Updated analysis of the GB cement producers' profitability in the supply of cement

Introduction

1. The purpose of this appendix is to update the analysis of the cement producers' profitability in the supply of cement in GB presented in our provisional findings report.

2. This analysis of cement profitability was set out in detail in Appendix 7.7 of the provisional findings. The analysis presented in that appendix had been prepared in accordance with the generic framework we had developed for assessing profitability across all reference markets in this investigation (ie aggregates, cement and RMX) as set out in Appendix 4.1 of the provisional findings.

3. We received extensive comments on our cement profitability analysis from the Top 3 GB cement producers, namely Lafarge Tarmac, Hanson and Cemex, both relating to points of principle and the values placed on inputs to our calculations. We sought and obtained advice from an independent expert (Professor Geoffrey Whittington)[1] on the approach we had applied to analysing cement profitability and commissioned a report about the cost of a new cement works from an independent cement consultancy. As a result of both the comments of the GB cement producers and the advice we received, we have adjusted our approach to analysing and positioning the profitability of the GB cement producers in some important respects.

4. At a high level the approach taken to analysing profitability in the provisional findings was to compare the ROCE assessed on a current cost basis with the firms' costs of capital. This overarching approach to assessing profitability has not changed, rather

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various aspects of the way in which we assess and position profitability has been modified.

5. The analysis of profitability in the provisional findings covered the period 2007 to 2011 inclusive. We have therefore also updated the analysis to include the 2012 information about the financial performance of the GB cement producers.

Structure of this paper

6. The rest of this appendix sets out:

   (a) the theoretical underpinnings to the approach adopted to analyse profitability;

   (b) the context to the analysis and interpretation of profitability in line with the theoretical underpinnings;

   (c) the modifications to the approach of analysing and positioning profitability adopted in the provisional findings;

   (d) the aspects of the approach to the profitability analysis which we have maintained;

   (e) the calculation steps taken to implement the modified approach to analysing profitability;

   (f) the results of applying the modified approach to analysing profitability; and

   (g) the findings from the profitability analysis.

Theoretical underpinnings to the approach adopted to analyse profitability

7. The approach taken to analysing profitability is grounded in the CC's Guidelines which in turn are justified by the analysis of Edwards, Kay and Mayer (1987) (EKM), particularly Chapter 4, section 4.4 onwards. EKM discuss the application of their approach to the identification of monopoly power.[2] They demonstrate that a particular measure of the ex post accounting rate of return (ARR) is suitable for comparison

[2] See pp58 & 59 of Edwards, Kay and Mayer (1987).

with the cost of capital, for this purpose. However, they stress the importance of separating monopoly profits from the consequences of unfulfilled expectations (of which impairment losses are an example). They also acknowledge other measurement difficulties.

8. EKM's ARR is based upon two critical accounting conventions. First, all assets (and, where relevant, liabilities) are measured on a Value to the Owner[3] basis (often referred to as Deprival Value) in the balance sheet. Second, all gains and losses recorded in the balance sheet (other than transactions with owners, such as dividend payments) are included in the profit measure. Thus, the income measure is 'comprehensive income' and the income statement ties in with the balance sheet, the income in the former reconciling with the change in net assets in the latter.

9. In our provisional findings analysis as set out in Appendix 7.7 we cited the Byatt Report (1986). This Report provides a very useful examination of the practical application of the Value to the Owner rules, and particularly the measurement of replacement cost on a Modern Equivalent Asset (MEA) basis. The report was prepared for a different use, the monitoring of nationalized industries, as several commentators have pointed out (eg Hanson) but that does not invalidate its relevance as an analysis of practical measurement issues (eg depreciation profiles), which tend to be treated more lightly by EKM. It also highlights the relevance of accounting for the costs of resources used at the price that resource would obtain in a competitive market when assessing the profitability of an entity.

[3] In Appendix 4.1 of the provisional findings the Value to the Owner is described in terms of value to the business, the terminology that is adopted in the UK's Accounting Standards Board's Statement of Principles.

Context to the analysis and interpretation of profitability in line with the theoretical underpinnings

10. A number of factors in the analysis of profitability of cement, and its interpretation, over the period of review required detailed consideration as explained below.

Appropriately valuing long-lived tangible fixed assets

11. Preparing profitability on a current cost basis (ie one that values assets in line with deprival valuation principles) for an industry such as cement requires particular care, not least because it involves estimating the (gross) MEA value for assets a significant proportion of which have been acquired in the distant past and then applying a suitable depreciation profile to that gross value.

12. No two cement works are exactly the same. Even if the equipment design is exactly the same, the basic raw materials, the erection of equipment, operational and maintenance procedures will not be exactly the same.[4] These factors will all affect the capital cost of an individual cement plant.

13. One response suggested that, given the economics of the cement industry, the only reliable way to estimate the current value of the capital stock is by reference to asset-specific valuations.[5] If an approach such as depreciated MEA were to be used, then these would need to be sense checked against the facts of the case—against transaction prices, where they exist, and against practitioners' knowledge of the economics of a particular class.

14. It is not feasible for us to undertake asset-specific valuations for each of the ten GB cement plants at each balance sheet date to perform this analysis. This would be a significant challenge even for the firms themselves to undertake. For the same

[4] Executive summary of report procured by CC from ICC. See paragraph 36.
[5] This view was expressed by Chris Higson, Professor of Accounting Practice at the London Business School, in his expert report on cement profitability analysis contained within the provisional findings, commissioned by Lafarge Tarmac.

reason that it is not feasible to undertake asset-specific valuations, it is also not feasible to develop asset-specific depreciation profiles which involve forecasting, among other things, the impact of future new technology and the impact of changes in the future relative prices of inputs used in the cement production process, on the evolution of the decline in value of long-lived assets to the business.

15. Observed transaction prices for the purchase of a business which includes cement assets cannot be reliably used to infer the value of the cement assets independent of those assets' wider value to that business.

16. It has also been our experience that it has been difficult, despite our persistent efforts to obtain this information from the relevant parties, to understand the reasons why the construction of the most recent new cement works in the UK, that at Tunstead, appeared to have cost around 50 per cent more than Tarmac paid for it. Therefore one of the seemingly more relevant data points for the cost of an MEA in GB did not appear to be reliable.

17. We have also been faced with assertions about the cost of a replacement cement works (ie the cost of an MEA) that are very much higher than the costs of constructing one recent cement works. In the light of the paucity of information on this matter, we decided to commission independent advice about the nature and costs of a new cement works in GB from a consultancy with expertise in this area.

18. We therefore inevitability needed to undertake approximations, both of the gross and depreciated value of the assets used in the business. This has allowed us to modify the carrying values of assets as held in the cement producers' balance sheets where appropriate. The results of this analysis are more informative of the profitability of the

GB cement industry as a whole, rather than of the level of profitability in any period for each of the individual GB cement producers.

Interpreting profitability in the midst of a prolonged downturn

19. One of the major themes over the period of review (2007 to 2011 for provisional findings and 2007 to 2012 for this updated analysis) has been the severe and prolonged downturn that occurred starting in 2008 in the wake of the financial crisis that came to a head in that year. Construction is a highly cyclical industry and the volume of cement production fell by around 30 per cent from its peak in 2007. In response, firms mothballed plants which they may not have otherwise mothballed and closed cement works sooner than they otherwise might have done had the severe downturn not occurred. This downturn seems to be the most severe downturn experienced in GB since the oil price crises in 1974, nearly 40 years ago or even the Second World War.

20. The nature, severity and timing of this downturn was unexpected, however downturns in general (as well as upturns) are regular features of business life. As a result firms have suffered real financial losses (impairments) to the value to their businesses of their existing portfolio of cement assets which they were not necessarily expecting to occur at this particular point in time or with such severity.

21. Whilst the risk of impairment to the value of assets is a real cost to a business it is one which may well never occur for any individual asset, but when it does occur it will be unexpected in its timing, likely to affect a number of assets, be lumpy in nature, and be material. There may also be operational costs which peak in association with the unexpected closure or mothballing of hitherto productive assets.

