them annually, and so the annual average expected cost of 2021 repeating itself every, say, 10 years, would be one-tenth of the cost that consumers incurred in 2021.

The Tables above exclude some potential categories of benefit that might be attributed to the proposed interventions. These include:

- **Bill stability:** The proposed interventions reduce the cost for the generality of customers of reimbursing credit balances, RO payments and hedging costs (to the extent that it reduces default) at the point of supplier failure, which can lead to very large bill increases in a short period of time. In place of this, the proposed interventions will require customers to pay in advance for the cost of protecting credit balances, as allowed through the DTC. As the experience of 2021 shows, supplier failure typically occurs when wholesale prices and bills are high. Accordingly, the policy smooths out costs currently experienced in times when customer bills are high.
- **Dynamic benefits of competition:** The tables above do not attribute benefits or costs resulting from the impact of the proposed interventions on competition over time, though the Low benefits outcomes assume that tariffs will increase for engaged customers due to the loss of competition from failed suppliers. In principle, the dynamic benefits for competition could lean in either direction. On the one hand, current policies subsidise unsustainable entrants, which over the long term could undermine investment in the sector. On the other hand, under current circumstances, failures in the capital market could in principle undermine efficient retail entry absent an offsetting subsidy to entrants. Arguably, the balance of evidence points to the potential dynamic benefits of the proposed interventions: A subsidy funded by disengaged customers to customers of entrant suppliers, regardless of the degree of innovation, does not appear likely to be an efficient solution to promote innovators. Neither does the historical pattern of entry suggest that wider entry barriers have suppressed entry under existing arrangements.

# Appendix A. Direct Estimation of Social Cost Associated with Moral Hazard

In Chapter 5, we set out our approach to estimating the transfers between different groups of consumers that result from the insurance currently paid for by the generality of consumers to the customers of suppliers with risky business models against the default of those suppliers. Given the competitiveness of market for engaged customers, we assume that the financing subsidy received by suppliers with risky business models are passed through to their customers in the form of lower tariffs. In practice, however, it is not clear that all of the financing subsidy currently available would be passed through: to the extent that current arrangements accompany in additional (social) costs for suppliers with risky business models, only the difference between the financing subsidy and those additional costs would be passed through to their customers.

This Appendix briefly reviews the evidence on two alternative sources of social costs:

- Higher operating costs of the failed suppliers compared to non-failed suppliers; and
- The administrative cost of bankruptcy, borne by the failed supplier and passed on to its customers.

We conclude that the evidence that failed suppliers have excess operating costs over alternative suppliers is limited, at least on average. Although that the elimination of some inefficient competitors may still be expected to reduce costs to consumers, we do not include estimates of these costs on the basis that it is challenging to estimate those costs robustly based on the available data.  Excess administrative costs of bankruptcy are likely to account for £9 million to £11 million per annum, which costs consumers would save, and the saving of which costs are accounted for in our High Case assumptions.

## A.1. Difference in Opex between Failed and Non-Failed Suppliers

To estimate the difference in opex between failed and non-failed suppliers, we consult energy companies' consolidated segmental statements provided by Ofgem and accounts statements provided by Companies House for a period from 2016 until 2020.  Both sources provide an annual measure of opex.[44] Customer numbers per supplier are provided by Ofgem on a monthly basis. This enables us to compare opex per customer of incumbent suppliers with that of failed suppliers to calculate the social cost per customer.

Performing the opex analysis with data on customer numbers provided by Ofgem, we find per-customer opex of £190 for large suppliers and £178 for failed suppliers. Hence, the opex per customer are £12 lower for failed suppliers than for incumbent suppliers. This would

[44] Ofgem publishes opex as indirect costs for large suppliers separately for both electricity and gas in the consolidated segmental statements. In the accounts statements published by Companies House, opex is denoted as administrative expenses.

imply a social benefit from the presence of failed suppliers through lower opex which amounts to £27 million per year across 2.3 million customers of failed suppliers.

Using the consolidated segmental statements for incumbent suppliers and annual statements for failed suppliers, we find per-customer opex of £101 for large suppliers and £120 for failed suppliers. Hence, the opex per customer is £19 higher for failed suppliers than for incumbent suppliers resulting in an annual social cost of £44 million per year.

These results show that there is considerable uncertainty about the differences in the opex per customer between incumbent and failed suppliers.

The quality of the data underlying this analysis is low because:

- First, it contains implausible time series for incumbent suppliers, e.g. for the same supplier, per-customer opex increase by up to 40 per cent within one year.
- Second, there is limited data on opex of failed suppliers because they only publish annual financial statements when they reach a certain size. Hence, we mostly have to rely on one or two annual statements per failed supplier for the period from 2016 to 2021, which might not be representative.
- Third, we have no method for controlling for differences in accounting treatment and/or quality of service provided.

Due to the shortcomings in data quality described above, we do not rely on the opex analysis in the cost benefit analysis.

## A.2. Administrative Cost of Bankruptcy

When a supplier fails and there is no prospective buyer to take over, creditors/shareholders of the company engage administrators to wind up the business of the supplier. Winding up the business of a failed supplier creates additional costs compared to a business-as-usual situation in which a supplier does not fail.

Both in the pre- and post-policy world, customers of the failed supplier bear these costs. In the first instance, creditors pay the administrator for its services. However, creditors do not ultimately bear these costs, because they anticipate the likelihood of the failure and the expected costs which are related to the administration procedure. As a result, creditors charge higher interest rates for capital that compensate them for the expected administrative cost of the bankruptcy raising the cost of debt for suppliers. In turn, (failed) suppliers pass on the higher cost of financing to their customers.

We expect the policy to reduce the likelihood of failure due to the eliminating the incentive of excessive risk taking. Hence, the administrative cost of bankruptcy is higher in the pre- than in the post-policy world.

To measure the additional costs of winding up failed suppliers, i.e. the administrative cost of bankruptcy, we draw on administrator reports and proposals published by Companies House.

 

In these reports, administrators state their (expected) fees and expenses for winding up the business of a supplier. We inflate all fees and expenses to January 2022. Then, we sum up the costs (i.e. fees and expenses) of all administration procedures between January 2016 and December 2021 for which we have data. Dividing the aggregated cost with the number of customers who were affected by the administration procedures, we find an administrative cost of bankruptcy of £16.47 per customer of failed suppliers.

In the historical view, we calculate the administrative cost of bankruptcy as the product of the per-customer cost and the number of customers that went through the SoLR process since January 2016. The annual administrative cost of bankruptcy is subsequently derived by taking the annual average and amounts to £11.3 million.

In the equilibrium view, we derive an annual average of customers that are affected by failures for both small and large suppliers based on their expected default risk (derived in Section 5.1). Similar to the historical approach, we calculate the annual costs of bankruptcy for both small and large suppliers as the product of per-customer costs and the number of affected customers. The annual administrative cost of bankruptcy is then the sum of the costs for small and large suppliers.

In the pre-policy world, we find an annual administrative cost of bankruptcy equal to £11.7 million. In the post-policy world, the cost varies with the assumption on policy effectiveness:

- If small suppliers have a B credit rating in the post-policy world and the associated failure rate of small suppliers reduces to 2.22 per cent, the annual administrative cost reduces to £2.3 million; and
- If small suppliers have a BBB credit rating, which is associated with an annual failure rate of 0.06 per cent, the annual administrative cost reduces to £0.3 million.

Hence, we find that the policy reduces the administrative cost of bankruptcy by £9 million to £11 million.

## A.3. Results

Directly estimating the social cost which is associated with the transfer from the generality of customers to the failed suppliers, we find an annual social cost of £-18 – +55 million per annum.

The social cost originates from different components:

- Difference in opex between failed and non-failed suppliers which amounts to £-27 – +44 million per annum.
- Administrative cost of bankruptcy which amounts to £9 million to £11 million per annum.

# Appendix B. Sensitivity Analysis

We have performed several sensitivity analyses that provide additional results for the policy impact under different scenarios. These sensitivities show how the main results presented in the report change if important modelling assumptions are modified.

For the two items *cost of insurance* and *hedging costs*, we employ the historical view in our **high case outcome**. The historical view does not change across sensitivities, since it is based on what was mutualised historically through the SoLR process, and hence is not sensitive to changes in our assumptions of pre-policy behaviour. Hence, figures for cost of insurance and hedging costs remain unchanged in most sensitivity scenarios.

In contrast, the **low case outcome**, which is based on the equilibrium view, is able to accommodate all sensitivity checks and can give an indication of the direction in which net benefits of the policy are heading, when major assumptions of the main analysis are changed.

## B.1. Higher Market Share of Small Suppliers

Within the main body of the report, we use the assumption that suppliers are classified as large within a month whenever their market share exceeds a 5 per cent threshold. Otherwise, a supplier is classified as small.

Bulb, Octopus and Ovo are classified as large suppliers, since they all exceed the market share threshold by the end of the period. Thus, in our pre-policy world, we assume these three suppliers have a failure rate consistent with a BBB-rated firm. Whilst they may constitute a large supplier in terms of customer numbers, they may be less likely to have achieved a BBB rating due to e.g. a less diversified business and a lower captive customer base compared to other large suppliers.

To provide a sensitivity, we present results for two scenarios in which (1) we consider only Bulb to be a small supplier (alongside all others which are "small" in the main results); and (2) we place Bulb, Octopus and Ovo into the small supplier category.

In Table B.4, we present our findings for the first sensitivity, in which we only add Bulb to the small supplier category.

**Table B.4: Policy Impact when Bulb Is Considered a Small Supplier**

| | Partial Effectiveness | | Full Effectiveness | |
|---|---|---|---|---|
| Main Results | *Low* | *High* | *Low* | *High* |
| **Total (Consumers only, unweighted)** | ***87*** | ***467*** | ***102*** | ***559*** |
| (£ per customer) | *3* | *16* | *4* | *20* |
| **Total (Consumers only, socially-weighted)** | ***90*** | ***469*** | ***106*** | ***561*** |
| (£ per customer, socially-weighted) | *3* | *16* | *4* | *20* |
| Sensitivity | | | | |
| **Total (Consumers only, unweighted)** | ***118*** | ***466*** | ***135*** | ***544*** |
| (£ per customer) | *4* | *16* | *5* | *19* |
| **Total (Consumers only, socially-weighted)** | ***123*** | ***469*** | ***140*** | ***547*** |
| (£ per customer, socially-weighted) | *4* | *16* | *5* | *19* |
| Delta | | | | |
| **Total (Consumers only, unweighted)** | ***32*** | ***-1*** | ***33*** | ***-15*** |
| (£ per customer) | *1* | *0* | *1* | *-1* |
| **Total (Consumers only, socially-weighted)** | ***33*** | ***0*** | ***35*** | ***-14*** |
| (£ per customer, socially-weighted) | *1* | *0* | *1* | *0* |

*Source: NERA analysis*

Table B.4 shows net benefits of the policy of £118 – 135 million per annum in the Low case outcome and £466 – 544 million per annum in the High case outcome. Adding Bulb to the small supplier category therefore increases net benefits by £32-33 million per annum in the Low case outcome but decreases it by £1 – 15 million per annum in the High case outcome compared to our main results. These results are driven by the following dynamics:

- In the Low case outcome, which bases the pre-policy cost of insurance on an equilibrium view, we see a higher pre-policy CCB and RO insurance cost across all customers in line with the higher default rate when Bulb is considered as a small supplier.
- Similarly, we estimate a higher option value of hedging in the pre-policy world, based on the higher expected default rate.
- The High case outcome refers to actual mutualisations for these three line-items in the pre-policy world, and hence are unchanged whether or not Bulb is included as a small supplier.
- Switching costs are higher in the pre-policy world, in line with the higher default rate. We see these increased savings across both outcomes and scenarios.
- More customers are considered to be served by small suppliers. The cost of insuring their balances in the post-policy world in the Partial Effectiveness scenario is higher, because more customers are subject to higher interest rates.
- In all cases and scenarios, we see a higher increase in tariffs from small suppliers, since a hypothetical risky entrant now appears more risky and hence more expensive.

