

Energy market investigation

Foreclosure

24 February 2015

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

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

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Summary

1. This paper assesses the scope for foreclosure in electricity markets in Great Britain. By foreclosure, we refer to a vertically integrated firm using its position in one market to harm competitors in another market. We consider two types of foreclosure: customer foreclosure and input foreclosure.
2. Both of these are standard issues to consider in the context of vertical integration.¹ They were included in theory of harm 2 in the issues statement.² However, we did not receive responses to the issues statement to indicate that these were major concerns to parties; nor did we see plausible mechanisms for the harm suggested.
3. Customer foreclosure in this context involves a vertically integrated supplier³ causing harm to upstream competitors by strategically reducing their ability to sell their output. In electricity, these upstream competitors are independent generators.
4. This paper considers a range of possible mechanisms for customer foreclosure. We examine these against the standard framework of ability, incentive and effect.⁴ Each of these three conditions must hold for customer foreclosure to be plausible.
5. Our current view is that vertically integrated firms do not have the ability to foreclose generators (acting either unilaterally or through coordination). We are also doubtful that the incentive and effect conditions are met. Taken together, our current view is that this makes it unlikely that vertical integration is a feature that, alone or in combination with other features, adversely affects competition through customer foreclosure in the markets for the supply or acquisition of electricity in Great Britain.
6. We then go on to consider input foreclosure, which would involve a vertically integrated firm taking action in an upstream market to disadvantage independent retailers. We consider two possible mechanisms: one through increasing wholesale electricity prices, and one through trading and liquidity. Again, we examine these against the standard framework of ability, incentive and effect: whether vertically integrated (VI) firms may have the ability and

¹ Competition Commission (2013) *Guidelines for market investigations: their role, procedures, assessment and remedies* (CC3), p59.

² CMA (2014) *Energy market investigation: statement of issues*, p12.

³ A vertically integrated supplier is, for the purposes of this working paper, also referred to as a VI firm. It is a firm that has under common ownership electricity generation and electricity retailing activities. For the purposes of this working paper, the terms 'supplier' and 'supply' refer to a business engaged in retail activity to domestic and/or non-domestic customers, unless otherwise specified.

⁴ Competition Commission (2013) *CC3*, p58.

incentive to foreclose non-integrated suppliers by increasing their costs, thereby weakening them as competitors, causing them to exit the market, or deterring them from entering. We conclude that this is unlikely.

Introduction

7. In our issues statement, we identified two possible foreclosure concerns. The first was customer foreclosure – ie that VI firms may have the ability and incentive to foreclose non-integrated generators, weakening their position in the generation market to the benefit of vertically integrated generators. The second was input foreclosure – ie that VI firms may have the ability and incentive to foreclose non-integrated suppliers by increasing their costs, thereby weakening them as competitors, causing them to exit the market, or deterring them from entering. We assess these concerns separately, but note that the framework for assessment is similar in both cases.

Customer foreclosure

What is customer foreclosure?

8. By ‘customer foreclosure’ we refer to a scenario where a VI firm (or multiple VI firms on a coordinated basis) causes harm to upstream competitors and, in turn, raises downstream rivals’ costs. This occurs when the VI firm restricts the access of upstream competitors to its retail arm, or otherwise affects the terms on which they can sell to their potential customers. Therefore, for customer foreclosure to be a concern, it must generally be the case that the VI company accounts for a large proportion of sales in the downstream market.
9. The aim of customer foreclosure is to reduce the revenues or increase the costs of upstream rivals, in order to make them into less profitable and efficient competitors. This could reduce their ability to compete (partial foreclosure), or even lead to exit (total foreclosure).⁵ In turn, downstream competitors may be unable to compete effectively as a result of a less competitive upstream market.
10. In order to make the foreclosed firms less efficient, their unit (or marginal) costs need to increase. This may occur if the foreclosing behaviour reduces the production volume or the range of different goods (ie due to loss of economies of scale or scope).⁶ Reduced revenues and profitability could also

⁵ Competition Commission (2013) [CC3](#), p58.

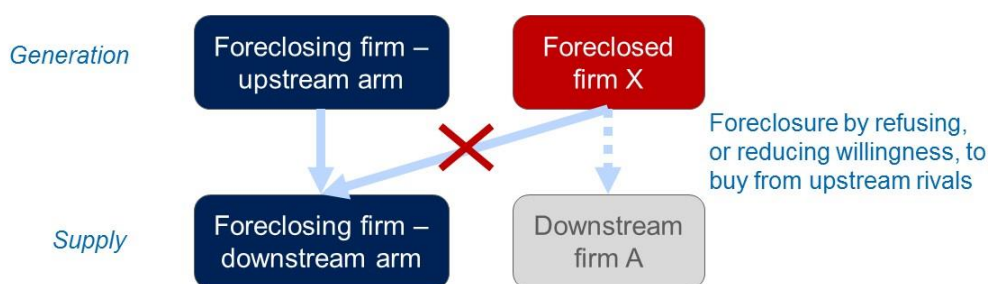
⁶ For an example of the use of this framework in another market investigation, see Competition Commission (2013) [Private motor insurance investigation: provisional findings](#), Appendix 9.2.

inhibit the ability of the foreclosed firm to invest in improved production processes. Customer foreclosure could also reduce overall efficiency by deterring entry or expansion.⁷

11. In the case of electricity, independent generators⁸ are the upstream competitors to vertically integrated firms. FIGURE 1 shows how customer foreclosure would involve a vertically integrated supplier reducing its willingness to buy from independent generators.

FIGURE 1

Simplified diagram of how customer foreclosure could operate in electricity



How do we evaluate customer foreclosure?

12. There is a standard framework for evaluating customer foreclosure. This uses three headings to judge whether customer foreclosure is likely (see Figure 2).⁹ All three of these aspects must be met in order for us to find harm from customer foreclosure.

⁷ European Commission (2008) *Guidelines on the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings*, p15.

⁸ We use the term 'independent generators' to refer to generators who are not vertically integrated, including those who have or hope to agree offtake agreements or other contracts with VI firms.