22. Several respondents commented that we were looking at too short and economically turbulent a time to form the basis of any measured conclusion. For example, the period of review was short in relation to the long-lived nature of the assets, there had been a slump in demand, excess capacity had emerged over the period of review, and demand had remained muted through to the end of 2012.

23. A potentially complicating factor in interpreting profitability is that impairment losses are a good example of the sort of 'unfulfilled expectations' that might otherwise obscure excess profitability that we are seeking to detect the presence or absence of.[6] The possibility of windfall profits (the positive flip side of 'unfulfilled expectations') is one of the reasons that CC guidelines refer to 'persistent profitability' being a test of monopoly pricing power rather than merely the presence of excess profitability in any one year as it is highly unlikely that a firm would persistently earn windfall profits.

24. In circumstances like these it would be more ideal to assess profitability over a much longer period of time than we have been able to (given the constraints on the data we have been able to gather—see paragraph 26), one which at a minimum covered a whole business cycle, so a relatively longer period of results could be reviewed. This allows an assessment of profitability taking one year with another, rather than a series of years which are likely to reflect a depressed view of long-term profitability. Profitability taking one year with another in effect allows the reviewer to smooth out over time the impact of lumpy impairment losses and other lumpy costs that may occur from time to time. Significant restructuring costs may be such an example, examples of which did occur in the period of review, at least for some of the GB cement producers.

[6] The Guidelines state in paragraph 125*(a)* that 'A period of low profitability may occur during the course of a downturn in trading conditions, regardless of the state of competition in the affected market'.

25. Another factor which is relevant to interpreting the cement industry's profitability over a relatively limited period of review is that the inherent structure of the cement industry is highly leveraged. That is to say that, whilst additional capacity is very lumpy and costly, once the decision is made to run an individual kiln/plant, the marginal cost of supplying extra tonnage is relatively low. This means that it would be expected that profitability would improve significantly if there were spare capacity during the downturn, once the economy, particularly the construction economy, picked up.

26. We sought to gather financial information to calculate margins over a period preceding 2007. However the cement producers for a variety of reasons (many of which were connected to the fact that there had been changes in the ultimate ownership of the businesses in this sector prior to 2007) were not able to produce this information for us. We are therefore restricted to looking at financial information covering the period 2007 to 2012.

Modifications to the approach of analysing and positioning profitability adopted in the provisional findings

27. As mentioned in paragraph 3 we received extensive comments from the Top 3 GB cement producers, some of which involved a number of points of principle. We have also obtained our own independent expert advice about the most appropriate conceptual approach to apply in this case.[7] As a result we have made a number of modifications to our approach to analysing the profitability of cement. We set out these changes, and the reasons why we have made these changes, in the table below.

[7] See footnote to paragraph 3.

TABLE 1 **Modifications to the approach adopted in the provisional findings to assessing profitability**

Issue	*Previous approach*	*Modified approach*
Inclusion of all gains and losses recorded in the balance sheet in the profitability measure The principle of 'comprehensive income' is important in making sure the economic performance over a period is properly measured. This principle is particularly relevant to the treatment of impairment losses (and carbon credits) in our analysis.	One of the measures of profitability we developed, the 'profitability based on the continuing costs of supply' measured profits pre-impairment losses and pre-carbon credits but measured capital employed effectively after impairment losses and after carbon credits.	When presenting profitability we now either compare *(a)* profits before impairment with capital employed before impairment or *(b)* profits after impairment with capital employed after impairment.
Handling of impairment losses Impairment losses when incurred are an unavoidable cost of running a business which affects investors' view of their prospective returns and therefore impairment costs are an ongoing cost of supply. However, we consider that impairment costs, unlike most ongoing costs of running a cement business which on the whole will be relatively steady from one year to the next, will by their nature be unpredictable, erratic, variable in quantum and hard- to- measure in nature. As a result we would not expect such costs to be directly reflected in prices in a competitive market.	Impairment losses were not included in the 'profitability based on the continuing costs of supply'.	We no longer use the description of 'profitability based on the continuing costs of supply' because it confuses two issues, namely the costs that were incurred in the current year that would be expected to be incurred in future years (at current cost levels) with the total of all the unavoidable costs of running a business in any one period, not all types of which would be expected to be incurred in all of the following periods. We now simply identify impairment losses separately as a notable item within our analysis of 'comprehensive profit'.
Difficulty of and imprecision in measuring impairment losses We consider that in practice firms adopt different approaches to recognizing whether an impairment (ie unexpected depreciation) of a tangible fixed asset, has occurred or not, and if they do recognize an impairment, how that impairment should be measured. It is one of the more inherently subjective areas in accounting, much more so than for depreciation.	We applied a method of calculating impairment which assumed that all fluctuations in output led to a change of valuable (MEA) capacity in the following year. As cement plants can have a prospective life of 50 years, applying such a view can be interpreted as taking a short-term view of the value of these long-lived assets, and therefore the approach to impairment to be unduly harsh.	We handle this issue in two ways. Firstly we now record as impairments only those plants which have been permanently retired during a year (ie we record actual lost capacity) and/or where firms have impaired the assets in their own financial statements. We retain the previous method of recognizing and measuring impairment as an alternative scenario. Secondly, in recognition of the extreme subjectivity of the recognition and measurement of impairment, we present the results in both scenarios—before and after impairment.
Handling of carbon credits Shortly before the period of review the EU introduced a scheme to try to restrict emissions by pricing them through a traded permit system. This is designed to affect the ongoing costs (or revenues if emissions are lowered) of the business.	Like impairment losses we did not treat this item as part of profitability of the continuing costs of supply.	We now treat these revenues as part of comprehensive income albeit, as with for impairment losses, we continue to identify this item separately. The scheme might be regarded as an extraordinary windfall item if it was unexpected at the beginning of 2007 and not expected to continue in the future, so that it would not be a continuing cost of supply. However, as neither of these conditions hold, we treat it like any other cost (or revenue) incurred by the business.
Approach to assessing the gross cost of a firms' assets A different approach to valuing the gross value of assets is needed if it is not based on the previous year's (clinker) output. Some firms pointed out that they had recently invested heavily in new assets, including over the period of review that were not properly captured in our gross (and net) asset valuations. Many of these assets were not associated with a fully integrated stand-alone cement works such	We assessed the gross value of cement plant and machinery assets purely as a function of the previous years' output. This approach to asset valuation did not take account of any major differences in the business model which affected the plant and machinery assets actually held by the firms.	We now adopt a two-tier approach to estimate the value of cement assets, a core element associated with an integrated cement facility and an estimate of the additional investment assessed on a case by case basis. The core element is valued on the basis of the maximum clinker output over the period of review.

Issue	*Previous approach*	*Modified approach*
as downstream blending and import facilities.		
Depreciation profile For the purposes of measuring economic costs we should use economic depreciation. This takes account of finance costs, which are particularly important in the case of long-lived assets such as cement plants.	We adopted a declining balance depreciation profile (concave profile) which put more weight on the decreasing cash flow benefits arising from the use of an asset over time* rather than the impact of financing costs over time.†	We now adopt straight-line depreciation. Based on the evidence put to us, we think it unlikely that the decline in the cash flow benefits from owning an asset over time, is sufficient to dominate the effects of financing costs, which are a significant factor for long-lived assets.‡ In addition the straight-line profile is more likely to even out any mis-specification in the depreciation profile across the whole GB population of cement assets than either a concave (declining balance depreciation) or convex profile (annuity depreciation).
Assumed useful economic lives for assets Cement plants in practice have had economic lives both longer than their accounting asset useful lives and the original design life.	As a result of adopting a declining balance depreciation methodology, there was no sharp cut off assumed asset life in the modelling.	As we are now adopting straight-line depreciation, we must make an explicit assumption about asset lives. Parties' views differed over the appropriate asset lives to assume. We have adopted 50 years in our analysis, not least because there are a number of vintage plants in GB to which it is appropriate to ascribe a positive asset value.