In the second scenario, we estimate the policy benefit if we consider Bulb, Ovo Energy and Octopus as small suppliers. As in the first scenario, the dynamics are generally led by differences in expected failure rate and the size of the "small" customer base. There are two counter-acting dynamics relative to the first scenario:

- We add two more suppliers to the set of small suppliers, neither of whom have failed, lowering the expected failure rate of small suppliers in the pre-policy world; and
- We increase the set of customers served by small suppliers, thus increasing the total costs incurred on behalf of small supplier customers, whether that is mutualised across all customers or borne by engaged customers directly.

We present results in Table B.5.

**Table B.5: Policy Impact when Bulb, Ovo Energy and Octopus Are Considered Small Suppliers**

| | Partial Effectiveness | | Full Effectiveness | |
|---|---|---|---|---|
| Main Results | ***Low*** | ***High*** | ***Low*** | ***High*** |
| **Total (Consumers only, unweighted)** | ***87*** | ***467*** | ***102*** | ***559*** |
| (£ per customer) | *3* | *16* | *4* | *20* |
| **Total (Consumers only, socially-weighted)** | ***90*** | ***469*** | ***106*** | ***561*** |
| (£ per customer, socially-weighted) | *3* | *16* | *4* | *20* |
| Sensitivity | | | | |
| **Total (Consumers only, unweighted)** | ***112*** | ***453*** | ***135*** | ***556*** |
| (£ per customer) | *4* | *16* | *5* | *20* |
| **Total (Consumers only, socially-weighted)** | ***118*** | ***456*** | ***140*** | ***558*** |
| (£ per customer, socially-weighted) | *4* | *16* | *5* | *20* |
| Delta | | | | |
| **Total (Consumers only, unweighted)** | ***26*** | ***-14*** | ***33*** | ***-2*** |
| (£ per customer) | *1* | *0* | *1* | *0* |
| **Total (Consumers only, socially-weighted)** | ***28*** | ***-13*** | ***35*** | ***-2*** |
| (£ per customer, socially-weighted) | *1* | *0* | *1* | *0* |

*Source: NERA analysis*

Table B.5 shows net benefits of the policy of £112 – 135 million per annum in the Low case outcome and £453 – 556 million per annum in the High case outcome. Adding Bulb, Ovo Energy and Octopus to the small supplier category therefore increases net benefits by £26 – 33 million per annum in the Low case outcome but decreases them by £2 – 14 million per annum in the High case outcome compared to our main results.

The differences are driven by the following dynamics:

- In the Low case outcome, which bases the pre-policy cost of insurance on an equilibrium view, we see a higher pre-policy CCB and RO insurance cost across all customers in line with the larger number of customers subject to higher default rates.
- In the Partial Effectiveness scenario, we see a higher cost of insurance included in tariffs in the post-policy world, because more customers are served by suppliers with higher financing costs.
- Additional tariff increases are higher in this sensitivity because more “engaged” customers are served by suppliers we consider “small”, and hence are subject to tariff increases above the cost of compliance.

## B.2. Large Suppliers Engage in Risky Behaviour in the Absence of the Policy

In our main analysis, we assume that large suppliers will continue to operate under sustainable business practices and maintain their BBB rating. However, if the status-quo world endures, distorted competition may induce prudent suppliers to exit the market or incentivise these suppliers to engage in risky behaviour.

As a sensitivity, we model our scenarios under the assumption that the credit rating for large suppliers falls to BB in the absence of the policy (pre-policy) but remains at BBB when the policy is implemented (post-policy). The pre-policy small supplier credit rating remains at CCC and improves to either B or BBB in the post-policy world depending on the effectiveness of the policy. This sensitivity is arguably still conservative (in the sense that it reduces benefits) because the credit rating of large suppliers could fall further still absent a change to current competitive dynamics. Persistent entry by high-risk suppliers could drive existing stablished players to pursue equally high-risk strategies, including separating their supply businesses from their network and generation assets to facilitate that strategy. In such circumstances, the benefits of the proposed interventions would rise materially.

We present the results in Table B.6 below.

**Table B.6: Policy Impact when Large Supplier Engage in Risky Behaviour in the Absence of the Policy**

| | Partial Effectiveness | | Full Effectiveness | |
|---|---|---|---|---|
| Main Results | ***Low*** | ***High*** | ***Low*** | ***High*** |
| **Total (Consumers only, unweighted)** | ***87*** | ***467*** | ***102*** | ***559*** |
| (£ per customer) | *3* | *16* | *4* | *20* |
| **Total (Consumers only, socially-weighted)** | ***90*** | ***469*** | ***106*** | ***561*** |
| (£ per customer, socially-weighted) | *3* | *16* | *4* | *20* |
| Sensitivity | | | | |
| **Total (Consumers only, unweighted)** | ***155*** | ***474*** | ***170*** | ***566*** |
| (£ per customer) | *5* | *17* | *6* | *20* |
| **Total (Consumers only, socially-weighted)** | ***158*** | ***476*** | ***174*** | ***568*** |
| (£ per customer, socially-weighted) | *6* | *17* | *6* | *20* |
| Delta | | | | |
| **Total (Consumers only, unweighted)** | ***68*** | ***7*** | ***68*** | ***7*** |
| (£ per customer) | *2* | *0* | *2* | *0* |
| **Total (Consumers only, socially-weighted)** | ***68*** | ***7*** | ***68*** | ***7*** |
| (£ per customer, socially-weighted) | *2* | *0* | *2* | *0* |

*Source: NERA analysis*

As the table shows, we find net benefits from the policy of between £155 – 170 million per annum (Low case outcome) and £474 – 566 million per annum (High case outcome) in this scenario. Compared to our main results (Table 6.3), the net benefits of the policy increased by £68 million per annum in the low scenario and £7 million per annum in the high scenario.

The increased benefits come from the following sources:

- In both the Low and the High case outcomes, we see a c. £7 million decrease in hedging and switching costs. These come from a greater reduction in the failure rate from the pre-policy to the post-policy world, since the pre-policy world in this sensitivity has a greater failure rate than in the main results.
- In the Low case outcome only, we see an additional c. £61 million decrease in the equilibrium value of the SoLR levy, because the implicit cost of consumers insuring CCBs and the RO in the pre-policy world is higher due to the worse credit rating of large suppliers.

## B.3. Reference Period and the Likelihood of "Bad Years" like 2021

We use January 2016 to December 2021 as reference period for our main analysis. We assign the same weight to each of the years in this six-year period. Hence, we implicitly assume that a “bad year” like 2021 with many failures and high mutualisation costs happens every six years.

However, “bad years” might happen more or less frequently. Furthermore, the reference period from 2016 to 2021, might not be representative period for the future due to the implementation of the DTC in 2019.

To provide a sensitivity, we calculate cost and benefits of the policy based on the reference period from 2019 to 2021 and weight 2019/2020 and 2021 such that a “bad year” like 2021 occurs every 20 years. We expect net benefits of the policy to decrease because default rates and mutualisation costs decrease.

**Table B.7: Policy Impact when 2019 to 2021 becomes the Reference Period and a Year like 2021 Happens Every 20 Years**

| | Partial Effectiveness | | Full Effectiveness | |
|---|---|---|---|---|
| Main Results | ***Low*** | ***High*** | ***Low*** | ***High*** |
| **Total (Consumers only, unweighted)** | ***87*** | ***467*** | ***102*** | ***559*** |
| (£ per customer) | *3* | *16* | *4* | *20* |
| **Total (Consumers only, socially-weighted)** | ***90*** | ***469*** | ***106*** | ***561*** |
| (£ per customer, socially-weighted) | *3* | *16* | *4* | *20* |
| Sensitivity | | | | |
| **Total (Consumers only, unweighted)** | ***43*** | ***287*** | ***58*** | ***383*** |
| (£ per customer) | *2* | *10* | *2* | *13* |
| **Total (Consumers only, socially-weighted)** | ***45*** | ***287*** | ***60*** | ***383*** |
| (£ per customer, socially-weighted) | *2* | *10* | *2* | *13* |
| Delta | | | | |
| **Total (Consumers only, unweighted)** | ***-43*** | ***-180*** | ***-44*** | ***-176*** |
| (£ per customer) | *-2* | *-6* | *-2* | *-6* |
| **Total (Consumers only, socially-weighted)** | ***-46*** | ***-182*** | ***-46*** | ***-177*** |
| (£ per customer, socially-weighted) | *-2* | *-6* | *-2* | *-6* |

*Source: NERA analysis*

Table B.7 presents net benefits from the policy of between £43 – 58 million per annum and £287 – 383 million in this scenario. Compared to our main results (Table 6.3), the net benefits of the policy decrease by £43 – 44 million per annum in the Low case outcome and £176 – 180 million per annum in the High case outcome.

The differences between the main results and this sensitivity come from the following sources:

- With a lower expectation of failure going forward in the pre-policy world, the cost of not implementing the policies are lower. In particular, the expected cost of paying out insurance on CCBs and the RO are lower, as is the expected mutualisation of hedges.

  - The difference between the Low and High case outcomes comes primarily from how we measure hedging costs in the pre-policy world. In the High case outcome, we focus on the amount actually mutualised, which is considerably larger than the option value represented by the Low case outcome. Thus, by reducing both in line with a lower expected default rate, the High case pre-policy hedging cost falls by more in absolute terms than the Low case pre-policy hedging cost.
- Because this sensitivity focuses on the pre-policy world, the costs of the post-policy world are unchanged between the main results and the sensitivity. The exception is that we model a smaller additional tariff increase, because a hypothetical risky entrant could enter more cheaply in the sensitivity given the lower likelihood of failure.