⁹ See, for example, Competition Commission/OFT (2010) *Merger assessment guidelines*, paragraph 5.6.6.

FIGURE 2

Framework for assessing customer foreclosure

Ability	Incentive	Effect
<ul style="list-style-type: none"> • Can the foreclosing firm ensure that upstream competitors are unable to trade with a significant share of the downstream market? • Does this make the upstream rivals into less efficient competitors? 	<ul style="list-style-type: none"> • Is the strategy profitable for the foreclosing firm? 	<ul style="list-style-type: none"> • Would the strategy harm end consumers? • (Simply causing harm to upstream competitors is not sufficient)

Scope of this section

13. This paper only looks at electricity. We would not expect customer foreclosure to be an issue in gas. In particular, the addressable market from the perspective of most upstream gas producers is likely to be larger. These firms could sell into other European markets,¹⁰ and liquefied natural gas producers could sell globally. This makes customer foreclosure by a vertically integrated gas supplier in GB seem implausible. In contrast, GB has only a limited amount of electricity interconnection to other countries.¹¹

Structure of this section

14. First we set out possible mechanisms for customer foreclosure in electricity generation and supply. We then evaluate the likelihood of foreclosure using the three conditions described in Figure 2, paying particular attention to the ability to foreclose.

Possible mechanisms for customer foreclosure

15. This section describes a range of potential mechanisms that a VI firm could use to foreclose independent generators. We do not claim that this is an exhaustive list of all possible mechanisms, but no other mechanisms have been suggested to us to date.
16. This paper looks only at the areas below as mechanisms for customer foreclosure. Other papers in this investigation may look at other aspects of

¹⁰ For example, Norway has gas pipelines to Belgium, France and Germany, as well as to GB (Norwegian Ministry of Petroleum and Energy (2014) *Gas exports from the Norwegian shelf*).

¹¹ National Grid Interconnectors (2014) *Getting more connected: the opportunity from greater electricity interconnection*, p7.

issues touched on below (eg availability of hedging products) from a wider perspective.

Option 1 – Reduce willingness to sign long-term offtake contracts

17. Independent generators often look for long-term offtake contracts¹² when building a new plant. These help to satisfy providers of finance to those generators that the plant has a secure source of income. If a VI firm (as a purchaser of electricity for its supply business) limited its willingness to sign these contracts, then this could potentially affect the ability of independent generators to invest.
18. These contracts are now a relatively common way of financing new plants. The government has carried out extensive work on routes to market for independent renewable generators.¹³ Gas-fired generators have also highlighted their interest in offtake contracts.¹⁴

Option 2 – Reduce willingness to trade certain products in the market

19. An independent generator may want to trade certain products in the market to allow it to hedge. (This will primarily involve selling output (and buying inputs such as gas). However, it may also make the reverse trades to buy to adjust its hedged position.) For example, a generator might want to sell its output a number of years ahead, in order to provide predictable revenues. A generator might also want products other than baseload (eg peak), if it expects to be running for only part of the time.
20. If a VI firm were to reduce trading in these products, this might limit the ability of independent generators to manage their risks through hedging.

Option 3 – Reduce willingness to trade with independent generators

21. This third mechanism involves a VI firm (as a purchaser of electricity for its retail business) reducing its willingness to trade with independent generators in particular. It therefore differs from the second option, because it is targeted at specific firms.
22. A VI firm could take various steps to avoid trading with independent generators. These might include taking a long time to sign the agreements

¹² Tolling agreements for gas-powered plants, and power purchase agreements for renewables.

¹³ For example, DECC (2012) [A call for evidence on barriers to securing long-term contracts for independent renewable generation investment](#).

¹⁴ InterGen (2014) [Response to consultation on a proposal to make a market investigation reference in respect of the supply and acquisition of energy in Great Britain](#), p3; ESB (2014) [Response to issues statement](#), p2.

underlying trading relationships, or offering limited credit terms. It could also theoretically refuse to carry out individual trades with independent generators or trade only at less favourable prices.

Option 4 – Dispatch own generation when cheaper options are available from other firms

23. A VI firm (as a purchaser of electricity for its retail business) could reduce its need to contract with independent generators by using its own generation, even when it was unprofitable ('out of merit'). This would reduce the revenues of independent generators.

Option 5 – Reduce willingness to buy green certificates

24. Generators receive Renewables Obligation certificates (ROCs) and levy exemption certificates (LECs) for producing renewable electricity.¹⁵ However, these certificates have value only when they are sold to a supplier.
25. If VI suppliers are able to source certificates from their own renewable generation, then this might make it harder for independent generators to unlock the full value from their plants. Drax mentioned its concerns about the markets for ROCs and LECs in its response to the issues statement.¹⁶

Unilateral ability to foreclose

Market power

26. Unilateral ability to engage in customer foreclosure requires the foreclosing firm to have significant downstream market power.¹⁷ If not, the independent generator can easily sell to other suppliers, and would therefore not be foreclosed.
27. When examining vertical issues¹⁸ the European Commission uses a 30% market share threshold, below which problems are unlikely.¹⁹ No supplier

¹⁵ Not all renewable generators receive ROCs; some receive support under the small-scale feed-in tariff (FiT) or under legacy arrangements (eg the Non-Fossil Fuel Obligation), and some do not receive any support.

¹⁶ Drax (2014) [Response to the issues statement](#).

¹⁷ Competition Commission (2013) [CC3](#), p59.

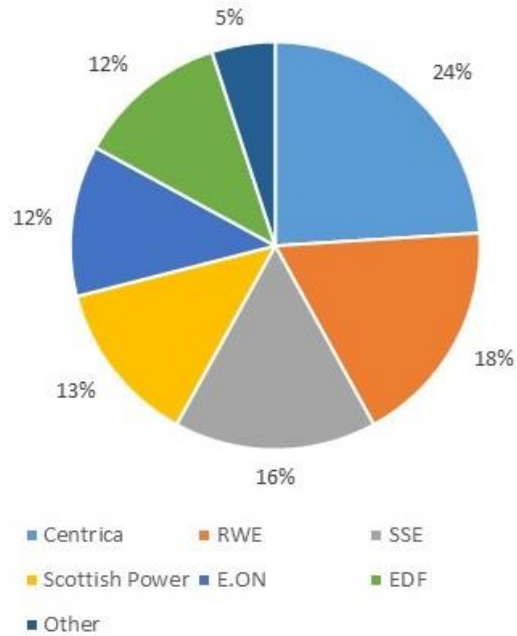
¹⁸ Although not specifically customer foreclosure.