Source: CC analysis.

*The cash flow benefits from owning an asset may decrease over time because of the impact of *(a)* rising costs of use and/or lower output over time, *(b)* introduction of new technologies which mean that the older plant is less valuable than before and *(c)* changes in the relative prices of inputs used in the production process (eg energy prices) mean that the older plant is more costly to run that new plant.
†Financing costs lead to the cash benefits resulting from using the asset earlier in its life being worth less (ie economic depreciation is lower), all other things being the same, than the cash benefits resulting from using the asset later in its life. This is because the early cash benefits are discounted over a much longer period than the later cash benefits.
‡A common argument in support of straight-line depreciation is that it represents a practical compromise between the two effects: declining benefits being offset by higher financing costs as the asset ages. Of course, this offsetting effect is unlikely to be exact, and the popularity of straight line in practice owes more to its simplicity than its theoretical superiority.

28. In addition to the revisions in approach highlighted in the above table, we have also commissioned a report to estimate the cost of a new cement works in GB as at 1 January 2007 as an input of our calculations of profitability over the period of review.

Aspects of the approach to the profitability analysis which we have maintained

29. In this section we consider comments from the cement producers which have not caused us to change our approach to assessing profitability. Some of the points raised whilst, having a theoretical basis, are in our view unlikely to be material to our assessment of the firms' profitability. Given the imprecision of the exercise (see paragraphs 11 to 18) efforts have been concentrated on understanding and

quantifying the issues that are most likely to make a material difference to our assessment of profitability.

TABLE 2 **Maintenance of the approach adopted in the provisional findings to assessing profitability**

Issue	*Response*
Our view on the mode of entry driving the profitability results Our profitability analysis is based on entry being on a brownfield site, rather than on the much more costly greenfield basis. This has a material impact on the profitability so calculated.	The more relevant benchmark here is not what a theoretical new entrant may be forced to do (which in any case is highly unlikely in current market circumstances) but what has been the mode of entry over the past, all of which has been on brownfield sites in GB since Cauldon in 1957. In addition we do not foresee any investment in greenfield cement plants in GB in the near to mid-future.
The linkage between older plants and higher operating costs Lafarge Tarmac provided cost data that sought to demonstrate that there is no direct linkage between unit costs and the age of the assets at an individual cement plant, and that we should not assert that there was 'undoubtedly higher operating costs associated with older plants'.	There are a number of factors which influence individual cement plants unit costs and the age of the cement plant is one of them. We also understand that the moisture content of the (locally available) raw materials has an important impact on unit costs and this may well explain the differences observed.
Treatment of intangible assets other than start up costs Conceptually, 'proper' intangible assets should be included in the balance sheet. This would certainly include all intangibles that had a separate market value and those that had a clearly measurable cost which was justified by measurable benefits. It would not include blanket 'goodwill' figures arising on acquisitions, which can be dominated by measurement errors, over-payments and possibly monopoly rents.	In the cement industry, it seems unlikely that there will be important intangible assets such as intellectual property (important in high tech industries such as pharmaceuticals) or brand names (important in consumer industries such as Coca Cola). In addition we do not see the cement industry being strongly characterized as one that intensively uses organizational capital to gain a competitive advantage against other firms. We therefore believe our approach of not seeking to place a value on this sort of intangibles is substantially justified.
Treatment of intangible assets: start-up costs Some respondents pointed out that the various start-up costs create intangible assets. It is obviously the case that a new entrant would have to assemble and train a workforce, devise working practices, and possibly have a commissioning period when plant is below full capacity.	Start-up costs should not have much effect on the profit and loss account because the absence of depreciation of intangibles is compensated substantially by renewals (recruitment of new staff, upgrading of computer systems etc) which are charged to profit and loss but would not be so under the capitalization approach. This approach might lead to a lower net assets figure in the balance sheet (and therefore a higher rate of profit) but it is unlikely that its value there would be material, especially as some of these costs may already included in tangible asset values (eg commissioning costs in plant values, software costs in computer systems).
Individual firm profitability may stem from relative efficiency rather than excess profitability Some respondents pointed out there will inevitably be variation in firms' profitability, some of which may be due to structural reasons (eg the location of, and the raw materials associated with its plants gives it a competitive advantage) or temporary (eg it is the first-mover in implementing a new, more efficient production technology).	Our concern in this analysis is to understand the profitability of the industry as a whole over the period of review.

Source: CC analysis.

Calculation of profitability on a current cost basis (modified approach)

30. In this section we describe how we modelled profitability on the modified basis and discuss the inputs we used have used in our modelling.

31. We established the maximum clinker production for each cement works over the period 2006 to 2012. We then used that volume to establish the gross asset value for the plant at the date the plant/kiln was commissioned in 1 January 2007 prices by multiplying that volume by our benchmark cost for a 1 Mt clinker output per year plant. See paragraphs 35 to 44.

32. We then depreciated that value on a straight-line basis over 50 years. Where assets were retired due to the plant being permanently closed, we wrote off the carrying value as an impairment loss.

33. We then converted these figures (ie period end asset values, depreciation charges and impairment charges) into nominal terms by applying an asset price inflation factor of 3.0 per cent a year, the same factor that ICC[8] had applied in its calculations to estimate the cost of a new cement plant at 1 January 2007. The balancing difference between the balance sheet values in any one period was ascribed to holding gains, so that all changes in asset values went through the profit and loss account.

34. We finally substituted the (modified) historical values for plant and machinery and depreciation with the modelled CCA values for the assets, OCM[9] depreciation, impairment charges and holding gains.

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[8] See paragraph 36.
[9] Operational capacity maintenance.

Cost of an integrated cement plant capable of producing 1 Mt a year of clinker on a brownfield site

35. In our provisional findings we used a figure of £170 million at 1 January 2007 prices to estimate the cost of a new 1 Mt clinker production facility. We assumed asset price inflation over the period of 2.5 per cent a year. Many respondents stated this figure was too low and sought to evidence this through the various examples in the UK (the replacement works at Tunstead in 2004 and Rugby in 2000 in particular) and the cost of planned new works at Medway and the second kiln line at Tunstead.

36. Because of the differing evidence about the cost of a new cement facility, it was difficult for us to be able to develop a cost in which we both had confidence and could rationalize the claims about the likely cost of new cement works in GB. We therefore decided to commission a report from an independent cement consultancy firm, ICC (Independent Cement Consultants Limited). ICC's report is included as Annex B.

37. ICC has estimated the cost of a 'greenfield' new integrated cement works with clinker making capacity of 1.0 Mt including 10 per cent contingencies, as £188 million at 1 January 2007 prices. It estimated the cost of a brownfield site at 80 per cent of this, ie £150 million at 1 January 2007 prices.

38. Commissioning this piece of work has highlighted to us the broad spectrum of possible options available to a firm when it seeks to develop new cement-making capacity. To use the analogy of a house, if one wanted to obtain more housing, one in theory has at least the following options:

(a) build a new house in a remote location where there is no ready access to public utilities (no existing roads, water, power etc);

(b) build a new house in a location where there is relatively easy access to public utilities (such as roads, water, power etc);

(c) assuming there is space, build a house next door to the existing one;

(d) knock down the existing house, and build a new one in its place;

(e) re-use some of the existing housing capacity, by extending, possibly quite significantly, the house rather than building a new house from scratch, which should result in some synergistic savings in costs; and

(f) extend the house incrementally step-by-step, with the aim of adding housing capacity to match the timing of increases in demand.

Taking a mid-point between the greenfield (100 per cent new kit) and a brownfield development developed by the ICC

39. We do not believe that the equivalent of scenario *(a)* is relevant to assessing the profitability of the GB producers over the period of review. It seems highly unlikely that there will be any building of a new cement plant at a new remote location and there hasn't been any entry like this since Cauldon in 1957 and the original Tunstead works in 1966, which in any case was built adjacent to existing lime works.