## B.4. Alternative Financing Costs

In our core modelling presented in the body of this report, we assume that the cost of insuring CCBs and the RO is equal to the bond yield (i.e. the cost of debt) for a company with a similar default probability as the company in question (as described in Section 5.2, above). We apply this assumption in both the pre-policy (low/equilibrium) and the post-policy case:

- In the pre-policy world, the loan that the generality of customers provide to suppliers is more similar to debt than to equity, because they do not receive any potential for upside while still receiving a potential for downside in the case of default. The main distinction from a financing perspective is that CCBs and the RO are not paid out at all in the event of a default whilst debtholders would typically recover some of the value of any lending from the administrator. However, like debt they must be repaid so long as the supplier continues to operate.
- As the capital requirement moves from the generality of customers to the suppliers themselves, the cost of the capital does not change on average (absent a change in the riskiness of the cashflows of the business), because the total risk around the capital does not change as a result of its transfer. While the capital added to the business required to protect CCBs and the RO may come from equity, that equity would have a different call on the assets of the business than CCBs and the RO. Equity would not be a like for like replacement and issuing equity would change the true overall gearing of the business (including borrowing from customers and the RO) and disturb the returns earned by other sources of finance. Thus, the *marginal* cost to the business of explicitly procuring that capital may be lower than the cost of the capital raised to replace that previously provided by customers and the RO.

However, it is likely that customers would need to receive a higher interest rate than the cost of capital for their CCB and RO prepayments if the associated risk would be priced appropriately at the market. The reason is that creditors, who receive the cost of debt (bond yield) as a return for their capital, keep a share of their principal in the event of a supplier bankruptcy. According to Moody’s, the bond recovery rate for senior unsecured bonds was equal to approximately 42 per cent in April 2022.[45] In contrast, customers of the failed supplier do not benefit from the remaining value of the supplier's assets in the event of a failure. They lose 100 per cent of their credit balances and RO balances.[46]

Given the difference in recovery rates, reliance on a benchmark cost of debt may understate the amount of explicit tariff increase. But equally, it will understate the reduction in the expected SoLR levy (in the pre-policy world). The final estimate of the benefits will therefore be unbiased.

In this section, we present two sensitivities to the return on capital on capital that would be necessary to compensate customers for their exposures to cover CCBs and the RO.

First, we **model an uplift to the interest rate** that reflects the 0 per cent recovery of the principal for customers. We calculate the uplifted interest rate assuming the customers need to receive the same expected return that creditors would assuming 42 per cent recovery of the principal at the point of default. Because the probability of default is much lower for a large (BBB-rated) supplier, the impact on the cost of debt for non-recovery given default is much lower than for smaller (CCC-rated) suppliers. Table B.8 presents the uplifted interest rates that compensate customers for their 0 per cent recovery rate in the event of a supplier failure. This uplift only applies in the pre-policy world, because that is when customers pay the balance.

Second, we model the benefits and transfers for the proposed interventions assuming that the market rate of return for insurance of CCBs and the RO is given by the **Weighted Average Cost of Capital (WACC).** The implicit insurance offered by customers has a pay-off structure which mimics debt and a prospect of recovery at the point of default which is weaker than that of equity. The WACC consists of required weighted average of debt and equity returns.

To estimate the WACC for suppliers of different descriptions, we rely on the WACC reported by the CMA in the Energy Market Investigation, which would apply to a large supplier in 2016. The CMA estimated that the pre-tax real WACC for a retail supply business was 9.3-11.5 per cent, equal to the cost of equity because the CMA assumes there is no debt.[47] For the purposes of this sensitivity, we use the mid-point of this range, i.e. 10.4 per cent.

We take 10.4 per cent as the WACC for large supplier, as well as the WACC for a small supplier in the post-policy Full Effectiveness scenario. In the post-policy Partial Effectiveness scenario, we apply a spread based on the difference in bond yields, yielding a WACC of 14.7 per cent. In the pre-policy world, we assume that small suppliers have a very

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45 Moody's Investor Service (2022) Default Reports – April 2022.

46 As described in Section 2.1, the cost to customers of failed suppliers related to the loss of their credit balances and RO balances is mutualised via the SoLR process.

47 CMA (2016), Energy Market Investigation – Appendix 9.12: Cost of Capital, p. A-9.12-1.

high WACC of 20.0 per cent. This reflects the high WACC that might be expected for a supplier with a high probability of failure.[48]

**Table B.8: Interest Rates in the Main Scenario and in the Uplift Sensitivity Scenario**

| | Main | Interest Rate Uplift | WACC |
|---|---|---|---|
| CCC (small suppliers) | 11.61% | 16.29% | 20.0% |
| B (Partial Effectiveness) | 5.38% | 6.34% | 14.7% |
| BBB (Full Effectiveness) | 1.12% | 1.15% | 10.4% |

*Source: NERA Analysis*

We present the results of each of the sensitivities in comparison to the main result in Table B.9. All results refer to the Low case outcome, because the High case is based on historical mutualisations rather than an expected cost of capital and therefore is not comparable to the adjustments we make in the table. In principle, the deltas for the total impact on consumers should be close to zero since we are simply scaling our core results by uplifts to the return on capital which is primarily a transfer between consumers in our modelling.

48 We derive this by assuming a 50 per cent bond yield and applying the same WACC premium (9.3 per cent)

### Table B.9: Sensitivity Impact by Customer Group – Interest Rate Uplift and WACC

| | Customers of Failed Suppliers | | Engaged Customers with non-Failed Suppliers | | Disengaged Customers | | Total | |
|---|---|---|---|---|---|---|---|---|
| | Partial | Eull | Partial | Full | Partial | Full | Partial | Full |
| *Main Results* | | | | | | | | |
| SoLR Levy Reduction | 13 | 13 | 61 | 61 | 87 | 87 | 161 | 161 |
| Direct Cost of Insurance | -19 | -4 | -41 | -19 | -27 | -27 | -87 | -49 |
| Additional Tariff Increase | -30 | -45 | -44 | -67 | 0 | 0 | -75 | -112 |
| Other | 42 | 48 | 18 | 22 | 26 | 32 | 87 | 102 |
| **Total** | **6** | **12** | **-6** | **-2** | **87** | **92** | **87** | **102** |
| *Interest Rate Uplift - Results* | | | | | | | | |
| SoLR Levy Reduction | 17 | 17 | 80 | 80 | 114 | 114 | 210 | 210 |
| Direct Cost of Insurance | -23 | -4 | -46 | -19 | -27 | -27 | -95 | -50 |
| Additional Tariff Increase | -47 | -65 | -69 | -96 | 0 | 0 | -115 | -161 |
| Other | 42 | 48 | 18 | 22 | 26 | 32 | 87 | 102 |
| **Total** | **-10** | **-4** | **-17** | **-13** | **113** | **118** | **87** | **102** |
| *Delta to Main Results* | | | | | | | | |
| SoLR Levy Reduction | 4 | 4 | 19 | 19 | 26 | 26 | 49 | 49 |
| Direct Cost of Insurance | -3 | 0 | -5 | 0 | 0 | 0 | -8 | 0 |
| Additional Tariff Increase | -17 | -20 | -24 | -29 | 0 | 0 | -41 | -49 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **-16** | **-16** | **-11** | **-11** | **27** | **26** | **0** | **0** |
| *WACC - Results* | | | | | | | | |
| SoLR Levy Reduction | 47 | 47 | 218 | 218 | 311 | 311 | 576 | 576 |
| Direct Cost of Insurance | -52 | -37 | -195 | -173 | -247 | -247 | -495 | -457 |
| Additional Tariff Increase | -33 | -48 | -49 | -71 | 0 | 0 | -82 | -119 |
| Other | 42 | 48 | 18 | 22 | 26 | 32 | 87 | 102 |
| **Total** | **4** | **10** | **-7** | **-4** | **90** | **96** | **87** | **102** |
| *Delta to Main Results* | | | | | | | | |
| SoLR Levy Reduction | 34 | 34 | 157 | 157 | 224 | 224 | 415 | 415 |
| Direct Cost of Insurance | -33 | -33 | -155 | -155 | -220 | -220 | -408 | -408 |
| Additional Tariff Increase | -3 | -3 | -4 | -4 | 0 | 0 | -7 | -7 |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total** | **-2** | **-2** | **-2** | **-2** | **4** | **4** | **0** | **0** |

*Source: NERA analysis*

As the table shows, the net effect of both sensitivities across all consumer groups is zero:

In the Interest Rate Uplift sensitivity:

- Relative relative to the main results, we model a considerably higher implicit cost of insurance in the pre-policy world, with a much smaller increase in the post-policy explicit insurance cost (especially in the Full Effectiveness scenario). The larger gap between these insurance rates has two effects on the results:
  - We assume that the generality of customers bears a higher cost of insurance in the pre-policy world, and hence all customers benefit more when this responsibility is shifted to suppliers at a lower rate.
  - We assume that small suppliers are able to increase their tariffs above the cost of compliance by a greater extent, because the potential cost of a new risky entrant is higher than in the main results.
- Between these two dynamics, we see a greater benefit to disengaged customers (£26-27 million) offset by a smaller benefit to customers of small suppliers, with a net effect of £0 across all customer groups.

In the WACC sensitivity:

- All consumer groups see a much higher benefit from the reduction of the implicit cost of insurance, paid through the SoLR levy, but this is offset by a higher increase in tariffs once the insurance costs are borne by suppliers.
- Because the inherent riskiness of the capital does not depend on who bears it, this sensitivity demonstrates that the benefits of the policy do not depend on precisely how the cost of capital is characterised. If a WACC were a more appropriate way to measure the necessary increase in tariffs, then it would also be a more appropriate way to measure the avoided costs to consumers through the SoLR levy.

## B.5. Seasonal Variation in Protected Amounts of Credit Balances

This section presents a sensitivity on protected amounts of credit balances. Within our main results, we model suppliers protecting the annual peak of credit balances across the whole year in the post-policy world.

However, protecting the annual peak of credit balances across the whole year might not be necessary to:

i. Protect the credit balances which are at stake in the event of a supplier failure at a given point in time

ii. Prevent the mutualisation of credit balances in the event of a failure

Credit balances in the period from January to August are typically lower than in the period from September to December. Hence, if a supplier fails between January and August, the credit balances which are at stake are likely to be lower than for a supplier failure in September to December.

The policy could instead be designed to require the explicit protection of peak credit balances within subsets of the year. This would tend to increase the administrative burden of the policy (because it would need to be updated and verified more frequently), while reducing the cost of finance (because the amount protected would be lower on average over the year).

Therefore, we additionally calculate the average amount of money that would be required if credit balances were protected on the basis of their: (a) seasonal peak; (b) quarterly peak; or (c) monthly peak.

In Table B.10 below, we show the annualised amount of credit balances which would have to be protected under the baseline (annual) reconciliation and each of the subsets. The annualized amount is calculated as an average of the protected peaks, e.g. for the protection of quarterly peaks, we first calculate the peak of credit balances within each quarter and then take the average across all four quarters of the year. Note that, because small suppliers adopt the same credit balance profile as large suppliers, there is no difference between the amount of credit balance protected *per customer*.