¹⁹ For mergers: European Commission (2008) [Guidelines on the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings](#), p16. For vertical restraints: European Commission (2010) [Guidelines on vertical restraints](#), paragraph 178.

exceeds this threshold in GB – Centrica is the largest with 24% of domestic supply meters and 23% of non-domestic sites.²⁰

FIGURE 3

Shares of domestic supply in December 2013*

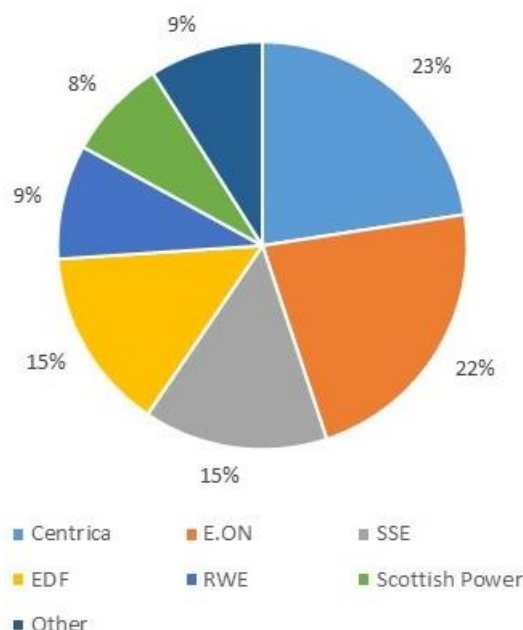


Source: Ofgem (2014) *2014 Great Britain and Northern Ireland national reports to the European Commission*, p52.
*By number of meters.

²⁰ Ofgem (2014) *2014 Great Britain and Northern Ireland national reports to the European Commission*, pp52–53.
We do not currently have data available on shares by volume.

FIGURE 4

Shares of non-domestic supply in November 2013*



Source: Ofgem (2014) *2014 Great Britain and Northern Ireland national reports to the European Commission*, p53.
*By number of sites.

28. To evaluate whether we might still have concerns in this case, we considered two possible factors that could increase the market power of VI firms (as purchasers of electricity for their retail businesses).

Types of customers

29. Market power may increase when looking at specific types of customers, rather than supply as a whole. In particular, concerns have been expressed about domestic consumer inertia.²¹ The purpose of this paper is not to examine whether this exists. In order to consider the potential for customer foreclosure, we suppose that each VI supplier has some inactive consumers.
30. We do not believe that a significant number of inactive domestic consumers would give a VI firm (as a purchaser of electricity for its retail business) the ability to carry out customer foreclosure. From the perspective of a supplier, electricity is a commodity. This does not vary depending on whether the electricity is eventually supplied to an inactive consumer or not. This means that any inactive consumers do not affect the shares of suppliers or their market power as buyers of electricity, although they may make these shares more static.

²¹ This is being evaluated separately as part of theory of harm 4.

Location of customers

31. For some purposes we might look at shares of supply on a regional, rather than a national, basis. Individual regions tend to have a supplier with a larger domestic share than the largest national domestic share.²²
32. However, for the purposes of this analysis, the geographic 'market' (for the purchase of electricity) is national. Electricity is bought and sold on a national basis; a generator will not know where its output will be consumed; and its revenues will be identical in any case.²³

Other points on ability – general

33. For foreclosure to be effective, a foreclosed firm needs to be unable to compensate for the loss of business from the VI firm's retail business by selling to other downstream firms instead.²⁴ Most of the Six Large Energy Firms (all of which are VI) are net purchasers of electricity and therefore likely to offer a potential alternative route to market (in the absence of a coordinated foreclosure strategy). In addition, independent suppliers represent 22% of volumes in non-domestic supply,²⁵ and around 7% of accounts in domestic supply.²⁶ This means that they provide a significant alternative route to market. Independent suppliers have been growing recently,²⁷ so may form an expanding sales channel for independent generators.
34. The proportion of generation receiving government support, in the form of Contracts for Difference (CfDs) and through the capacity mechanism, will increase in the next few years. This could help to limit the possibility of successful foreclosure, as some independent generators would have an additional, guaranteed revenue source outside the energy market. However, generators will still consider their forecast energy market revenues when bidding to receive support.

²² Ofgem/OFT/CMA (2014) *State of the market assessment*, paragraph 4.20.

²³ A small exception is for embedded generation (connected to the distribution network). These plants produce 'embedded benefits', which cover avoided transmission charges, balancing charges and transmission losses (ELEXON (2013) *Embedded generation and embedded benefits*, version 6.0). The split of these embedded benefits between a generator and a supplier is negotiated (National Grid (2014) *Review of the embedded (distributed) generation benefit arising from transmission charges*, p16), and so may be affected by any market power of a supplier in that specific region.

²⁴ MH Riordan (2005) *Competitive effects of vertical integration*, Columbia University Department of Economics Discussion Paper Series, p51.

²⁵ Ofgem (2014) *Energy market investigation: initial submission to the CMA*, p62.

²⁶ Cornwall Energy (October 2014) *Competition in British household energy supply markets*, p4.

²⁷ The proportion of accounts held by independent suppliers in the domestic supply market has increased from under 1% in 2011 to around 7% today (Cornwall Energy (October 2014) *Competition in British household energy supply markets*, p15). The share by volume of independent suppliers in the non-domestic supply market increased from 14% in April 2011 to 19% in October 2013 (Cornwall Energy (April 2014) *Competition in British business energy supply markets*, p12) and further since (footnote 25).