40. Our understanding is that both the planned Medway works and the new kiln line at Tunstead, [✂], are more akin to scenario *(b)*. In practice it seems that the realistic possibilities would be scenarios *(c)* to *(f)*, which are something between the greenfield and brownfield options. As a result we have decided to take the mid-point between the two estimates provided by ICC (90 per cent of the cost of a greenfield site, ie £169 million).

41. ICC has told us that recent history of the procurement of cement works (eg with the 2004 Tunstead works, the 2000 Rugby works and the 2009 Tilbury milling plant) was one of significant cost over-runs, and that as a result the normal ranging of cost of +/- 15 per cent of the mid-point cost estimate it would generally apply to its mid-point estimate, might not apply here. We have therefore used ICCs central estimate, but note that some GB works have cost more than this.

42. We also note there is the cost of getting permission to develop a cement works, which as ICC has pointed out can be very costly in complex cases and for which no 'average' figure can be readily estimated. This is therefore not included in the £169 million.

Adding the cost of financing to ICC's estimates

43. ICC has provided us with the typical phasing of a development over 28-months from contract award to completion of commissioning and handover to the owner[10] to allow us to estimate an uplift to take account for the cost of capital on the owner's investment before it is put to productive use. ICC told us that a down payment of around 25 per cent is often required. Using the phasing provided by ICC in the report, the estimate of the percentage down-payment, plus the cost of capital of 10 per cent we have applied when evaluating profitability in this market investigation, we estimated that the cost of financing adds nearly 14 per cent to the cost of a project. This is a more significant percentage than discussed in the ICC report of 5 to 10 per cent which reflects the assumption that investors would expect to earn their cost of capital on their investment in an asset both before and after the asset is put into productive use.

44. We therefore multiplied the £169 million by nearly 1.14 to arrive at the benchmark cost in our modelling of £192 million (£191.8 million unrounded) per 1 Mt clinker capacity plant. It is worth stressing that underpinning this benchmark cost is an assumed ratio of cement output to clinker output of 1.2. Some of the GB cement producers exhibit a higher ratio and others a lower ratio, but overall this is in keeping with the observed ratio over the total period of review.

[10] See p15 of the ICC report.

Adjustments to take account of recent investment not directly related to investment in additional clinker-production facilities

45. Where we had the information, we made specific adjustments to take account of investment that would not in principle be accounted for by the £192 million per 1 Mt clinker capacity plant. Some GB cement producers, notably Lafarge, had more extensive downstream facilities, which in principle should be recognized in its capital employed base.

46. Lafarge Tarmac provided us with an analysis of substantial recent investment over the period Lafarge had made in its Hope works (aimed at improving the efficiency and extending the economic useful life of the plant), in rail out-loading facilities, in downstream blending facilities, in import terminals and in advanced packing facilities. We therefore added £[✂] to capital employed as at 1 January 2007 to cover this investment which covered a period of 2005 to 2012 over this period.

47. During the period of review Cemex invested in a stand-alone grinding/import terminal at Tilbury. This cost around £50 million to build and was commissioned in 2008. We have therefore increased Cemex's capital employed to reflect this investment. We note, however, that the cost of this investment is very much higher than the range of figures quoted by ICC.

48. ICC does not include in its estimate for an integrated cement works the cost of off-site depots and any investment in train facilities apart from 'unloading facilities'. As we do not have sufficient specific information to assess the materiality of past investment by the cement producers in these areas (apart from that which may be included in the recent investments described for Lafarge and Cemex) we have not made any other adjustments to capital employed.

Asset price inflation over the period 2007 and 2012

49. In the provisional findings analysis we assumed 2.5 per cent asset price inflation per year. We have now modified this to 3.0 per year to be consistent with the asset price inflation used by ICC to estimate the cost of a cement works as at 1 January 2007. In preparing its report ICC used a database of cement projects whose costs referred to the first quarter of 2011, and so it deflated costs measured at this point by 3.0 per cent a year.

Results of applying the modified approach to analysing profitability

50. Below we set out the results of applying the modified approach. As in the provisional findings, we also present profitability on the (modified) historical cost basis.

TABLE 3 **Profit & loss account and balance sheet for GB cement producers' over the period 2007 to 2012 based on HCA and CCA basis (modified approach)**

	2007	*2008*	*2009*	*2010*	*2011*	*2012*
Cement sales (Mt)	12.2	10.5	7.8	8.1	8.7	8.4
Clinker production (Mt)	10.2	8.7	6.4	6.6	7.1	6.4
HCA profit & loss						
Revenues	842	791	640	647	711	676
Costs excluding depreciation	–672	–669	–513	–509	–535	–542
HCA depreciation	–65	–63	–70	–61	–65	–55
Subtotal	105	59	58	76	111	79
Restructuring costs	–18	–14	–12	–6	–7	–3
Impairment losses	-	-	-	-	-	-
Carbon credits	7	62	36	47	35	37
Profit reflecting all costs incurred	94	107	81	117	139	113
HCA balance sheet						
Plant & machinery / AICC	837	868	844	811	818	829
Other fixed assets	183	199	144	165	146	141
Net current assets	36	43	37	–3	–22	–48
Provisions	–92	–84	–41	–39	–61	–44
Total assets	965	1,027	983	934	880	878
Average of opening/closing balance	*965*	*996*	*1,005*	*959*	*907*	*879*
CCA profit & loss						
Revenues	842	791	640	647	711	676
Costs excluding depreciation	–672	–669	–513	–509	–535	–542
CCA depreciation (OCM)	–44	–37	–39	–40	–42	–43
CCA depreciation ('holding gains')	34	34	33	33	32	32
Profit before separately identified items	161	119	121	130	167	123
Restructuring costs	–18	–14	–12	–6	–7	–3
Impairment losses	-	–83	-	-	-	-
Carbon credits	7	62	36	47	35	37
Profit reflecting all costs incurred	150	84	145	170	195	157
CCA balance sheet						
Plant & machinery / AICC	1,127	1,091	1,085	1,077	1,068	1,057
Other fixed assets	183	199	144	165	146	141
Net current assets	36	43	37	–3	–22	–48
Provisions	–92	–84	–41	–39	–61	–44
Total assets	1,254	1,250	1,225	1,201	1,130	1,106
Average of opening/closing balance	*1,259*	*1,252*	*1,237*	*1,213*	*1,165*	*1,118*

Source: CC analysis based on Annex A, Tables 1a to 4a.

TABLE 4 **Summary financial results for GB cement producers' based on CCA basis (modified approach) and calculation of ROCE thereon over the period 2007 to 2012**

	£m for profits and capital employed / % for ROCE						
	2007	*2008*	*2009*	*2010*	*2011*	*2012*	*Average*
Profit & loss account							
Profits before impairment	150	167	145	170	195	157	164
Impairment	-	–83	-	-	-	-	–14
Profits after impairment	150	84	145	170	195	157	150
Balance sheet							
Capital employed before impairment	1,259	1,336	1,321	1,296	1,249	1,202	1,277
Capital employed after impairment	1,259	1,252	1,237	1,213	1,165	1,118	1,207
ROCE							
Before impact of impairment	12	13	11	13	16	13	13
After impact of impairment	12	7	12	14	17	14	12

Source: CC analysis based on Table 3.

Notes:
1. Calculation of averages does not take account of the impact of changes in the value of money over the period of review.
2. Calculation of capital employed before impairment does not take into account the impact of changes in the value of money on the accumulated impairment charge.

Results of applying the previous approach to analysing profitability with straight-line depreciation

51. As explained in paragraph 130 of Appendix 7.7 of the provisional findings, we valued each firm's cement plant and machinery assets on the basis of the previous year's clinker production plus an operating capacity margin of 30 per cent. We multiplied these actual clinker volumes plus 30 per cent by the assumption we had made for the cost of a integrated cement plant capable of producing 1 Mt a year of clinker.