**Table B.10: Post-Policy Amounts of Credit Balance Under Protection**

| | | Annual | Bi-Annual | Quarterly | Monthly |
|---|---|---|---|---|---|
| £ Per Customer | | 77 | 63 | 62 | 55 |
| Total Large Supplier (£m) | a | 1,763 | 1,428 | 1,402 | 1,245 |
| Total Small Supplier (£m) | b | 440 | 356 | 350 | 311 |

*Source: NERA Analysis*

**Table B.11: Post-Policy Interest Rates**

| | | Partial Effectiveness | Full Effectiveness |
|---|---|---|---|
| Interest Rate - Large Supplier (%) | c | 1.12 | 1.12 |
| Interest Rate - Small Supplier (%) | d | 5.38 | 1.12 |

*Source: NERA Analysis*

Multiplying these amounts with the interest rates of the respective policy effectiveness scenarios (Table B.11), we find that a policy requiring to protect monthly peaks instead of annual peaks reduces the cost of insurance of credit balances to £31 million per annum in the Partial Effectiveness scenario and to £17 million per annum in the Full Effectiveness scenario (Table B.11).

**Table B.12: Post-Policy Cost of Insurance of Credit Balances with Seasonal Variation on Protected Amounts**

| | Annual | Bi-Annual | Quarterly | Monthly |
|---|---|---|---|---|
| Partial Effectiveness (£m) | 43 | 35 | 35 | 31 |

| | | | | | |
|---|---|---|---|---|---|
| Full Effectiveness (£m) | e = a * c + b * d | 25 | 20 | 20 | 17 |

*Source: NERA Analysis*

However, the additional cost of administrating a policy which allows the protection of monthly instead of annual peaks might be higher than the benefits that arise from a lower cost of insurance.

## B.6. Additional Tariff Increase for Engaged Customers

In our main results, we assume that tariffs do not increase for engaged customers of large suppliers except by the amount to cover the cost of complying with the new obligations. By contrast, we assume that tariffs from small suppliers increase to the level that would be required for a risky supplier to meet the obligation with no improvement in creditworthiness, as this represents the competitive constraint on prices. This applies to customers of small non-failed suppliers.

In this sensitivity, we assume that these price increases feed through to large suppliers' engaged customers, because the large suppliers no longer face the same price competition from small suppliers. In particular, we assume that they are able to increase tariffs by the same amount in total per customer that small suppliers are able to increase their tariffs.

We apply this rate for small suppliers and large suppliers alike. Even though we assume large suppliers would be able to finance the obligation at a lower rate, we assume that they price above this level and earn higher profits as a result. In the core results (in Section 5.4.2), we estimate that tariffs for small suppliers increase by £16.7-£21.5 per customer, including the level required to comply with the policy.

As we show in Table B.12 below, we apply the same total tariff increase to engaged customers of large suppliers (Row c). Depending on the scenario, the cost of compliance for a large supplier is lower than for a small supplier (Rows d and e), so the *additional* tariff increase needed to reach the same total amount is larger (Rows f and g).

**Table B.13: Additional Tariff Increase for Engaged Customers**

| | | Row | Partial Eff. Low | Partial Eff. High | Full Eff. Low | Full Eff. High |
|---|---|---|---|---|---|---|
| Cost of Insurance for CCC-rated Supplier | £/cust | a | 21.5 | 21.5 | 21.5 | 21.5 |
| Expected Reduction in Bankruptcy Cost | £/cust | b | 0.0 | 4.8 | 0.0 | 4.8 |
| Total Tariff Increase | £/cust | c = a - b | 21.5 | 16.7 | 21.5 | 16.7 |
| Tariff Increase Embedded (Small Supplier) | £/cust | d | 8.3 | 8.3 | 1.7 | 1.7 |
| Tariff Increase Embedded (Large Supplier) | £/cust | e | 1.7 | 1.7 | 1.7 | 1.7 |
| Additional Tariff Increase (Small Supplier) | £/cust | f = c - d | 13.1 | 8.3 | 19.7 | 14.9 |
| Additional Tariff Increase (Large Supplier) | £/cust | g = c - e | 19.7 | 14.9 | 19.7 | 14.9 |
| | | | | | | |
| Engaged Customers of Small Suppliers | mn | f | 3.4 | 3.4 | 3.4 | 3.4 |
| Engaged Customers of Large Suppliers | mn | g | 7.4 | 7.4 | 7.4 | 7.4 |
| | | | | | | |
| Tariff Increase - Main | £m | h = e * f | 44.4 | 28.2 | 66.6 | 50.4 |
| Tariff Increase - Sensitivity | £m | i = e * (f + g) | 190.3 | 138.5 | 212.5 | 160.8 |
| Delta | £m | j = i - h | 145.9 | 110.4 | 145.9 | 110.4 |

*Source: NERA Analysis.*

We present the results of this sensitivity in Table B.13 below.

**Table B.14: Additional Tariff Increase - Results**

| | Partial Effectiveness | | Full Effectiveness | |
|---|---|---|---|---|
| Main Results | ***Low*** | ***High*** | ***Low*** | ***High*** |
| **Total (Consumers only, unweighted)** | ***87*** | ***467*** | ***102*** | ***559*** |
| (£ per customer) | *3* | *16* | *4* | *20* |
| **Total (Consumers only, socially-weighted)** | ***90*** | ***469*** | ***106*** | ***561*** |
| (£ per customer, socially-weighted) | *3* | *16* | *4* | *20* |
| Sensitivity | | | | |
| **Total (Consumers only, unweighted)** | ***-59*** | ***357*** | ***-44*** | ***448*** |
| (£ per customer) | *-2* | *13* | *-2* | *16* |
| **Total (Consumers only, socially-weighted)** | ***-50*** | ***363*** | ***-34*** | ***455*** |
| (£ per customer, socially-weighted) | *-2* | *13* | *-1* | *16* |
| Delta | | | | |
| **Total (Consumers only, unweighted)** | ***-146*** | ***-110*** | ***-146*** | ***-110*** |
| (£ per customer) | *-5* | *-4* | *-5* | *-4* |
| **Total (Consumers only, socially-weighted)** | ***-140*** | ***-106*** | ***-140*** | ***-106*** |
| (£ per customer, socially-weighted) | *-5* | *-4* | *-5* | *-4* |

*Source: NERA Analysis.*

As the Table shows, benefits decrease in line with the size of the additional tariff increase (i.e. £110-146 million), and are negative to consumers in the Low case outcome.

However, this sensitivity assumes a high degree of market power among large suppliers with respect to their engaged customers.  Given the fact that engaged customers have already demonstrated their willingness to change suppliers, it is doubtful that suppliers would be able to increase tariffs to this extent.  Moreover, since tariffs of non-failed suppliers were generally priced higher than those of failed suppliers, they may not be able to increase their prices by the same amount without prompting entry by potential new competitors, or exceeding the price cap.

Finally, these additional price increases are not driven by suppliers' costs, and thus are seen as increased returns for equityholders of large suppliers rather than a true economic cost. Thus, if we were considering the full societal cost benefit, this sensitivity would be no different from the core results.

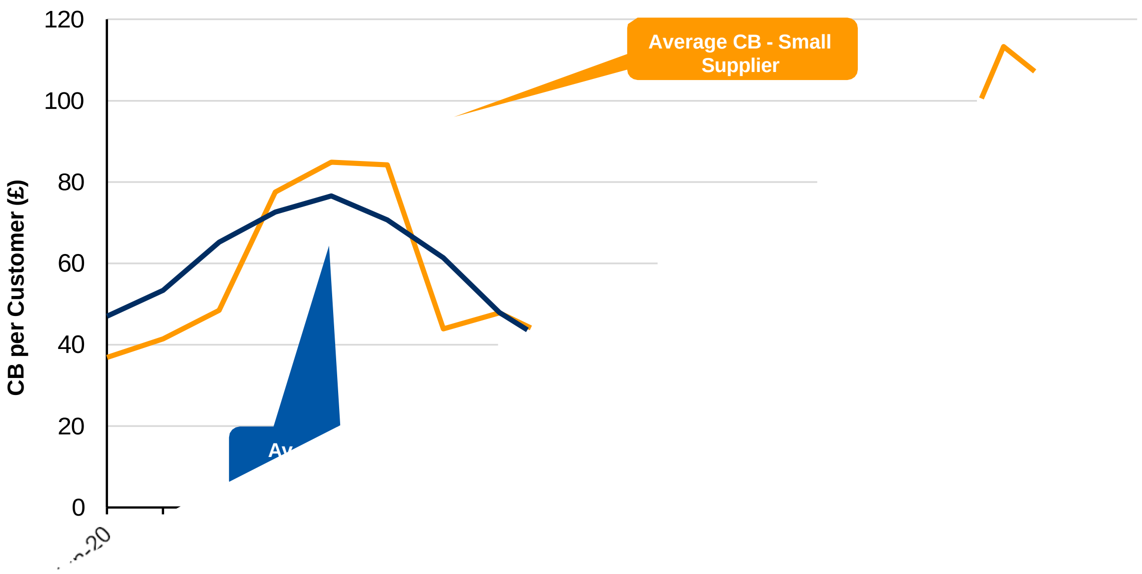
# Appendix C. Detailed Modelling Assumptions

## C.1. Credit Balances to Insure under the Equilibrium View

In Section 5.2, we describe our estimation strategy for the cost of insurance of credit balances. Under the equilibrium view, we combine total credit balances to protect with an assumed probability of default pre- and post-policy to reflect the credit worthiness of different types of suppliers in the industry. This sub-section of the appendix describes how we calculate total credit balance obligations to protect for the industry.

Credit balances are not constant throughout the year. Customers on fixed price contracts are billed a constant level each month based on their average consumption of energy throughout the year. As Figure C.1 shows below, credit balances therefore typically build during the summer months when customers are billed for more energy than they use and are depleted during the winter season. It is therefore important to consider when failures occurred historically to model what level of credit balances are effectively mutualised pre-policy and the level of credit balances that suppliers must protect in the peak month.

**Figure C.1: Credit Balances Typically Build during the Summer**




*Source: NERA Analysis*

We utilise two RFI datasets on gross credit balances and gross credit balances net of unbilled consumption respectively to model total CB obligations that the industry has to protect. We model credit balances using the following steps:

- We analyse the gross credit balances for small and large suppliers in 2021

- In a second RFI, we calculate the percentage of credit balances gross of debit balances net of unbilled consumption to credit balances gross of debit balances and apply this percentage to the average gross credit balances calculated in step 1.

In the pre-policy world, the effective level of credit balances that the generality of customers was protecting was the average credit balances net of unbilled consumption across September to December 2021. This is the period of the year in which most failures occur, from a combination of when wholesale energy prices typically rise, RO payment schedules, and the season in which suppliers face higher costs from consumers. Therefore, this is the effective level of protection that customers have provided for free historically. This figure is £69 per domestic customer per annum. Splitting it up into small and large supplier per customer credit balances, we find that customers of small suppliers would have had to protect £80 per annum and those of large suppliers £65.