Other points on ability – specific to particular mechanisms

35. In addition to the general points made above, there are also specific factors relating to ability for each of the possible foreclosure mechanisms identified.

Option 1 – Reduce willingness to sign long-term offtake contracts

36. The government is introducing an Offtaker of Last Resort (OLR) Scheme that will compel VI suppliers (as purchasers of electricity for their retail businesses) to offer backstop offtake contracts to renewable generators with CfDs.²⁸ While this is designed as a backstop, it will limit the ability to foreclose independent generators with CfDs (unilaterally or collectively), partly because the existence of a backstop will allow generators to sign higher-risk contracts with a wider range of counterparties that they might not otherwise have contemplated.²⁹
37. Other suppliers may also be more likely to provide offtake agreements under a CfD. A CfD contract will remove most price risk from renewable generators, meaning that they will not need protection through a floor price in offtake contracts. This may reduce the risk to the offtaker (ie purchaser of electricity) of offering a long-term contract.

Option 2 – Reduce willingness to trade certain products in the market

38. The Secure and Promote generation licence condition³⁰ requires some firms to offer to buy or sell certain key baseload and peak products at certain times of the day. However, this does not prevent VI firms (as purchasers of electricity for their retail businesses) from reducing their willingness to trade products outside the obligation. A VI firm's ability to foreclose independent generators would therefore depend on whether the mandated products that it is forced to offer and sell are reasonable substitutes for any other products independent generators might want to trade.³¹
39. Unilateral action might have a larger effect using this mechanism than the other mechanisms. This is because one firm reducing trading in products could reduce the willingness of other market participants to trade these products, so augmenting the effect of one firm's actions.³² However, this

²⁸ DECC (2014) *Supporting independent renewable investment: Offtaker of Last Resort – government response*.

²⁹ For example, one independent generator told us that the OLR should allow it to seek offtake contracts with counterparties with lower credit ratings. Call with [REDACTED], 8 September 2014.

³⁰ Generation Special Licence Condition AA.

³¹ We look at this in more detail in our work on liquidity, beyond the scope of this paper.

³² Ofgem (2013) *Wholesale power market liquidity: final proposals for a 'Secure and Promote' licence condition*, paragraph 1.4.

reaction from other firms may also increase the costs of the original firm, to the extent that it benefits from liquidity.

Option 3 – Reduce willingness to trade with independent generators

40. On a day-to-day basis, a VI firm (as a purchaser of electricity for its generation business) may have little ability to refuse to trade with an independent generator. This is because a large majority of electricity trading is anonymised (including over-the-counter (OTC) trading and trading on exchanges, which between them account for over 95% of trading in the market);³³ therefore, firms could not target any supplier with whom they have a grid trade master agreement (GTMA). Any attempt to foreclose would have to be a long-term refusal to trade, by refusing to sign a GTMA or offer credit terms.

Option 4 – Dispatch own generation when cheaper options are available from other firms

41. A VI firm (as a purchaser of electricity for its retail business) has the ability to foreclose by dispatching its own generation only if the independent generator is marginal (and therefore pushed out of the market). If not, the independent generator will be able to sell to another supplier.
42. A VI firm's ability to foreclose is also limited because it cannot be sure which generator would be at the margin. This means it cannot target its foreclosure efforts on independent generators (individually or as a group).

Option 5 – Reduce willingness to buy green certificates

43. The design of the Renewables Obligation (RO) includes a 'headroom' mechanism, which sets the ROC sourcing obligation (ie overall demand for ROCs) 10% above the expected annual volume of RO generation.³⁴ The headroom mechanism tries to ensure that there will be excess demand for these certificates,³⁵ which should increase the chances of an independent generator being able to find a buyer. This may limit the ability of a VI firm to foreclose in this way.

³³ This is an estimate based on our sample of market participants. See liquidity working paper.

³⁴ DECC (2013) *Calculating the level of the Renewables Obligation for 2014/15*, p1.

³⁵ Although we note that there have been concerns that there may at some point be an oversupply of ROCs. If this were to occur, it might leave independent generators more exposed.

Our current view of unilateral ability to foreclose

44. Taking into account the factors explained above, our current view is that we have not identified a plausible mechanism that would permit a single VI supplier to foreclose one or more independent generators.

Collective ability to foreclose

45. This section considers whether customer foreclosure could be achieved through some form of tacit coordination among VI suppliers, which might mean that one or more independent generators were unable to access a sufficiently large proportion of the customer base, and could therefore be effectively foreclosed.
46. While this section focuses on the ability to coordinate to carry out customer foreclosure, there would need to be a reason why the coordinating firms would want to foreclose (eg to create or maintain a barrier to entry at the generation level). We also note that this analysis looks only at the ability of VI firms (as purchasers of electricity for their retail businesses) to coordinate when dealing with independent generators; it does not cover any potential ability to coordinate in supply to retail markets.
47. In order for there to be coordination, firms need to be able to reach and monitor a coordinated outcome, and the coordination needs to be internally and externally sustainable.³⁶ The likelihood of these conditions being satisfied will vary depending on the foreclosure mechanism.
48. As a general point, most VI firms supply more electricity to customers than they generate.³⁷ This means that most VI firms need to buy some electricity externally, and collectively the Six Large (VI) Energy Firms are net purchasers from independent generators. This appears to limit their ability to foreclose in aggregate.
49. In relation to reaching and monitoring coordination, we note these points:
- Some mechanisms operate on a day-to-day basis (eg options 2 and 4), and would therefore be affected by changes in system conditions and fluctuating demand. This lack of stability could make it difficult to reach a coordinated outcome.

³⁶ Competition Commission (2013) [CC3](#), paragraph 250.

³⁷ Descriptive statistics: generation and trading working paper, Figure 12.