52. As explained in Table 1, this approach could be seen as an unrealistically extreme method of assessing impairment losses (and reversal of impairment losses, and even gains) but it had the virtue of being capable of being systematically calculated from one period to the next. This approach to impairment is therefore a very different approach to assessing impairment losses to that being taken under the modified approach, where only those assets that are prematurely retired[11] or which are treated

[11] Premature in terms of the assumed 50 years life.

as being impaired in the financial information provided to us by the GB cement producers are treated as impaired.[12]

53. We otherwise make the same modelling assumptions, and approach to presentation of the results, that we have reflected within the modified approach. That is to say that we now use straight-line depreciation assessed over 50 years, we use the same assumption of the cost of an integrated cement plant capable of producing 1 Mt a year of clinker and asset price inflation over the period. We also compare pre-impairment profits with pre-impairment capital employed and post-impairment profits with post-impairment capital employed.

[12] [✂]

TABLE 5 **Profit & loss account and balance sheet for GB cement producers over the period 2007 to 2012 based on HCA and CCA basis (provisional findings approach with straight-line depreciation over 50 years)**

	2007	*2008*	*2009*	*2010*	*2011*	*2012*
Volumes						
Cement sales (Mt)	12.2	10.5	7.8	8.1	8.7	8.4
Clinker production (Mt)	10.2	8.7	6.4	6.6	7.1	6.4
HCA profit & loss						
Revenues	842	791	640	647	711	676
Costs excluding depreciation	–672	–669	–513	–509	–535	–542
HCA depreciation	–65	–63	–70	–61	–65	–55
Subtotal	105	59	58	76	111	79
Restructuring costs	–18	–14	–12	–6	–7	–3
Impairment losses	-	-	-	-	-	-
Carbon credits	7	62	36	47	35	37
Profit reflecting all costs incurred	94	107	81	117	139	113
HCA balance sheet						
Plant & machinery/AICC	837	868	844	811	818	829
Other fixed assets	183	199	144	165	146	141
Net current assets	36	43	37	–3	–22	–48
Provisions	–92	–84	–41	–39	–61	–44
Total assets	965	1,027	983	934	880	878
Average of opening/closing balance	*965*	*996*	*1,005*	*959*	*907*	*879*
CCA profit & loss						
Revenues	842	791	640	647	711	676
Costs excluding depreciation	–672	–669	–513	–509	–535	–542
CCA depreciation (OCM)	–52	–53	–45	–33	–34	–36
CCA depreciation ('holding gains')	40	40	34	27	26	26
Profit before separately identified items	159	109	117	131	168	123
Restructuring costs	–18	–14	–12	–6	–7	–3
Impairment losses	48	–138	–211	5	71	–75
Carbon credits	7	62	36	47	35	37
Profit reflecting all costs incurred	196	20	–71	178	267	83
CCA balance sheet						
Plant & machinery/AICC	1,375	1,224	1,002	1,001	1,064	979
Other fixed assets	183	199	144	165	146	141
Net current assets	36	43	37	–3	–22	–48
Provisions	–92	–84	–41	–39	–61	–44
Total assets	1,502	1,383	1,141	1,125	1,127	1,029
Average of opening/closing balance	*1,483*	*1,442*	*1,262*	*1,133*	*1,126*	*1,078*

Source: CC analysis based on GB cement producer supplied information.

TABLE 6 **Summary financial results for GB cement producers based on CCA basis (provisional findings approach with straight-line depreciation over 50 years) and calculation of ROCE thereon over the period 2007 to 2012**

	£m for profits and capital employed / % for ROCE						
	2007	*2008*	*2009*	*2010*	*2011*	*2012*	*Average*
Profit & loss account							
Profits before impairment	148	158	141	172	196	157	162
Impairment	48	–138	–211	5	71	–75	–50
Profits after impairment	196	20	–71	178	267	83	112
Balance sheet							
Capital employed before impairment	1,435	1,532	1,563	1,428	1,350	1,376	1,447
Capital employed after impairment	1,483	1,442	1,262	1,133	1,126	1,078	1,254
ROCE							
Before impact of impairment	10	10	9	12	15	11	11
After impact of impairment	13	1	–6	16	24	8	9

Source: CC analysis based on Table 5.

Notes:
1. Calculation of averages does not take account of the impact of changes in the value of money over the period of review.
2. Calculation of capital employed before impairment does not take into account the impact of changes in the value of money on the accumulated impairment charge.

Findings from the profitability analysis

54. Our best estimate of the profitability of the GB cement producers over the period of review (2007 to 2012) as set out in Table 4 results in an average ROCE of 13 per cent before impairment and 12 per cent after impairment.

55. We also present an alternative analysis of profitability in Table 6 which reflects a different approach to gross asset valuation, one which models a systematic calculation of impairment losses suffered by the cement producers over the period of review. This analysis results in an average ROCE of 11 per cent before impairment and 9 per cent after impairment.

56. As explained in paragraph 52, the approach to impairment reflected in the alternative analysis is a very different approach to assessing impairment losses to that being taken under the modified approach (reflected in our best estimate), where only those assets that are prematurely retired or which are treated as being impaired by the GB cement producers in the financial information provided to us are treated as impaired. Our view is that this latter approach reflects an excessively short-term view of the value of the long-lived assets used in cement production, and therefore would

significantly overestimate the extent of the impairment losses incurred by three of the four GB cement producers during the period of review.

Modelled results for each of the cement producers

1. Below we set out the modelled results for each of the GB cement producers. Any details applied when modelling the profitability of an individual cement producer are noted here.

Lafarge

2. The calculation of impairment losses here relates to the retirement of the Northfleet and Westbury works. Both these events have been wholly accounted for in 2008. Although the Northfleet works closure in 2008 had been long planned by Lafarge, the modelling approach taken generates an impairment loss for this plant.

3. As mentioned in paragraph 6 Lafarge provided us with an analysis of substantial recent investment over the period it had made in its Hope cement works (aimed at improving the efficiency and extending the economic useful life of the plant), in downstream blending facilities, in import terminals and in advanced packing facilities. We therefore added £[✂] to capital employed as at 1 January 2007 to cover this investment which covered a period of 2005 to 20012 over this period.

TABLE 1a **Profit & loss account and balance sheet for Lafarge over the period 2007 to 2012 based on HCA and CCA basis (modified approach)**

	Prepared on an HCA basis (all £m save volumes)						
	2006	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
Volumes							
Cement sales (Mt)		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker production (Mt)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
HCA profit and loss							
Revenues		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Costs excluding depreciation		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
HCA depreciation		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Subtotal		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Restructuring costs		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Impairment losses							
Carbon credits		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profit reflecting all costs incurred		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
HCA balance sheet							
Plant & machinery/AICC	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other fixed assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Net current assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Provisions	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Average of opening/closing balance		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	Prepared on a CCA basis (£m)						
	2006	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
CCA profit and loss							
Revenues		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Costs excluding depreciation		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
CCA depreciation (OCM)		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
CCA depreciation ('holding gains')		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profit before separately identified items		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Restructuring costs		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Impairment losses		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Carbon credits		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profit reflecting all costs incurred		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
CCA balance sheet							
Plant & machinery/AICC	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other fixed assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Net current assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Provisions	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Average of opening/closing balance		*[✂]*	*[✂]*	*[✂]*	*[✂]*	*[✂]*	*[✂]*

Source: CC analysis based on Lafarge supplied information.

TABLE 1b **Summary financial results for Lafarge based on CCA basis (modified approach) and calculation of ROCE thereon over the period 2007 to 2012**

	£m for profits and capital employed / % for ROCE						
	2007	*2008*	*2009*	*2010*	*2011*	*2012*	*Average*
Profit and loss account							
Profits before impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profits after impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Balance sheet							
Capital employed before impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Capital employed after impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
ROCE							
Before impact of impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
After impact of impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: CC analysis based on Table 1a.

Notes:
1. Calculation of averages does not take account of the impact of changes in the value of money over the period of review.
2. Calculation of capital employed before impairment does not take into account the impact of changes in the value of money on the accumulated impairment charge.