In the post-policy world, we assume that suppliers must insure the peak level of credit balance obligations across the year. We calculate that this is £71 per customer per annum.

We then scale the pre- and post-policy total obligations by the number of customers, weighting for the average number of suppliers who did not respond to the RFI to capture total customer numbers in the industry. Doing so yields a pre-policy credit balance obligation of roughly £1.9bn and £2bn in the pre- and post-policy worlds respectively.

## C.2. Renewable Obligations to Insure under the Equilibrium View

In this section, we present the renewable obligations that must be protected in the pre- (implicitly by customers) and post-policy (explicitly by suppliers in the first instance though this ultimately filters, at least in part, through to consumers).

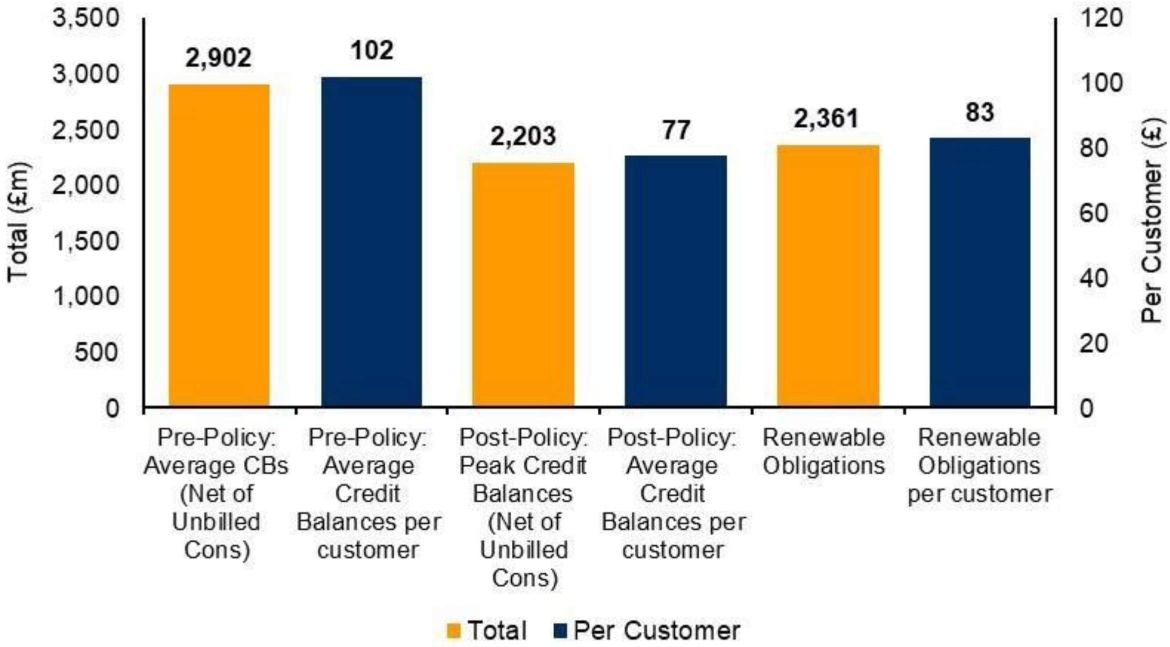
To estimate total obligations for domestic customers we utilise public Renewable Obligation data on the buy-out price (£50.8) and Obligation Rate (0.492/MWh) from the 2021/22 RO Scheme. We combine these numbers with:

- The total number of domestic customers
- The average electricity consumption per customer: modelled as 80% multiplied by 3.2MWh and 20% multiplied by 4.1MWh in line with Ofgem's assumptions regarding the proportion of customers using a single-rate vs a two-rate (e.g. Economy 7) meter.

We split this total figure for domestic RO obligations between large and small suppliers based on the relative percentage of customers in each type. This yields a maximum obligation (based on suppliers having to protect 100 per cent of the maximum obligations throughout the year) of £70 per customer or £2.3bn for the industry. We assume that suppliers do not have to protect any obligations for non-domestic customers.

We present our credit balances and ROs to insure on a per customer and total industry basis in Figure C.2.

**Figure C.2: Total and Per-Customer RO and CB Obligations to Protect in Pre- and Post-Policy Scenarios**




*Source: NERA Analysis*

## C.3. Low Scenario of the Hedging Cost Estimates – Detailed Description

As outlined in Section 5.3, we estimate the low scenario of the total mutualised hedging cost as the value of the option to switch to the price cap to consumers.[49] Building on financial theory, we use an adjusted Black-Scholes model to estimate the option value to customers, treating the option to switch as a financial option.

### C.3.1. Detailed description of approach[50]

To estimate the total mutualised hedging cost, we estimate the option value of switching to the price cap per customer based on a 3-1.5-12 price cap approach and the expected number of customers switching per month.

For the low scenario, we first calculate the option value per customer using an adjusted Black-Scholes Model (see C.3.2 below). We value the option of switching at the beginning of each month from January 2016 to December 2021 (valuation date). For each of these valuation dates, we estimate the value of a customer's option to switch to the price cap for during each of the following twelve months, including the month of the valuation date. This

49 We only analyse the option value for domestic customers.

50 This section describes the approach for a 3-1.5-12 price cap approach. The same approach is used to estimate the hedging cost under a 6-2-12 price cap approach in section C.3.4.

allows us to account for the fact that at the valuation date, the option value for customers differs, depending when the switch takes effect within the next twelve months.

For each of the twelve months from a given valuation date, we also calculate the default rate in terms of the number of customers who switch suppliers because their previous supplier went bankrupt and underwent a SoLR process. For a given month in the period January 2016 to November 2022, we use the actually observed number of domestic customers who switched suppliers because their original supplier went bankrupt. These customers were subsequently assigned to a new supplier through the SoLR process.[51]

We multiply the monthly option value per customer by the monthly number of switching customers to obtain the total option value of switching under the SoLR process in each of the twelve months starting from a valuation date. The sum of these total monthly option values forms the estimate of the total option value per valuation date between January 2016 and December 2021.

We conduct this calculation for gas and electricity separately, using the same number of switching customers for both types of energy. Implicitly, we therefore assume that customers are supplied with electricity and gas by the same supplier. Once this supplier goes bankrupt, customers switch to the electricity and the gas price caps simultaneously.

Adding the total option values for switching gas and electricity suppliers, we obtain a single option value of switching for each valuation date. The average of these total option values across valuation dates from January 2016 to December 2021 provides the total combined option value of switching per year.

For the pre-policy world, this provides the estimated hedging costs caused by customers switching through the SoLR process from 2016 to 2021 which were mutualised to the generality of customers.

For the post-policy world, we follow the same approach reducing the number of expected switches per month depending on the effectiveness of the policy reflected in the post-policy rating and default rate of small suppliers.

### C.3.2. Adjusted Black-Scholes Model and inputs

The adjusted Black Scholes model (BSM) essentially calculates the option value per customer as the difference between the price cap and the current wholesale market price, taking into account the impact of time:

$$O = P_t N(d_1) - Ce^{-rt} N(d_2)$$

Where:

51 We assume that all domestic customers of a failed suppliers are switching to the new supplier through the SoLR process. We further assume that the number of customers is the same for gas and electricity, thus assuming that customers had gas and electricity supply contracts with the same failed supplier.

$$d_1 = \frac{ln\frac{P_t}{C} + (r + \frac{\sigma^2}{2})\ t}{\sigma\sqrt{t}}$$

And

$$d_2 = d_1 - \sigma\sqrt{t}$$

We define and operationalise the input parameters as outlined in Table C.1.

**Table C.1: Inputs Options Model**

| Parameter | Name | Description | Operationalisation/ data |
|---|---|---|---|
| $O$ | Option value of switching | - | - |
| $P$ | Forward curve | Current wholesale market prices for the relevant contracts[52] at which suppliers have to hedge immediately after the switch (short-term hedge). | Gas and power futures for relevant contracts (£/MWh). (For electricity baseload and peakload contracts are considered.) |
| $C$ | Price cap (optimal hedging strategy) | Price suppliers would pay if the volumes were hedged in advance (long-term hedge), assuming they are following the optimal hedge strategy. | Optimal hedge strategy calculated by NERA based on the 3.1.5-12 hedging strategy currently consulted by Ofgem.[53] |
| $r$ | Risk-free interest rate | - | We currently assume the RFR to have a very low, non-negative value which remains constant over time. |
| $t$ | Time until the option is chosen | Time between the valuation date and the beginning of each month at which customers can decide to use the option. | Number of days between the valuation date and the first day of each of the subsequent months. |
| $\sigma$ | Volatility of the forward curve | Volatility of the relevant futures contracts. | Weighted daily standard deviation of relevant contracts. |
| $N$ | Normal distribution | Standard normal distribution | - |

*Source: NERA Analysis*

Our model also accounts for the fact that the relevant volumes new suppliers need to hedge at short notice due to a switch depend on the valuation date, since monthly gas and electricity consumptions are subject to seasonal variations. Thus, both the forward curve prices ($P$) capturing the cost of short-term hedging and the price cap (optimal hedging strategy) ($C$) capturing the cost of long-term hedging reflect average monthly consumption changes.

The model also accounts for the fact that the percentage of volumes hedged varies across future price cap periods. Under the 3-1.5-12 approach, for the current (ongoing) price cap

[52] We adjust the relevant futures contracts for the short-term hedges depending on the valuation date and thus the specific following twelve months for which the option value is calculated.

[53] For the evaluation of the 6-2-12 price cap approach, we calculate an optimal hedge strategy based on the 6-2-12 hedging strategy used by Ofgem throughout 2021.

period (or quarter), we assume that 100 per cent of the monthly consumption of a customer will be hedged. For months in the next price cap period (quarter), assume a proportion is hedged based on the 3-1.5-12 strategy: at the beginning of the quarter (e.g. January, with respect to Q2), suppliers have hedged 50 per cent of their Q2 requirement; at the beginning of the second month, they have hedged 83 per cent, and at the beginning of the third month, they have hedged 100 per cent for the next quarter and 17 per cent for the *following quarter*. This is reflected in both, the calculation of the forward curve prices ($P$) and the price cap (optimal hedging strategy) ($C$).

### C.3.3. Assumptions underlying the Black-Scholes Model

The BSM relies on a number of assumptions which we adjust for the model to fit the purpose of estimating the hedging costs caused by switches through the SoLR process.

Table C.2 provides an overview of the main model assumptions and how they are addressed in our analysis.