- VI firms have different amounts and types of generation, and different supply volumes,³⁸ meaning that they are somewhat asymmetrical. This will affect their individual need to buy from other firms (option 3), their individual costs of dispatching their own generation (option 4) and their individual ability to produce ROCs from their own plants (option 5). The costs and benefits of a coordinated strategy would therefore vary among VI firms, making it more difficult to reach (and sustain) a coordinated outcome.
 - Long-term offtake contracts are reasonably complex, because there are a variety of terms that could be varied (option 1), and these are typically tailored to each offtake agreement. This would make it difficult to monitor any coordinated outcome.
50. The internal sustainability of coordination is also doubtful:
- In some cases, there is limited transparency to allow firms to monitor deviations. This applies in particular to the terms of offtake agreements (option 1), the existence of trading agreements (option 3) and the market for ROCs (option 5).
 - Even if VI firms could monitor deviations, there may be a limited ability to retaliate. For example, contracting for offtake agreements occurs on an occasional and irregular basis (option 1).
51. In addition, the external sustainability of coordination does not appear likely:
- As noted above, there are active independent suppliers, and these firms have grown recently. Most of the mechanisms would present opportunities for independent suppliers if VI firms were deliberately incurring extra costs. For example, there is some evidence that firms other than VI suppliers have provided offtake agreements to renewable generators (option 1).³⁹
 - Any barriers to entry or expansion may, however, limit the ability of external parties to challenge the coordinated outcome. We do not assess that in this paper.
52. Our current view is that the ability of coordinating VI firms to foreclose one or more independent generators is relatively weak, even if there were to be a clearly sustainable mechanism for reaching and sustaining coordinated behaviour, which does not appear likely in this context. We therefore do not

³⁸ Ofgem/OFT/CMA (2014) *State of the market assessment*, p95.

³⁹ Baringa (2013) *Power purchase agreements for independent renewable generators: an assessment of existing and future market liquidity*, Table 7.

consider that coordination for the purpose of carrying out customer foreclosure is likely, even before considering incentives and effects.

Incentive and effect

53. As noted previously, customer foreclosure requires each of **ability**, **incentive** and **effect** to be met. The sections above show that it is unlikely that VI firms have the ability to foreclose independent generators (either unilaterally or collectively).
54. However, we have also considered whether these firms would have an incentive to carry out customer foreclosure, and the potential effect on consumers. This section provides an overview of our thinking in these areas. In summary, we do not think it likely that either of these conditions is met.

Incentive

55. A foreclosing firm might look to receive benefits in various areas:
- increased wholesale prices (and therefore increased generation profits for its own generation arm);
 - reduced retail competition (by increasing wholesale costs for independent suppliers);
 - increased support through the capacity market or CfDs; and
 - ensuring that its generation remains in merit and can continue to act as a structural hedge.⁴⁰
56. We note that for each of these potential areas of benefit, there are underlying assumptions required for the benefits to materialise in practice. For example, higher wholesale prices will benefit a VI firm as a whole only if it is able to pass them on to consumers,⁴¹ which should tend to encourage entry upstream.
57. Against these potential benefits, a VI firm would need to consider the potential costs of each strategy. The European Commission notes that the VI firm's

⁴⁰ There are potential benefits from vertical integration, such as the natural hedge against power prices, lower credit requirements or mitigation against imbalance costs. These benefits will be achieved when a firm's generation and supply volumes match. A VI firm may therefore want to ensure that this is the case.

⁴¹ Otherwise, the benefits to its generation arm would be offset (or outweighed) by the losses to its supply arm.

costs of reducing purchases from upstream rivals are higher if upstream rivals are more efficient, or if its own upstream arm is capacity constrained.⁴²

58. The incentive to carry out behaviour that could foreclose may be limited (and foreclosure considerations may not affect incentives):
- There are clear opportunity costs from foreclosing. These occur when refusing to buy from the cheapest sources of generation (options 3 and 4) or when contributing to the Renewables Obligation buyout fund rather than receiving a share of it (option 5).
 - Foreclosing could also reduce the ability of a VI firm to manage its risks (option 2). However, this may be mitigated to the extent that it has a natural hedge between its generation and supply.

Effect

59. Customer foreclosure could potentially affect consumers through higher wholesale prices, retail costs or support costs. However, depending on the mechanism, there are reasons to consider that the effect of any customer foreclosure strategy on consumers may be limited.
60. Wholesale costs form the largest single component of a customer's electricity bill,⁴³ and so would be an obvious way for customer foreclosure to affect consumers. However, foreclosing any one generator is likely to have little impact on the wholesale price, as the new marginal generator will often have a similar marginal cost to the previous one.
61. Independent generators represent nearly 30% of upstream volumes,⁴⁴ and independent firms have continued to invest in new plants in recent years.⁴⁵ This indicates that widespread total foreclosure is not occurring.
62. Even a successful foreclosure strategy would have limited impact on consumers if it affected only a proportion of independent generators. For example, option 1 focuses on investment, meaning that it may mostly affect new generation capacity rather than existing capacity. Another example is

⁴² European Commission (2008) *Guidelines on the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings*, p16.

⁴³ For domestic customers, see Ofgem (2014) *Chart data as of October 2014*, 'Breakdown of an electricity bill over time'.

⁴⁴ See descriptive statistics: generation and trading working paper.

⁴⁵ For a list of power plants in Great Britain, including owners and construction dates, see DECC (2014) *Electricity: chapter 5*, Digest of United Kingdom energy statistics (DUKES), 5.10: Power stations in the United Kingdom.

option 5, which would affect only generators under the Renewables Obligation.⁴⁶

63. Independent generators would also be harmed only if they were unable to implement counter-strategies, such as vertically integrating themselves or signing long-term wholesale contracts. Some independent generators have already done so,⁴⁷ although there may be costs and risks involved.⁴⁸
64. To have an effect on consumers, the product must be a significant proportion of the overall downstream cost, otherwise higher costs for foreclosed firms would have little impact on the prices paid by consumers. This may not apply to some of the mechanisms in question. For example, the RO represents only around 5% of an electricity bill.⁴⁹
65. Finally, even if there were a suggestion that strategies followed by VI firms were causing harm, there would need to be consideration of any offsetting efficiencies for consumers. We have not considered it necessary to assess these in this working paper.