Hanson

4. Hanson has not permanently retired any of its cement assets although it did mothball one of the two kilns at Ketton in 2008. When modelling, a value of £40 million has been placed on this kiln to allow this element of expenditure to be modelled separately from the rest of the cement works which is assumed to be the age of the second kiln.

5. A similar approach was taken to the modelling of the asset values associated with the replacement kiln at Padeswood.

TABLE 2a **Profit and loss account and balance sheet for Hanson over the period 2007 to 2012 based on HCA and CCA basis (modified approach)**

	Prepared on an HCA basis (all £m save volumes)						
	2006	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
Volumes							
Cement sales (Mt)		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker production (Mt)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
HCA profit and loss							
Revenues		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Costs excluding depreciation		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
HCA depreciation		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Subtotal		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Restructuring costs		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Impairment losses							
Carbon credits		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profit reflecting all costs incurred		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
HCA balance sheet							
Plant & machinery/AICC	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other fixed assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Net current assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Provisions	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Average of opening/closing balance		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	Prepared on a CCA basis (£m)						
	2006	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
CCA profit and loss							
Revenues		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Costs excluding depreciation		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
CCA depreciation (OCM)		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
CCA depreciation ('holding gains')		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profit before separately identified items		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Restructuring costs		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Impairment losses		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Carbon credits		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profit reflecting all costs incurred		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
CCA balance sheet							
Plant & machinery / AICC	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other fixed assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Net current assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Provisions	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Average of opening/closing balance		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: CC analysis based on Hanson-supplied information.

TABLE 2b **Summary financial results for Hanson based on CCA basis (modified approach) and calculation of ROCE thereon over the period 2007 to 2012**

	£m for profits and capital employed / % for ROCE						
	2007	*2008*	*2009*	*2010*	*2011*	*2012*	*Average*
Profit and loss account							
Profits before impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profits after impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Balance sheet							
Capital employed before impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Capital employed after impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
ROCE							
Before impact of impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
After impact of impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: CC analysis based on Table 2a.

Notes:
1. Calculation of averages does not take account of the impact of changes in the value of money over the period of review.
2. Calculation of capital employed before impairment does not take into account the impact of changes in the value of money on the accumulated impairment charge.

Cemex

6. As mentioned in paragraph 47, during the period of review Cemex invested in a stand-alone grinding/import terminal at Tilbury. This cost around £50 million to build and was commissioned in 2008. We have therefore increased Cemex's capital employed to reflect this investment.

TABLE 3a **Profit and loss account and balance sheet for Cemex over the period 2007 to 2012 based on HCA and CCA basis (modified approach)**

	Prepared on an HCA basis (all £m save volumes)						
	2006	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
Volumes							
Cement sales (Mt)		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker production (Mt)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
HCA profit and loss							
Revenues		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Costs excluding depreciation		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
HCA depreciation		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Subtotal		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Restructuring costs							
Impairment losses							
Carbon credits		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profit reflecting all costs incurred		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
HCA balance sheet							
Plant & machinery/AICC	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other fixed assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Net current assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Provisions	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Average of opening/closing balance		*[✂]*	*[✂]*	*[✂]*	*[✂]*	*[✂]*	*[✂]*
	Prepared on a CCA basis (£m)						
	2006	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
CCA profit and loss							
Revenues		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Costs excluding depreciation		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
CCA depreciation (OCM)		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
CCA depreciation ('holding gains')		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profit before separately identified items		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Restructuring costs		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Impairment losses			[✂]				
Carbon credits		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profit reflecting all costs incurred		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
CCA balance sheet							
Plant & machinery/AICC	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other fixed assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Net current assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Provisions	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Average of opening/closing balance		*[✂]*	*[✂]*	*[✂]*	*[✂]*	*[✂]*	*[✂]*

Source: CC analysis based on Cemex supplied information.

TABLE 3b **Summary financial results for Cemex based on CCA basis (modified approach) and calculation of ROCE thereon over the period 2007 to 2012**

	£m for profits and capital employed / % for ROCE						
	2007	*2008*	*2009*	*2010*	*2011*	*2012*	*Average*
Profit and loss account							
Profits before impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profits after impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Balance sheet							
Capital employed before impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Capital employed after impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
ROCE							
Before impact of impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
After impact of impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: CC analysis based on Table 3a.

Notes:
1. Calculation of averages does not take account of the impact of changes in the value of money over the period of review.
2. Calculation of capital employed before impairment does not take into account the impact of changes in the value of money on the accumulated impairment charge.

Tarmac

TABLE 4a **Profit and loss account and balance sheet for Tarmac over the period 2007 to 2012 based on HCA and CCA basis (modified approach)**

	2007	*2008*	*2009*	*2010*	*2011*	*2012*
Volumes						
Cement sales (Mt)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker production (Mt)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
HCA profit and loss						
Revenues	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Costs excluding depreciation	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
HCA depreciation	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Subtotal	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Restructuring costs						
Impairment losses						
Carbon credits	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profit reflecting all costs incurred	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
HCA balance sheet						
Plant & machinery/AICC	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other fixed assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Net current assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Provisions	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Average of opening/closing balance	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
CCA profit and loss						
Revenues	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Costs excluding depreciation	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
CCA depreciation (OCM)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
CCA depreciation ('holding gains')	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profit before separately identified items	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Restructuring costs	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Impairment losses	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Carbon credits	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profit reflecting all costs incurred	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
CCA balance sheet						
Plant & machinery/AICC	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other fixed assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Net current assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Provisions	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total assets	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Average of opening/closing balance	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: CC analysis based on Tarmac supplied information.

TABLE 4b **Summary financial results for Tarmac based on CCA basis (modified approach) and calculation of ROCE thereon over the period 2007 to 2012**

	£m for profits and capital employed / % for ROCE						
	2007	*2008*	*2009*	*2010*	*2011*	*2012*	*Average*
Profit and loss account							
Profits before impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Profits after impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Balance sheet							
Capital employed before impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Capital employed after impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
ROCE							
Before impact of impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
After impact of impairment	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: CC analysis based on Table 4a.

Notes:
1. Calculation of averages does not take account of the impact of changes in the value of money over the period of review.
2. Calculation of capital employed before impairment does not take into account the impact of changes in the value of money on the accumulated impairment charge.

UK Competition Commission:

Consultancy Assignment: The estimation of the cost of procuring and building a new 1 million tonnes per annum clinker plant on a Brownfield site within the UK.

23rd September 2013.

Notice

Important Notice

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Contents

List of Abbreviations

CAPEX	Capital Expenditure Cost
OPEX	Operating Expenditure Cost
SNCR	Selective Non Catalytic Reduction
TPA	Tonnes per Annum
TPD	Tonnes per Day
TPH	Tonnes per Hour
VCM	Vertical Cement Mill
VSM	Vertical Spindle Mill
AF	Alternative Fuel
RDF	Refuse Derived Fuel
MBM	Meat and Bone Meal
SRF	Solid Recovered Fuel
EPC	Engineering, Procurement and Construction
SP 5/SP 6	Number of cyclone stages in a preheater / precalciner
C/K	The Cement to Clinker ratio = tonnes cement produced per tonne clinker used.
GGBFS	Ground Granulated Blast Furnace Slag
PSP	Processed Sewage Pellets
M & E	Mechanical and Electrical Supply
WHR	Waste Heat Recovery
SNCR	Selective Non Catalytic Reduction
FLS	F.L.Smidth, plant designer & equipment supplier
MSC	Multistage Combustion, a technique used in precalciner kiln processes to reduce NOx emissions.
UKCC	United Kingdom Competition Commission.
ICC	Independent Cement Consultants Ltd.
NOx	Nitrogen Oxides

Assignment Scope

The Assignment scope is to provide a range estimate of the cost a theoretical entrant into GB would have needed to incur to procure a 1 million tonnes per annum capacity clinker plant on a Brownfield site using the technology that this entrant would have purchased as at 1 January 2007.