**Table C.2: Assumptions underlying the Black-Scholes Model**

| | Comment | Solution |
|---|---|---|
| European option | The option that consumers get is American not European, i.e. one can exercise the option to move to the price cap at any point (or more realistically, whenever one falls off a fixed price contract). | We are assuming a European option which has lower value. This is appropriate, given that we determine whether or not the option to switch is taken by estimating the probability of supplier failure based on the level of wholesale market prices relative to the respective price cap. |
| Strike price | BSM values an option against a fixed and known strike price. For the estimation of hedging cost, the strike price of the option to switch (i.e. the price cap) is moving and will not be entirely fixed, it is also of indefinite duration. | The strike price represented by the price cap is fixed for a limited period. We account for the changes in the level of the price cap by adjusting it for different price cap periods. |
| Repeated switching | When a customer switches to the price cap, they get another American option to move back to the market price | We assume that once a customer switches to the price cap, they are stuck on it until the currently-placed hedges have elapsed. This will understate the option value. |
| Log-normal distribution of current prices | Energy prices may not be log normal | We ignore the non-log normality. |
| No transaction costs | A switch to the price cap is associated with transaction costs to consumers, contradicting the BSM assumption of no transaction costs for choosing an option. | Since the analysis focusses only on customers switching suppliers automatically through the SoLR process, we make the simplifying assumption that transaction cost of switching are assumed to be zero with regard to the BSM. |

*Source: Nera Analysis*

### C.3.4. Low scenario hedging cost estimates for a 6-2-12 strategy

While the baseline scenario presented in section 5.3.2 is based on the 3-1.5-12 approach currently consulted by Ofgem, this section provides the estimated hedging cost for the 6-2-12 approach currently used by Ofgem. Still, the overall estimation approach remains the same as for the 3-1.5-12 strategy.

For a 6-2-12 price cap profile for the low scenario, we find that the policies reduce the hedging cost mutualised to the generality of customers by £86 million to £104 million per annum depending on the effectiveness of the policies in reducing suppliers’ risk of default, as shown in Table C.3. In the partial policy effectiveness scenario, where small suppliers’ credit rating is assumed to improve from CCC to B, the mutualised hedging costs decrease from £104 million to £18 million. In the full policy effectiveness scenario, where small suppliers' credit rating is assumed to improve to BBB, the total mutualised hedging costs decrease to £0.5 million.

For individual consumers, the mutualised hedging cost are reduced by more than 80 per cent from £3.7 to £0.6 per customer per year in the partial policy effectiveness scenario. In the full effectiveness scenario, the mutualised hedging cost is reduced by about 99 per cent to £0.02 per customer per year.

**Table C.3: The Low Scenario Reduction in Annually Mutualised Hedging Costs Ranges from £86m to £104m**

| | **Pre-policy** | **Post-policy** | | **Delta Pre and Post Policy** | |
|---|---|---|---|---|---|
| | | Partial Effectiveness | Full Effectiveness | Partial Effectiveness | Full Effectiveness |
| Total hedging cost per annum | £105m | £18 | £0.5m | £86m | £104m |
| Hedging cost per domestic customer | £3.7 | £0.6 | £0.02 | £3.0 | £3.7 |

*Source: NERA Analysis.*

# Appendix D. Impact of the Proposed Intervention on Default Rates

We expect small supplier default rates to decrease with the implementation of the proposed interventions due to the elimination of a market failure that arises out of suppliers' ability to finance themselves through subsidised finance provided by consumers. It is, however, difficult to assess the impact of the proposed intervention on the default rates for small suppliers directly.

We proxy for the impact of the proposed interventions on default rate by examining how it would affect the factors that credit ratings agencies use to assess the default risk of a small supplier. The Appendix proceeds as follows:

- Section D.1 sets out our assumptions and approach;
- Section D.2 assesses the directional improvement in Moody's qualitative subfactors;
- Section D.3 calculates critical financial ratios used in Moody's credit rating; and
- Section D.4 concludes that the evidence presented in this Appendix further suggests that the proposed interventions may reasonably be expected to reduce default probabilities. The proposed interventions are likely to have material impacts on some of the key drivers of credit ratings (and implicitly the likelihood of default). Moreover, the evidence considered suggests that reduction is likely to be broadly in line with the ranges assumed in this report.

## D.1. Assumptions and Approach

In this Appendix, we use Moody's credit rating methodology for *Unregulated Utilities and Unregulated Power Companies*[54] to determine how a small supplier's default probability could be affected by the proposed interventions.[55] Specifically, we demonstrate that the factors that Moody's relies upon to assess credit ratings (and by implication the probability of default) are likely to indicate a lower probability of default commensurate with a B-rated firm or better following the proposed interventions.

We use Moody's methodology in this Appendix because Moody's publishes weighted methodologies which allow one to assess the impact of individual subfactors without needing to know the score for each other subfactor. S&P methodologies are typically more holistic and require a full shadow credit rating in order to assess the marginal impact of

[54] Moody's Investors Service (2017) Rating Methodology – Unregulated Utilities and Unregulated Power Companies

[55] We do not use separately-published methodology for regulated electric and gas utilities because of the limited degree to which UK energy suppliers are regulated. While there is a price cap on retail prices for household customers in place, there is generally enough competition in the market to push prices below the price cap. Furthermore, UK energy suppliers do not correspond to any of the types of companies that Moody's uses to rate regulated utilities (e.g. network companies).

improvements in individual dimensions. We assume that Moody's credit ratings are broadly equivalent to S&P ratings of an equivalent level.

The analysis conducted in this Appendix is hypothetical. Moody's rates supply businesses on behalf of private creditors, who are primarily preferred creditors at the point of default. Moody's methodology is not entirely clear as to whether it would consider CCBs and RO exposures as debt for the purpose of its credit ratings. On the one hand, the presence of large obligations to customers and under the RO will increase the probability of default. On the other hand, both customers and the RO do not have a claim on the assets of the business at the point of default and therefore, unlike other debt, would not reduce the likely recovery for bondholders should default occur. In any case, our purpose is to assess implied default probabilities on behalf of all providers of capital to a business, including customers who have no recourse to the assets of the business. We therefore examine the impact of the proposed interventions on the factors which affect credit ratings, assuming that CCBs and exposures under the RO constitute debt.

Our assessment is indicative only, based on our interpretation of the published Moody's guidance, which is generalised across unregulated utilities and unregulated power companies, most of which have generation portfolios. In reality, Moody's would be likely take the specific nature of the UK energy supply industry into account in actually assigning a credit rating.

Moody's examines both qualitative and quantitative sub-factors to determine the credit rating of a company, for which it assigns a sub-factor specific credit rating. Table D.1 sets out and describes those qualitative and quantitative factors and their weightings. As should be clear from the Table, 30-40 per cent of the credit ratings in question depend on quantitative financial metrics, with the remaining 60-70 per cent depending on qualitative factors.

In the pre-policy world, we therefore assume that small suppliers would be rated CCC in the assessment of most (but not all) of these sub-factors. We assess whether the policy would improve each of the sub-factor ratings to levels commensurate with a higher credit rating and implicitly a lower probability of default.

It is unlikely that the policy will impact all sub-factors listed below. We highlight in blue the sub-factors that we expect the policy to impact.

**Table D.1: Moody's Rating Grid for Unregulated Utilities and Unregulated Power Companies**

| Broad Rating Factor | Type of Rating Factor | Rating Sub Factor | Unregulated Utility - Sub-Factor Weighting | Unregulated Power Company - Sub-Factor Weighting |
|---|---|---|---|---|
| **Scale** | Qualitative | Scale | 10% | 10% |
| **Business Profile** | Qualitative | Market Diversification | 10% | 5% |
| | | Hedging and integration impact on cash flow predictability | 5% | 10% |
| | | Market Framework & Positioning | 10% | 15% |
| | | Capital Requirements | 5% | 5% |
| | | Business mix impact on cash flow predictability | 10% | - |
| **Financial Policy** | Qualitative | Financial Policy | 10% | 15% |
| **Leverage and Coverage** | Quantitative | (CFO Pre-W/C + Interest) / Interest Expense | 10% | 10% |
| | | (CFO Pre-W/C) / Debt | 15% | 20% |
| | | RCF / Debt | 15% | 10% |
| **Total** | | | **100%** | **100%** |

*Source: Moody's Investors Service (2017) Rating Methodology – Unregulated Utilities and Unregulated Power Companies*

## D.2. Assessment of Qualitative Sub-Factors

Given the difficulty in assessing a qualitative sub-factor, we base our assessment on our expectation of the direction in which the policy influences the sub factor (i.e., on our expectation of *whether but not the extent to which* the policy improves or worsens the sub-factor rating). Furthermore, it is not possible to draw firm conclusions on qualitative factors for different policy designs (i.e. protecting only RO balances), though of course both policies taken together will tend to have a greater influence on the sub-factors than a single policy.

### D.2.1. Unaffected Qualitative Sub-Factors

- **Scale:** Scale is assessed based on companies' total assets. To the extent that the proposed intervention will make it more difficult for new entrants to enter the market and the fact that the market is currently consolidating due to the large number of supplier exits, the average scale of suppliers in the market will increase. However, this effect does not originate from the policy change. In general, we do not expect that the proposed intervention will influence supplier scale. Given that current small suppliers have total assets valued less than $2.5 billion (the threshold for a B-rated score) and will continue to be below this threshold following the proposed interventions, we assume that there will be no improvement in default probability following the interventions.

- **Market Diversification:** The score for market diversification depends on the geographic diversification of the suppliers. There is no direct effect of the policy on market diversification. Small suppliers are most likely to operate predominantly in a single well-developed geographic region (i.e. just GB) both before and after the proposed intervention. Based on Moody's methodology, it would continue to assign an approximate sub-factor rating of Ba with or without the proposed intervention.

- **Market Framework and Positioning:** By eliminating a market failure, the proposed intervention improves the market framework. However, Moody's description of this sub-factor rating refers primarily to generation and wholesale markets, for which the applicability of this rating methodology for small energy retailers is limited. In applying its credit rating methodology, Moody's retains discretion and may consider that the creditworthiness and default rating of suppliers had improved as a result of changes to the retail market framework. However, the Moody's methodology does not provide clear descriptions that would allow one to assess the extent of any improvement in creditworthiness.

- **Capital Requirements and Operational Performance:** This sub-factor primarily concerns the imminent need for capex by the rated business, which could put a strain on the balance sheet. The energy retail business is not asset-intensive and thus, capex in physical assets does not play a role for small suppliers. The capex that is incurred by suppliers is largely in the form of customer acquisition costs and discounted tariffs, which may decrease given the requirement to protect credit balances. However, it is unclear that any change would be picked up by Moody's methodology which apparently concentrates on fixed assets.

- **Business Mix Impact on Cash Flow Predictability:** This sub-factor rating improves as the share of low-risk business for a company increases. Under Moody's methodology, local transmission and distribution systems are considered a low-risk business. The sub-factor rating does not change, because we do not expect any changes to the ownership of network business, which is implied by the proposed intervention.

### D.2.2. Hedging and Integration Impact on Cash Flow Predictability

This subfactor measures "the relative predictability of a company's year-on-year cash flow by considering the effectiveness of its hedging strategy with respect to conventional generation, the contribution from other contractual or market arrangements (such as PPAs or capacity payments) and the extent to which a high-quality customer supply base can help dampen overall cash flow volatility".[56]

Higher scores are awarded to companies with a low variance on expected cash flows. If suppliers do not hedge or hedge over very short periods and to a low extent, their cash flows tend to be more volatile.