Current views on customer foreclosure

66. Our current view is that customer foreclosure is unlikely to be an issue in this market. In particular, this paper has shown that VI firms do not have the **ability** to foreclose independent generators. We have also indicated that it is questionable whether there is an **incentive** to foreclose, or whether there would be an **effect** on end consumers. Given that all three conditions must be met for customer foreclosure to be viable, we do not propose to carry out further work on this issue, unless we receive compelling evidence or reasoning to do so.

Input foreclosure

67. In this section of the paper we consider whether input foreclosure may be an issue in electricity markets in Great Britain. We explain what we mean by input foreclosure and consider two different forms that it might take. We evaluate each of these separately.

⁴⁶ This will be particularly limited once the RO is replaced by the CfD for new renewable generation.

⁴⁷ For example, Drax and GDF Suez.

⁴⁸ This could include any reasons for not wanting to participate in the retail market (eg due to limited profitability, complexity or regulatory uncertainty), or any capability gaps relative to those needed to be a generator. Potential entrants might also be dissuaded by difficulty of simultaneously entering the upstream and downstream markets.

⁴⁹ Calculated from Ofgem (2014) [Chart data as of July 2014](#), using the estimated figures for 2013.

What is input foreclosure?

68. By input foreclosure we refer to a scenario where a VI firm (or multiple VI firms on a coordinated basis) uses its VI position to cause harm to downstream competitors and benefits from this at the retail level. In practice, this is likely to involve finding a way to increase the cost of wholesale electricity to suppliers.
69. We considered what possible mechanisms a VI firm could use to achieve this goal and identified two. First, if a firm has any market power in generation, whether unilateral or coordinated, it could increase wholesale electricity prices across the board by generating less at any given price, which would increase input costs for independent suppliers. Second, it could try to restrict trading or otherwise worsen liquidity, which might either raise traded prices or impose a risk premium on independent suppliers.
70. As with customer foreclosure, input foreclosure is generally addressed by considering ability, incentive and effect.⁵⁰ In other words, for it to be a concern, all three conditions must hold:
- (a) **ability** – the VI firm must account for a large proportion of the upstream market or must be able to act in a coordinated fashion, so that it can influence rivals' costs downstream;
 - (b) **incentive** – the VI firm must gain enough in the retail market as a result of the strategy to more than offset the costs to it of carrying out the strategy; and
 - (c) **effect** – the result of the foreclosure must cause harm to end consumers.
71. It might not be necessary to look at all three conditions if at least one clearly does not hold.

Market power in generation as a tool for input foreclosure

72. In this section we consider the ability and incentive for a VI generator to withhold capacity unilaterally as a tool for input foreclosure. Under this mechanism, the firm would foreclose downstream rivals by increasing wholesale prices, thus raising their costs. We investigated generators' incentives and ability to withhold capacity in our market power in generation working paper. Our current view is that there is insufficient incentive for any generator to do so. In reaching this view in that paper, we did not take into

⁵⁰ Competition Commission (2013) [CC3](#), p59.

account vertical structure or the effects on the retail market – we looked only at the incentives for generators as if they had no retail interests. Here, we consider whether the effects on rival suppliers might give a VI generator an **additional** incentive to withhold capacity.

Ability to foreclose

73. Due to the shape of the supply curve, generators with relatively low market shares may nevertheless be able to influence wholesale prices by withholding generation capacity (see our market power in generation working paper).
74. We found that, in practice, the ability to affect wholesale prices significantly generally occurs when demand is close to the point at which there is a shift between technology types of the marginal unit of generation, and withholding can change the price-setting technology – for example, shifting it from coal to gas. Beyond that shift, any further price rises are relatively small and require withholding relatively large volumes; therefore, we found that they were generally unprofitable for the generator. We also considered in our market power in generation working paper whether a collective withholding strategy was plausible, and concluded that it did not seem likely. For completeness, we consider here whether an increase in wholesale prices would act to foreclose independent suppliers.
75. Suppliers will generally contract forward large proportions of their forecasted demand. Therefore, in order to have a significant effect on their actual input costs, the VI firm would have to withhold capacity sufficiently frequently to affect future price expectations. Those expectations would then incrementally begin to affect wholesale costs, because a supplier setting its retail prices today will base them partly on the volume it has already hedged and only partly on forward prices for the volume it is trading today. So there is effectively a double lag for the VI firm between incurring the cost and achieving the benefit.
76. The effect on independent suppliers will be affected by other components of consumers' bills and their consequences for choice of supplier. Wholesale electricity costs make up around half of retail electricity bills. Consider a hypothetical example of a 5% increase in wholesale prices. If this were fully passed through to retail prices, it would represent a 2.5% increase in retail electricity prices. Then consider that VI firms are unlikely to be able to affect wholesale gas prices. If customers are primarily seeking dual-fuel tariffs (or a single supplier), then for a customer paying similar amounts for gas and electricity, the effective price rise might be only around 1.25%. This means that a relatively large wholesale price rise would be necessary to have a

significant effect on consumers' overall energy bills, and therefore to cause large numbers of consumers to switch supplier.

77. We also note that it is not possible for VI firms to target specific independent suppliers using this mechanism: they can increase the price of wholesale electricity only in general.

Incentive to foreclose

78. The incentives to raise rivals' costs depend on the relative sizes of the cost from foreclosing (ie lost generation margin) and the gain from withholding – namely, the gain of downstream retail customers or higher retail prices.
79. The size of the cost depends on the lost margin of the plant being withheld and the gain in revenue for other generation assets. Our results in the market power in generation working paper show that withholding generally leads to a net loss for the generator, especially when the additional costs of withholding, such as the start-up costs for a power plant and opportunity costs, are considered.
80. The size of the gain depends on how many customers switch to the foreclosing VI firm (or are deterred from switching away from it) and the margins earned on those marginal customers.
81. We observed three reasons why the costs of a withholding strategy to the generation arm may be large in practice. First, as noted in our market power in generation working paper, the ability and incentive to exploit the opportunity is hampered by uncertainty about demand and wind output. If a generator does not know with certainty when it will have the ability to shift price significantly, it will have to withhold capacity more often in order to achieve price effects, and will incur a loss when the price does not shift significantly. Second, in order to have the ability to withhold, the generator either will have to avoid forward contracting the relevant output, thus incurring risk that could have been avoided, or will have to acquire a costly reputation for withholding even when its forward position would incentivise it not to do so.⁵¹ Third, as noted above, there is a substantial lag between introducing the strategy and seeing an effect on independent suppliers, and therefore a degree of risk which reduces the profitability of the strategy – because market circumstances may change between the period in which the generator withholds and the period in which expectations affect forward prices.