For this theoretical plant it is to be assumed;

- That this entrant is able to find somewhere in GB with ready access to reserves of both limestone and the other raw materials required for cement making lasting 50+ years.
- The equipment would be procured from one of the major reputable European equipment suppliers such as FLS or Polysius on a turn-key basis.

A narrative explanation should set out what factors would tend towards a lower estimate and what factors would point to a higher estimate for such a plant. In addition, these range estimates should be supported by various curves, assumption explanations and expected percentage breakdown of costs for the various sub sections of an integrated cement plant

The estimated cost of the plant, which is to be calculated on a Brownfield basis should consider and comment on the costs of completing the necessary feasibility studies, etc... and the interest cost on expenditure incurred up to the point when the plant would be commissioned.

A further requirement would be to comment on typical costs of infrastructure projects to support a cement company's distribution and product strategies, such as an estimated cost for;

- Cement packing facilities
- Downstream blenders and blending of cement
- Rail links and depots
- Import facilities

Executive Summary

Background

The UKCC requested ICC to provide a range estimate of the cost a theoretical entrant into GB would have needed to incur to procure a 1 million tonnes per annum capacity clinker plant on a Brownfield site using the technology that this entrant would have purchased as at 1 January 2007.

In ICC experiences, it is quite complex to provide an estimated cost for a Brownfield site without firstly estimating the costs of a Greenfield site of a particular plant output required. Typical percentage factors can then be applied to a Greenfield cost estimate to arrive at an estimated Brownfield plant cost. This is the approach ICC has used to meet the project scope.

When providing such an estimate the following major issues need to be considered for any sensitivity analysis during UKCC financial modelling;

- There are no 2 plants exactly the same in the world. Even if the equipment design is exactly the same, the basic raw materials, the erection of equipment, operational and maintenance procedures will not be exactly the same. However, to manage these differences, industry benchmarking techniques can be utilised in order to make comparisons between different cement plants.

- When completing feasibility studies, ICC generally apply an accuracy rating of plus/minus 15% for any such estimate for a new kiln project.

- ICC believe it is prudent and good practice to allow for a contingency when estimating project costs, ICC use a figure of 10%.

- The cost of capital to fund the project will depend upon how the project is funded, E.g. via external loans or via internal resources, etc… Typical figures experienced by ICC for recent projects have been in the range of 5% to 10%. The cost of the debt incurred due to interest during the construction period has not been included in the total capital cost estimates.

- Reserves and Planning permission: Obtaining planning permission for a new kiln line at Brownfield/Greenfield sites is generally a lengthy and costly process (ICC has experience of such studies in complex cases which can amount between £15m-£30m). It is not straight forward to quantify these costs and they will vary significantly. All costs associated with obtaining planning permission, environmental permits, public consultations etc… are not included in the estimates as the variations of costs for this are significant, and strongly dependent on what was previously approved when the plant was originally built and the existing operational licenses. However, for the purposes of this estimate, ready access to reserves of both limestone and the other raw materials required for cement making lasting 50+ years is assumed.

- Exchange rates: A major part of the equipment would be paid for in Euros to the major equipment suppliers, which carries a risk in itself when paying for the

equipment over a period of 4 years. E.g. The Euro is currently worth around £0.841 compared with an average exchange rate of £0.684 in 2007. If the new line had been tendered in 2007 based upon Euros in 2007 then the project cost would be now be significantly higher in £ terms. The ICC capital cost estimate is based upon sterling estimates and the allowance of a plus/minus 15% accuracy factor for estimating capex will allow for some degree of currency exchange rate fluctuation.

- ICC used Independent Capex estimating methods to develop the Baseline Capex Model and assumed an exchange rate of 1 Euro = £0.87 and £1 = 1.61 US $.

- Typically a major project is depreciated over 25 years for the equipment items, with civil structures depreciated over 40 years. As long as a plant has the raw material reserves, and the equipment has been responsibly operated and maintained it is not unreasonable to consider extending this life. However, the original design life of a plant needs to be considered and the margin of safety factor that is incorporated into an original design to ensure contractual performance guarantees were met. It can be seen for the existing cement plants in the UK, many plants have experienced working lives beyond their original design life. It is also known that as the plant becomes older the maintenance costs increase, which pushes up the opex, as expensive major equipment items have to be replaced requiring lengthy maintenance shutdown periods. Due to these longer maintenance periods required, the number of available operating days for producing at a plant are also reduced. Expensive major equipment items could be;

  -Kiln: section, girth gear and kiln tyre replacements
  -Cement mill: main drive gearbox internals, mill shells/mill heads or trunnions
  -Coal and Raw mill: Gearbox Internals

- It should be remembered the cement industry is a heavy industrial process industry and the quality of the raw materials in close proximity and thus reducing transportation costs to a major population centre cement demand area offers strategic advantages for a business.

Capital Cost Estimate for a 1.2Mtpa Integrated Cement Plant

The estimated capital cost as of January 2007 for a Brownfield 1.2 Mtpa cement 100% new integrated cement plant is as follows;

-Capex for a complete new integrated cement plant without contingencies = £170.58m.

-Capex for a complete new integrated cement plant with 10% contingencies = £187.64m.

(ICC assumes 10% contingencies as standard but it should be noted that this figure may vary between 5% and 15% from experience with other studies and projects).

With an estimating accuracy of capital cost estimating being plus/minus 15% the likely range of Capex required for a complete new integrated cement plant would be within the following;

No contingencies = £144.99m to £196.16m.

With 10% contingencies, (which ICC consider that it would be sensible to use) = £159.49m to £215.78m.

This estimated cost is for the maximum investment case scenario where 100% new plant is required for the new line.

From ICC experiences with benchmarking Brownfield site projects, when comparing costs and options between Greenfield and Brownfield sites, a typical Brownfield cost would be around 80% of the Greenfield/Full plant cost.

With the assumptions made as outlined within this report, using the figure of £215.78m for a Greenfield site multiplied by an 80% factor would suggest that the capex figure for a theoretical Brown field plant should be below £172.62m.

Infrastructure Sub Projects Cost Estimate

When estimating the costs of new equipment and upgrading existing facilities there are a number of infrastructure sub projects that require consideration. Within this study, no major costs for these items have been included.

Downstream blenders and blending of cement

The C/K ratio of 1.2 used for this study is lower than figures which ICC has encountered from International new plant projects where the ratio has been as high as 1.6. The C/K ratio may be increased by blending PFA or GBFS off site. Typical cement blending mixers may be incorporated in Depot/Grinding plant designs and a purpose design blending plant with silos/mixers and road loading could cost around £4m- 15m at 2007 costs. Here again, the capital cost will vary significantly depending upon the type of storage systems, number of blended cements and transportation/loading facilities required.

Rail links and depots

Rail facilities vary from zero provisions to very sophisticated provisions at the existing UK Cement plants. The capital cost may thus vary significantly from around £5m to the £25m.

It may be worthwhile noting that capex for new plants overseas with large land mass, which also lack basic infrastructure within the country have cost more than this E.g. £30m plus.

Import facilities

Cement Import facilities vary significantly in size, cost and capacity and the type of storage employed. E.g. a Dome silo or Flat cement store, shipments and hence ship unloader size, road/rail loading systems for 40,000 – 60,000 tonne cement storage. These may cost anywhere between £6m and £20m at 2007 costs. It is also worth noting that some companies adopt a strategy of installing Cement milling equipment near to an import facility.

Other

The below sub projects have not been considered for the UK estimation, however, ICC has experience of working overseas in developing countries where there are sometimes other major infrastructure issues to consider such as;

The Power supply and National Grid to ensure continuity of supply.

Water supply to ensure the continuity of supply.

Road costs to link cement works to major towns.

Housing and facilities / amenities development for small villages or camps by remote cement plant locations for workers, etc...

Fuel pipelines for gas or oil.