We expect that the proposed intervention influences the hedging sub-factor score positively. In the pre-policy world, a failed supplier retains the CCBs and ROCs upon default. In requiring protection of CCBs and ROCs, this is not the case in the post-policy world. Thus, the proposed intervention increases the cost of a bankruptcy and therefore incentivises suppliers to run more prudent business models that reduces the likelihood of bankruptcy. In particular, we expect that suppliers will hedge more and increase the visibility of their future cash flows which positively affects their sub-factor rating.

Assuming that small suppliers currently underhedge based on the spate of supplier failures during the energy price crisis, alongside a customer base with high churn, we assume that small suppliers would score poorly on this criterion pre-policy, in line with a B or Caa rating. This suggests that there is "no reliable cash flow visibility" or that the "hedging strategy is ineffective" (Table D.2).

The proposed intervention enhances hedging and cash flow predictability and could increase the sub-factor rating to Ba or Baa. A large proportion of small supplier customers are on fixed year contracts with a high share of customers remaining with their supplier after the end of their first contract. The proposed intervention incentivises small supplier to hedge appropriately (see our discussion on 6-2-12 and 3-1.5-12 hedging strategies in Section 5.3), because it reduces their risk profile and thus their financing costs for protecting CCB and the RO. We expect that the combination of a substantial loyal customer base and a responsible post-policy hedging strategy provides at least "good visibility on > 30% expected cash flow for at least the next year, if underpinned by sizeable high quality customer base", which improves the sub-factor rating to Ba according to Table D.2. It is also reasonable to assume that the policy could improve the sub-factor rating to Baa if it is very effective in incentivising small suppliers to engage in a responsible hedging strategy such that there is a good visibility on > 30% expected cash flow for the next 2 years.

[56] Moody's Investors Service (2017) Rating Methodology – Unregulated Utilities and Unregulated Power Companies, p.8

**Table D.2: Sub-Factor Rating Grid for Hedging and Integration Impact on Cash Flow Predictability**

| Sub-Factor Rating | Description |
|---|---|
| Aaa | Forward hedges or other contractual/market arrangements provide a high degree of visibility on substantially all expected cash flow for the next 10 years OR<br>Large, high quality captive downstream customer base in non-competitive market eliminates exposure to commodity risk over the long-term |
| Aa | Forward hedges or other contractual/market arrangements provide good visibility on 75% or more of expected cash flow for the next 7 years OR<br>Good visibility on > 50% expected cash flow for the next 5 years, if underpinned by sizeable high quality customer base |
| A | Forward hedges or other contractual/market arrangements provide good visibility on 50% or more of expected cash flow for the next 5 years OR<br>Good visibility on > 50% expected cash flow for the next 3 years, if underpinned by sizeable high quality customer base |
| Baa | Forward hedges or other contractual/market arrangements provide good visibility on 50% or more of expected cash flow for the next 3 years OR<br>Good visibility on > 30% expected cash flow for the next 2 years, if underpinned by sizeable high quality customer base |
| Ba | Forward hedges or other contractual/market arrangements provide good visibility on 30% or more of expected cash flow for at least the next 2 years OR<br>Good visibility on > 30% expected cash flow for at least the next year, if underpinned by sizeable high quality customer base |
| B | Minimal reliable cash flow visibility OR<br>Limited ability to hedge OR<br>Portfolio of contracts/hedges very short-term OR<br>Substantial short generation position versus customer base |
| Caa | No reliable cash flow visibility OR<br>Hedging strategy is ineffective OR<br>Most assets in underdeveloped markets characterised by little transparency, poor liquidity and limited potential to hedge |

*Source: Moody's Investors Service (2017) Rating Methodology – Unregulated Utilities and Unregulated Power Companies*

### D.2.3. Financial Policy

This sub-factor assesses "the issuer's desired capital structure or targeted credit profile, history of prior actions and adherence to its commitments".[57] It is an important determinant of default risk, because it measures the qualitative aspects of management and board tolerance for financial risk. A track record of conservative financial policy and a low leverage increase the sub-factor rating.

[57] Moody's Investors Service (2017) Rating Methodology – Unregulated Utilities and Unregulated Power Companies, p.14

Gearing levels in energy retail supply are generally very low, because the business is not asset intensive. In the 2015 Energy Market Investigation, the CMA shows a gearing of 0% in the retail supply business.[58] Hence, the suitability of this sub-factor in assessing a supplier's financial policy is limited.

However, we hold the view that CCB and RO balances can be considered as debt, and perhaps would be if a credit rating agency carried out a bespoke assessment. Both constitute a significant share of a small supplier's capital structure. By protecting CCB and RO balances, we expect companies to replace this "debt" with equity and thereby reduce their leverage.

The policy could improve the sub-factor rating for small suppliers from Caa potentially up to Baa, under the assumptions used in this appendix for the treatment of debt:

- A pre-policy rating of Caa corresponds to an "elevated risk of debt restructuring" and an "expected financial policy which is unfavourable to creditors or an excessively high debt leverage" (Table D.3). Since CCBs and ROs constitute a material share of the capital structure across the year and the existence of a high pre-policy failure rate, customers face a material risk of losing their deposited CCB and RO. We therefore view a pre-policy rating of Caa as justifiable.
- We find that the policy could improve the sub-factor rating to Baa. We assume that suppliers engage in less risky business models post-policy and cannot rely on CCB and RO balances to finance their operations. Leverage may also decrease as suppliers may need to raise equity to replace the debt (i.e. CCB and the RO). We conclude that the sub-factor rating post-policy could move to a Baa which is associated with a "track record and expected conservative financial policy" in the long run.

[58] Competition Markets Authority (2015) Energy market investigation – Appendix 10.4 Cost of capital

**Table D.3: Sub-Factor Rating Grid for Financial Policy**

| Sub-Factor Rating | Description |
|---|---|
| Aaa | Long track record and expected maintenance of extremely conservative financial policy; very stable metrics; low debt levels for the industry; AND<br>Public commitment to the highest credit quality over the long-term |
| Aa | Long track record and expected maintenance of a conservative financial policy; stable metrics; lower than average debt levels for the industry; AND<br>Public commitment to a very high credit quality over the long-term |
| A | Extended track record and expected maintenance of a conservative financial policy; moderate debt leverage and a balance between shareholders and creditors;<br>Not likely to increase shareholder distributions and/or make acquisitions which could lead to a weaker credit profile;<br>Solid commitment to high credit quality |
| Baa | Track record and expected maintenance of a conservative financial policy; an average level of debt for the industry and a balance between shareholders and creditors<br>Some risk that shareholder distributions and/or acquisitions could lead to a weaker credit profile;<br>Solid commitment to targeted metrics |
| Ba | Track record or expectation of maintenance of a financial policy that is likely to favour shareholders over creditors; higher than average but not excessive level of leverage<br>Owners are likely to focus on extracting distributions and/or acquisitions but not at the expense of financial stability |
| B | Track record of aggressive financial policies or expected to have a financial policy that favours shareholders through high levels of leverage with only a modest cushion for creditors OR<br>High financial risk resulting from shareholder distributions or acquisitions |
| Caa | Expected to have a financial policy unfavourable to creditors with a track record of or expected policy of maintaining excessively high debt leverage OR<br>Elevated risk of debt restructuring |

*Source: Moody's Investors Service (2017) Rating Methodology – Unregulated Utilities and Unregulated Power Companies*

## D.3. Assessment of Quantitative Sub-Factors

Moody's rating methodology on unregulated utilities and unregulated power companies uses three distinct ratios for the quantitative assessment of companies' credit ratings:

- Interest coverage;
- Cash flow to debt; and
- Retained cash flow to debt.

For each ratio to have a meaningful value, it is crucial that companies have a non-negligible level of debt, because debt or debt service acts as the denominator in all ratios. However, gearing is close to zero in the energy retail supply business, except for CCB and RO exposures, which we consider as debt that suppliers owe to their customers (and/or Ofgem).[59]

In a case in which suppliers do not borrow from capital markets at all, the protection of CCB and RO pre-payments could improve the sub-factor rating to Aaa for each ratio. This improvement in the credit rating is implausible and derives from the almost negligible level of debt in the denominator. High performance on individual financial ratios would not be sufficient to ensure a strong credit rating in the presence of less supportive qualitative factors.

Nevertheless, the financial ratios can help to explain the forces at play that lead to an uplift in the credit rating as an increasing share of CCB and RO pre-payments are protected. We present an illustrative example of the financial ratios (and associated sub-factor rating thresholds) as a function of the level of CCB and RO protection in the ensuing sub-sections.

We consider a scenario in which suppliers have a non-negligible amount of regular debt (i.e. a bank loan) in order to be able to show how the financial ratios are positively impacted by the protection of CCB and RO pre-payments. In our illustrative example, the size of the bank loan works out to £30 per customer (based on Bulb's 2020 annual report[60]). We calculate financial ratios assuming a progressively increasing protection of CCBs and the RO. What rate of interest market participants will pass through into their prices and/or Ofgem will permit in the DTC is not currently known. We therefore employ three different working assumptions on the allowed interest for CCB and RO protection of 1, 5 and 10 per cent, to be included in the DTC.

Table D.4 shows the full set of assumptions. Given these assumptions, an overall uplift of the sub-factor rating for the three financial ratios to a Baa (equivalent to BBB under S&P's scale) is feasible. Many smaller suppliers do not have bank or similar debt on their balance sheets. Accordingly, the analysis in this section may understate the financial ratios that may be achieved in practice.

59 Competition Markets Authority (2015) Energy market investigation – Appendix 10.4 Cost of capital

60 Bulb reports a bank loan of £54m in 2020. Dividing it with Bulb's customer number of April 2020, we find an average loan of £32.7 per customer. We use a loan of £30 per customer as an approximation in our illustrative example.