⁵¹ Generators, including generation arms of VI firms, typically contract forward or 'hedge' a substantial proportion of their expected output. See liquidity working paper.

82. We also considered the costs imposed on the retail arm of the foreclosing firm. In the standard economic model of input foreclosure, the VI firm will sell to other firms at the raised price while its retail arm continues to purchase the upstream arm's output, so the retail arm does not face higher costs. However, in the electricity sector, the VI firm's upstream arm is capacity constrained, and in practice the retail arm of each of the Six Large Energy Firms purchases from other market participants.⁵² Therefore, the retail arm cannot entirely avoid the increase in wholesale prices, so its costs increase and the retail margin available (ie the gain from foreclosing) is consequently reduced.
83. Next we considered the benefits to the VI firm of withholding. There may be two effects of higher wholesale prices. The first is that they are passed through into higher retail prices for **all** retailers. To the extent that this is the case, the effect on a VI firm is exactly the same as that on a generator, so we do not need to consider it here. The second is that independent retailers' prices rise relative to those of VI firms (because the latter have generation assets that mitigate, but do not avoid, the cost increase), and customers switch away from independent retailers and towards VI firms.⁵³
84. The benefit to the withholding firm depends on two factors. First, how many switching customers does it gain? Second, what margin does it earn on those customers?
85. The diversion of customers from independent suppliers will generally not be wholly to the foreclosing VI firm. As a rough guide, we might expect it to be in proportion to market shares among VI suppliers. Centrica has the largest share of accounts among the Six Large Energy Firms: 33% of all accounts; 26% of electricity accounts.⁵⁴ However, our market power in generation working paper found that Centrica had the least ability to influence price. The next-largest supplier is SSE, with 17% of all accounts and 18% of electricity accounts. Consider a hypothetical example where a foreclosure strategy caused all domestic consumers to leave independent suppliers. (This would be the upper limit on gains for VI suppliers, rather than a scenario we consider likely.) Independent suppliers have a share of domestic supply of below 10%. Therefore, the maximum gain to SSE, if all customers left all independent suppliers, would be 1.4% of domestic accounts (1.6% of domestic electricity

⁵² The overall effect on the VI firm is likely to be on net, rather than gross, purchases, because the generation arm will earn a higher margin on its remaining external sales. Therefore, this may not be a cost for EDF, which is net long. See descriptive statistics: generation and trading working paper.

⁵³ Or the current rate of switching from VI firms to independent retailers is reduced. The effect is equivalent.

⁵⁴ Calculated as Centrica's share of accounts divided by the combined share of the Six Large Energy Firms. Data estimated for 31 October 2014 taken from Cornwall Energy (December 2014) *Electricity and gas supply market shares domestic survey, quarter 4 2014*.

accounts).⁵⁵ The actual gain from a foreclosure strategy is likely to be significantly smaller: based on our comments on ability to foreclose, we do not think it plausible that a foreclosure strategy would be able effectively to force all independent suppliers out of business.

86. We would expect the customers who are diverted to be primarily the most price-elastic customers, and that margins on those customers will be low. Therefore, the gain from foreclosure will not be large.
87. Finally, we noted in our market power in generation working paper that existing regulations – including REMIT and the Transmission Constraint Licence Condition (TCLC) – and potential future changes to licence conditions can have a powerful effect on incentives to exploit market power.⁵⁶

Current view on input foreclosure through market power in generation

88. Given the considerations above, it seems to us unlikely that VI firms would have clear incentives or the ability to disadvantage independent suppliers through this mechanism. Therefore, we have not found it necessary to investigate in detail the possible effects of foreclosure.

Liquidity as a tool for input foreclosure

89. The second mechanism we assessed was for a VI firm or several VI firms to reduce liquidity, thus increasing independent retailers' costs. Under such a theory, the VI firm(s) involved would bear some costs from reduced liquidity but would hope that the benefits at the retail level from reduced competition would outweigh these costs. In practice, this harm would be likely to manifest through an increased cost of hedging or increased risk through being unable to hedge in the desired way.⁵⁷ In this section we consider whether this is a realistic concern. We refer to the evidence set out in our liquidity working paper, but do not repeat all of that evidence here.

Ability to foreclose

90. First, we considered whether a VI firm could target specific suppliers and refuse to trade with them. We do not think this is likely, because (as noted above) a large majority of electricity trading is anonymised, and therefore firms could not target any supplier with which they have a GTMA.⁵⁸ Ofgem's

⁵⁵ Calculated as independent suppliers' share of accounts multiplied by SSE's share of accounts among the Six Large Energy Firms.

⁵⁶ Competition law may also deter abuse of a dominant position.

⁵⁷ See liquidity working paper for our definition of 'hedging' and further discussion of its effect on competition.

⁵⁸ See paragraph 40, above.

Secure and Promote generation licence conditions also make it easier for small suppliers to secure GTMAs with the Six Large Energy Firms.⁵⁹

91. We therefore considered whether VI firms might instead take actions aimed at worsening liquidity in general, either by trading less in aggregate or by trading less in specific products that are valuable to independent suppliers.⁶⁰ We focused on their ability to foreclose.
92. First, we do not believe that a unilateral strategy by one firm is likely to have significant effects on overall liquidity. The total amount of open trading⁶¹ in GB wholesale electricity in 2013 was 940TWh. The largest amount of external trading by any of the Six Large Energy Firms was by RWE npower, which sold on average 188TWh per year,⁶² or 20% of the total. It is possible that an individual firm has a larger share of trading in particular products, but since a very large share of trading takes place in relatively few products (focused on baseload and seasons ahead of delivery), we consider it unlikely that either (a) any one firm has a large share of those widely traded products, or (b) worsened liquidity in an individual product with relatively little traded volume would have a significant effect on independent suppliers.
93. In any case, Ofgem's Secure and Promote generation licence conditions⁶³ would make it difficult for any of the Six Large Energy Firms to reduce liquidity significantly in the most traded products,⁶⁴ which are covered by those conditions. All of those firms are required to offer to sell each of those products throughout two hour-long windows each day. We found that most of the Six Large Energy Firms appeared able to carry out the bulk of their hedging strategies using these products. Since Ofgem has mandated good availability in these products, it seems unlikely that the Six Large Energy Firms would be able to place rival suppliers at a significant disadvantage.
94. Second, we did not think it likely that VI firms would be able to coordinate a joint strategy to reduce liquidity. In order for there to be coordination, firms need to be able to reach and monitor a coordinated outcome, and the coordination needs to be internally and externally sustainable (ie firms need to

⁶⁰ We discuss the range of products traded, and their role in reducing risk via hedging, in our liquidity working paper.

⁶¹ Excluding direct bilateral trades, which make up a small proportion of all trading, and VI firms' internal trading, but including OTC and exchange trades. Source of estimate: Ofgem presentation: Good wholesale market/Wholesale market indicators.

⁶² Over the period January 2011 to July 2014. See liquidity working paper.

⁶³ The Secure and Promote generation licence conditions would make it difficult to refuse to trade with particular small suppliers, and the market making licence conditions require the Six Large Energy Firms to post bids and offers for a range of products in two daily windows, with a prescribed maximum spread for each. The effect of the spread is that any attempt to post an unattractive sell price will make its buy price extremely attractive.

⁶⁴ We estimated that these products accounted for 65% of all trading, or 84% of all products traded a month or more ahead of delivery. See liquidity working paper.

be able to punish any deviations from the strategy).⁶⁵ These conditions are unlikely to be met for at least three reasons:

- (a) Since the VI firms have a range of different net positions, and differ greatly in terms of their internal organisation and need for liquidity, the costs to them of such a strategy would vary widely, and so a coordinated outcome may be difficult to reach.
- (b) VI firms are likely to have an individual incentive to deviate (ie to trade externally), but any deviation would be difficult to monitor, because the majority of trading takes place OTC and over exchanges where counterparties are anonymised and trading is not published.
- (c) Any punishment would be difficult to target at the firm which deviates, and a broader attempt to punish would be constrained by the Secure and Promote generation licence conditions.

95. Third, the volume of independent generation significantly exceeds the demand from independent suppliers. In 2013, generators other than the Six Large Energy Firms had a 28% share of generation output,⁶⁶ whereas our latest available data suggests that independent retailers accounted for less than 10% of retail customers and less than 13% of overall consumption.⁶⁷ Therefore, at a minimum, we would not expect independent suppliers to be in a position where they had no purchasing options. This would limit the effect that even a coordinated strategy could have. The amount of trading that any independent supplier requires is very small relative to total generation and to total trading in wholesale electricity in Great Britain.
96. Fourth, we have seen no evidence that such a strategy is occurring on a unilateral or coordinated basis. Our evidence suggests that the Six Large Energy Firms are generally trading externally in sufficient quantities to cover their own hedged positions (for both generation and supply), and also trading enough specialised products to achieve their 'shape'.⁶⁸ If one or more of them were engaging in this type of input foreclosure strategy, we would expect them to limit external trading to a minimum and try to reach hedged positions through internal trades as far as possible.

⁶⁵ Competition Commission (2013) [CC3](#), paragraph 250.

⁶⁶ See descriptive statistics: generation and trading working paper.

⁶⁷ Cornwall Energy (December 2014) *Electricity and gas supply market shares domestic survey, quarter 4 2014*, based on electricity volumes allocated to suppliers through the supplier volume allocation process. Note that embedded (distributed) generation is treated as negative demand for settlement purposes and a handful of very large demands are settled through the central volume allocation process used to settle transmission-connected generators.

⁶⁸ See liquidity working paper.

97. In addition, our investigation of broker data found that just over 70% of offers to trade OTC are posted by the Six Large Energy Firms; and more than two-thirds of the best prices we observed were posted by those six firms.⁶⁹ This does not seem prima facie consistent with either a refusal to trade or trying to trade on poor terms.
98. For these reasons, we think it is unlikely that any party is, or could, either unilaterally or collectively, foreclose independent suppliers by acting to reduce liquidity in wholesale electricity in Great Britain.

Incentive and effects

99. Given the considerations above on the ability of VI firms to foreclose independent suppliers by reducing liquidity on the wholesale electricity market, we have not found it necessary to investigate in detail the incentive to foreclose, or the effects of foreclosure. However, we note that incentives to foreclose are far from clear. All of the Six Large Energy Firms are reliant on external trading to some extent, since their generation and demand will not balance (either in volume or in 'shape'). A firm that reduces its external trading sufficiently to have any effect on liquidity is likely to increase its own supply arm's wholesale energy costs for externally sourced electricity, and in principle we see no reason why this increase should be smaller than that suffered by other suppliers. If that were the case, it is unclear what competitive advantage it would derive at the margin, unless the change were sufficient to drive independent suppliers out of business completely.

Current views on input foreclosure

100. Our current view is that input foreclosure is unlikely to be an issue in the GB electricity sector. In particular, it seems unlikely that firms would have an incentive to try to foreclose by withdrawing generation, or an ability to foreclose by reducing liquidity. Given that all three conditions – ability, incentive and effect – must be met for input foreclosure to be viable, we do not propose to carry out further work on this issue, unless we receive compelling evidence or reasoning to do so.

⁶⁹ We are unable to identify all of the traders in our dataset because of broker requests to anonymise party names, so a subset of our data shows the type of firm but not its identity. Therefore, we cannot conclusively say whether all Six Large Energy Firms consistently offered good prices; but we can say that there is no sign of systematic behaviour among them.