**Table D.4: Assumptions for Illustrative Example on Financial Ratios**

| | Unit | Assumption | | |
|---|---|---|---|---|
| Customer Number | m | 1.7 | | |
| Small Supplier CCB | £/customer | 105 | | |
| Small Supplier RO | £/customer | 83 | | |
| Bank Loan | £/customer | 30 | | |
| Starting margin | £/customer | 0 | | |
| Dividends | £/customer | 50 per cent of EBIT per customer | | |
| Allowed Interest for CCB and RO protection | % | 1 | 5 | 10 |

*Source: NERA Analysis*

### D.3.1. Interest Coverage

The financial ratio on interest coverage is defined as

$$Interest\ Coverage = \frac{CFO\ pre\text{-}WC + Interest\ Expense}{Interest\ Expense},$$

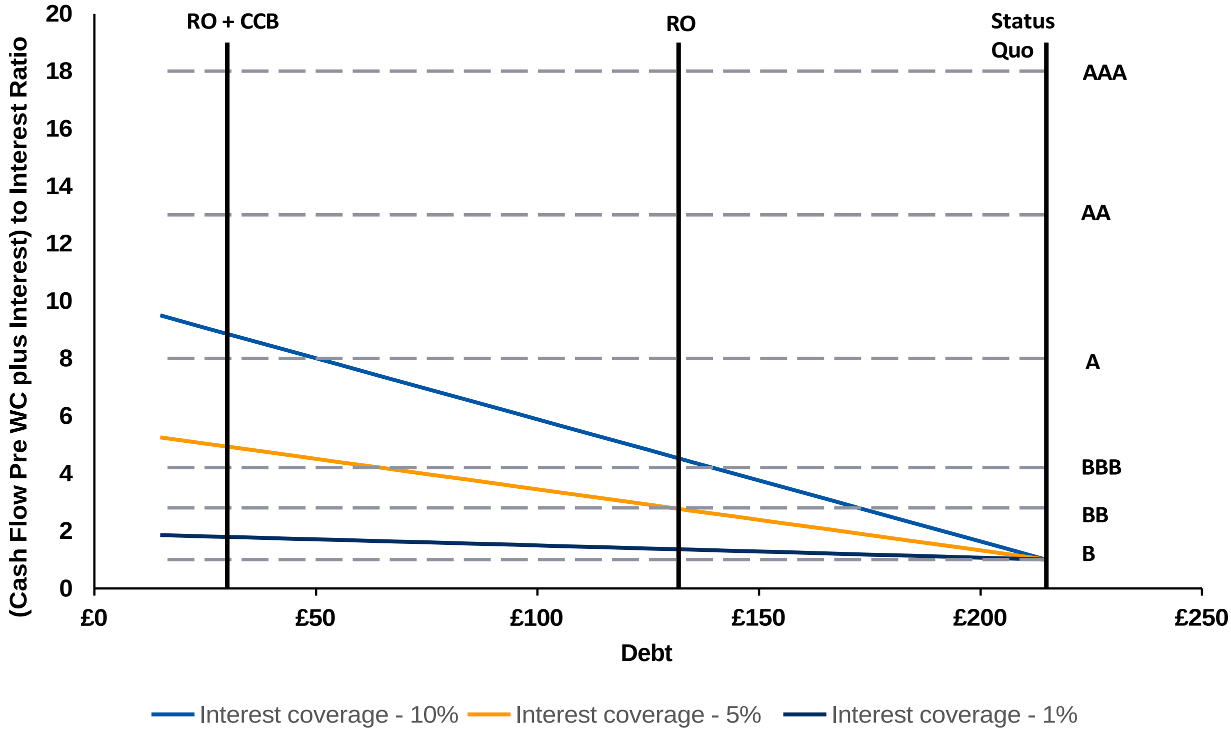
where *CFO pre-WC* denotes cash from operations before changes in working capital. In our illustrative example, all variables feed into the equation on a per-customer basis.

Figure D.1 presents the improvement in the sub-factor rating as the level of CCB and RO protection increases. The improvement in the sub-factor rating is driven by a higher CFO pre-WC (numerator). It results from the additional allowed interest for the protection of CCB and RO pre-payments which increases the DTC allowance. We assume for the purposes of the example, that small suppliers will protect CCB and the RO with equity. As a result, interest expenses (i.e. the denominator) are not affected.

In addition to calculating financial ratios for different levels of CCB and RO exposures left unprotected in the business (shown by the blue and orange lines), the Figure shows threshold values for the financial ratios for achieving credit ratings between B and AAA.

If the proposed intervention only requires the protection of RO balances, the sub-factor rating increases to a BBB (BB) rating under the assumption of a 10 (5) per cent allowed interest in the DTC. If the proposed intervention requires full protection of both CCBs and the RO, the sub-factor rating improves to an A (BBB) rating under the assumption of a 10 (5) per cent allowed interest in the price cap.

**Figure D.1: Interest Coverage under a 10%, 5% and 1% Allowed Interest for CCB and RO protection**




*Source: NERA Analysis.*

### D.3.2. Cash from Operations Pre-W/C over Debt

The financial ratio on cash flows over debt is defined as

$$CFO\ pre\text{-}WC\ over\ Debt = \frac{CFO\ pre\text{-}WC}{Debt},$$

where *CFO pre-WC* denotes cash from operations before changes in working capital and *debt* equals the sum of CCB, RO and bank loan. As the level of protection of CCB and RO increases, debt decreases. In our illustrative example, all variables feed into the equation on a per-customer basis.

Figure D.2 presents the improvement in the sub-factor rating as the level of CCB and RO protection increases. Similar to the results presented in Section D.3.1, CFO pre-WC (i.e. the numerator) increases due to the allowed interest as the level of CCB and RO protection increases. Additionally, debt decreases as the level of CCB and RO protection increases, because we consider CCB and RO as debt and we assume that small supplier replace this debt with equity in the post-policy world.

If the policy only requires the protection of RO balances, the sub-factor rating remains constant or increases only slightly to a B rating. If the policy requires full protection of both

CCB and RO pre-payments, the sub-factor rating improves to an AA (BBB) rating under the assumption of a 10 (5) per cent allowed interest in the price cap.

**Figure D.2: Cash from Operations Pre-W/C over Debt under a 10%, 5% and 1% Allowed Interest for CCB and RO protection**

*Source: NERA Analysis.*

### D.3.3. Retained Cash Flow over Debt

The financial ratio on retained cash flows over debt is defined as

$$RCF\ over\ Debt = \frac{FFO - Dividends}{Debt},$$

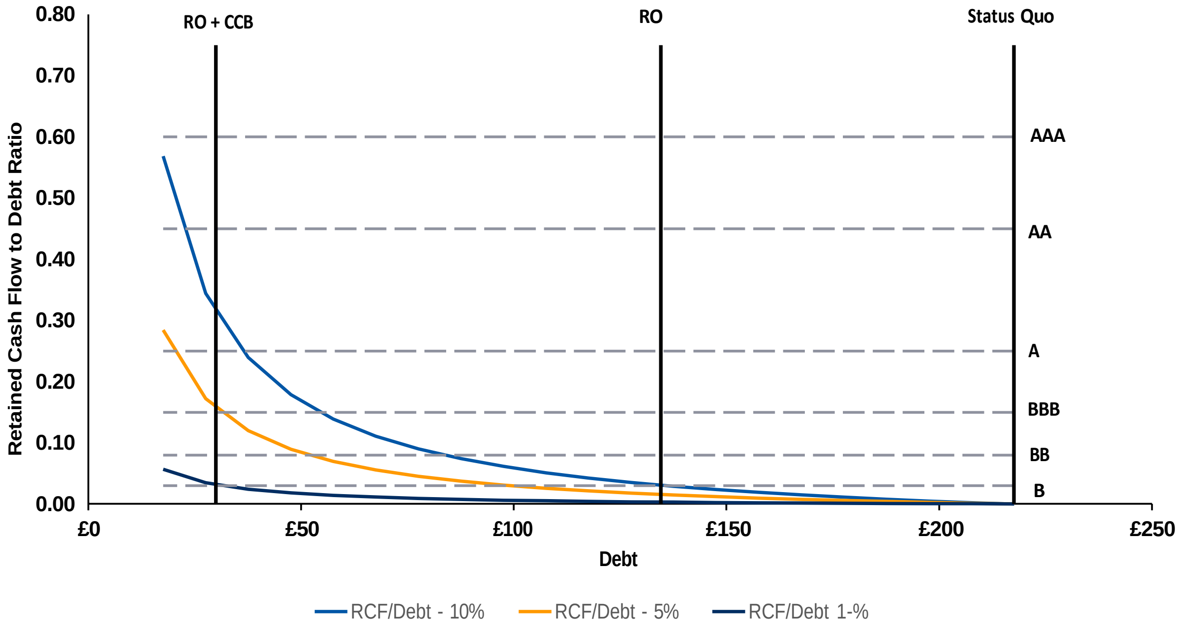
where *FFO* denotes funds from operations, which is equal to CFO pre-WC in our illustrative example. *Debt* is equal to the sum of CCB, RO and bank loan. As the level of protection of CCB and RO increases, debt decreases. In our illustrative example, all variables feed into the equation on a per-customer basis.

If the policy only requires the protection of RO balances, the sub-factor rating remains constant or increases only slightly to a B rating. If the policy requires full protection of both CCB and RO pre-payments, the sub-factor rating improves to an A (BBB) rating under the assumption of a 10 (5) per cent allowed interest in the price cap.

Figure D.3 presents the improvement in the sub-factor rating as the level of CCB and RO protection increases. The change in the FFO (numerator) and debt (denominator) is the same as in Section D.3.2. However, we subtract dividends from FFO in the numerator. For the purposes of this example, we assume that 50 per cent of the margin is passed on to shareholders, the numerator increases more slowly as the level of CCB and RO protection increases compared to the ratio in Appendix D.3.2.

If the policy only requires the protection of RO balances, the sub-factor rating remains constant or increases only slightly to a B rating. If the policy requires full protection of both CCB and RO pre-payments, the sub-factor rating improves to an A (BBB) rating under the assumption of a 10 (5) per cent allowed interest in the price cap.

**Figure D.3: Retained Cash Flow over Debt under a 10%, 5% and 1% Allowed Interest for CCB and RO protection**




*Source: NERA Analysis.*

## D.4. Conclusions

The analysis set out above is not intended to present a full and detailed credit rating for any individual supplier before or after the proposed interventions have been implemented. Instead, the analysis set out above is intended to answer the question as to whether the proposed interventions could reasonably be expected to reduce default probabilities to those commensurate with B-rated or BBB-rated firms.

The precise improvement for an energy supplier in GB is unclear insofar as Moody's methodology does not specifically relate to energy supply in Britain and in applying its methodologies, Moody's retains discretion to assess risks in a bespoke fashion. However, based on Moody's methodology, we conclude that the factors used by credit rating agencies (and the implied default probabilities) could reasonably be expected to improve to levels commensurate with a Baa rating (Moody's equivalent to S&P's BBB). The two qualitative factors on which Moody's relies that would be likely to improve are Hedging and Integration and Financial Policy, which together would account for 15-25 per cent of the total credit rating for unregulated utilities and power companies. In addition, financial ratios worth 30-40 per cent of the credit rating could materially improve to an A, AA-rating or better. Those improved financial ratios may require that suppliers refinance their activities at least partly using greater equity and/or prices in the market to reflect the additional costs of financing the proposed interventions.

Our primary reason for anticipating that default rates will fall following the policy intervention is the strong theoretical argument that requiring suppliers to finance their own activities will reduce moral hazard, risk-taking and default. However, whilst not intended to provide a precise rating for any individual firm, the analysis in this Appendix provides further comfort that default rates may reasonably be expected to fall within the ranges identified in this report, i.e. between a B and Baa/BBB-rating.

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