Summary

The estimated cost and cost range of 1.2 Mtpa per year capacity integrated cement plant (1.0 Mtpa clinker) 2007 £m, can be summarised as per the below;

Estimate	0% Contingency	10% Contingency
Greenfield site estimate (£M)	£170.58	£187.64
Minus 15% accuracy	£144.99	£159.49
Plus 15 % accuracy	£196.16	£215.78
Brownfield site estimate (£M)	£136.47	£150.12
Minus 15% accuracy	£116.00	£127.60
Plus 15 % accuracy	£156.94	£172.64

Within this estimation, whilst packing facilities have been included, a number of infrastructure items have not been included, such as;

- Downstream blending facilities (estimated as £4m to £15m per facility)
- Rail links and depots (estimated as £5m to £25m)
- Import facilities (estimated as £6m to £20m per facility depending on size, capacity and type of storage)
- Financing costs (estimated as 5-10%)
- Obtaining planning permission for new kiln line / raw reserves (estimated for complex cases as £15m to £30m)

For this UK scenario, the estimate for a Greenfield site of minus 15% on Capex is highly unlikely. Hence the costs are more likely to be £187.64 m average and £215.78m maximum with 10% contingencies or £170.58m to £196.16m without contingencies.

Similarly for the UK scenario, Brownfield Site example, the minus 15% scenario is unlikely and so the costs would be more like £150.12m average and £172.63m maximum with 10% contingencies.

Capital Cost Estimate Breakdown 1.2Mtpa Greenfield Integrated Cement Plant

Within this estimate ICC has reviewed the equipment cost for a 100% new equipment integrated cement plant where there has been a previous cement plant in operation at the considered site.

Cost breakdown by major cost categories

The typical cost breakdown by major cost categories can be summarised as follows;

Cement mtpa	1.20	1.20
Clinker mtpa	1.000	1.000
Cement to Clinker ratio(*)	1.200	1.200
Contingencies %	Zero %	10%
Capex £m	£170.58	£187.64
M+E supply plus Basic Engineering	£[✂]	£[✂]
Civils-concrete, steel	£[✂]	£[✂]
Erection	£[✂]	£[✂]
Project team, training, general	£[✂]	£[✂]
Consultancy	£[✂]	£[✂]
Spares	£[✂]	£[✂]
Total check £m	£170.58	£187.64

*N.B. ICC has assumed a prudent figure of Cement to clinker ratio of 1.2. Within the UK, the UKCC has advised that the cement companies in the UK are between 1.1 – 1.3. It is worth noting that the major international cement companies normally have policies for maximising the use of additives within cements to maximise this cement to clinker ratio. The basic concept being that clinker is more expensive to produce than some additives or extenders that can be used when making cement. This can also be dependent on the regulations and standard requirements for the grades of cement that are required in different countries.

The above estimate does not include some unpredictable costs associated with a new plant where there has been no cement plant previously at the site being considered, such as;

- Land purchase for quarry and quarry plant
- Higher costs for planning and permitting, public consultations, public enquiries/exhibitions etc…
- Higher consultancy costs for expert witnesses etc…
- Cost of access roads, rail
- Higher site preparation costs / overburden removal / quarry face development, etc…
- Securing water and power supplies
- For new developments in remote locations, where the cost of housing and other amenities may be sometimes necessary

Cost breakdown by major unit operations

The approximate cost according to the major unit operations can also be estimated as per the below;

Process Section	No Contingencies	10% Contingencies
Quarries-Crushing, conveying	£[✂]	£[✂]
Raw materials/additives	£[✂]	£[✂]
Preparation of raw meal	£[✂]	£[✂]
Raw meal blending	£[✂]	£[✂]
Preparation of clinker including fuel	£[✂]	£[✂]
Clinker silo	£[✂]	£[✂]
Preparation of cement	£[✂]	£[✂]
Packing and shipping	£[✂]	£[✂]
Utilities	£[✂]	£[✂]
Spares	£[✂]	£[✂]
Consultancy	£[✂]	£[✂]
Project Team/Training/General	£[✂]	£[✂]
Total £m	£170.58	£187.64
Maximum +15%	£196.16	£215.78
Minimum - 15%	£144.99	£159.49

(N.B. this breakdown can vary significantly between different projects and depends upon the definitions for each unit and its interfaces).

Packing facilities vary according to the plant location and the range of cements produced. Provisions for Bulk, Bag and Road and Rail despatch are assumed in the Capex estimation. A typical Bulk to Bag ratio may be around 70:30 but this is very variable as is the proportion of bulk cement despatched by rail. This area of capital cost should not be underestimated. There can be situations in the industry where a packing plant is established at one site for two cement plants located in different towns. If the cement plant without a packing plant is then sold to another owner, major investment would be required to install a packing plant in order to be able to compete in the bagged cement market. Using the above sub section costs for packing and shipping with an accuracy of plus/minus 15% would provide reasonable estimates for this type of project.

For this UK scenario, the estimate of minus 15% on Capex is highly unlikely. Hence the costs are more likely to be £187.64 m average and £215.78m maximum with 10% contingencies or £170.58m to £196.16m without contingencies. There are a number of contributing factors for the minus 15% on Capex estimate not being likely, such as;

- Would international cement plant equipment suppliers see the UK market as a booming / attractive market for equipment sales in comparison to developing countries? Probably not and thus they would predictably be less hungry to reduce their profit margins during contract negotiations. Where in developing countries, it might be considered in order to win the second and third major equipment order.

- The cement industry in the UK is very mature with some plants having over 100 year's history. The majority of UK cement plants have already gone through expansion projects to try and utilise any excess production capacity.

Capital cost reduction methods by the reuse of an existing cement plant site, for a Brownfield site with a 1.2 mtpa integrated cement plant

In this theoretical case the investment for the Brownfield site is 80% of the cost of a full Greenfield site with a new integrated cement plant, which requires 100% new equipment (i.e. where the existing facilities do not have spare capacity to support extra output).

Therefore, the percentage factor which can be applied to a complete new plant cost estimate in order to obtain a realistic Brownfield site estimate will depend upon the bottlenecks/spare capacity within the existing plant facilities. This would require lengthy and detailed study and

calculations. However, in ICC experiences this percentage factor for a Brownfield cement plant can be typically 70% to 90% of the costs of the cost of a full plant on a Brownfield site.

There are limitations to Brownfield expansions, all too often Brownfield site expansions can be used as a mechanism to obtain additional capex to meet the plant management "wish list" of improvements which are desirable for improving the existing facilities, this can inflate the true costs of the capex for an expansion project. Tight financial control as well as "value engineering" is required to ensure that all new plant costs are justifiable. Weaknesses in the project feasibility studies may also fail to identify some bottlenecks where new plant is linked in with the existing plant. This can incur additional capital expenditure at a later date as these bottlenecks are eventually eliminated.

Accurate Brownfield costs can only be estimated from knowledge of what bottlenecks exist at the site. It may be necessary to include some expenditure of refurbishing the older plant for areas such as;

- Environmental improvements to meet tighter emission standards.
- The need to integrate new and old plant centralised control rooms, air, water and drainage services, power distribution, etc…
- It may be cost effective to add in modest amounts of capital to remove some bottlenecks with the existing plant if this secures higher capacity at an attractive £/tonne investment.

Other costs not included are the demolition and restoration of land formerly used for older lines. Again, these costs are very variable but for one recent Brownfield site project, the demolition cost was in the region of £300,000. The price fluctuation and thus the value of scrap steel can influence the costs of demolition significantly.

There are numerous possible scenarios that can be considered when predicting what would or could be included within a Brownfield project and each case really is site specific. To demonstrate the technique of estimating, ICC has offered an example project. In the following theoretical estimate, it has been assumed that;

- The additional clinker and storage capacity is increased by only 50% of the normal requirement in order to minimise initial investment costs.
- The existing well sized cement mills (E.g. the plant is not already cement milling restricted for the existing plant's clinker output) are retained with one new cement mill sized for 0.6 mtpa grinding capacity.
- Existing cement mills will be optimised to increase output and efficiency.
- The quarry crushing and conveying plant will work double shifts avoiding the need for new equipment.
- Additional conveyors and feed bins are required for the new raw mill but with no additional storage halls required.

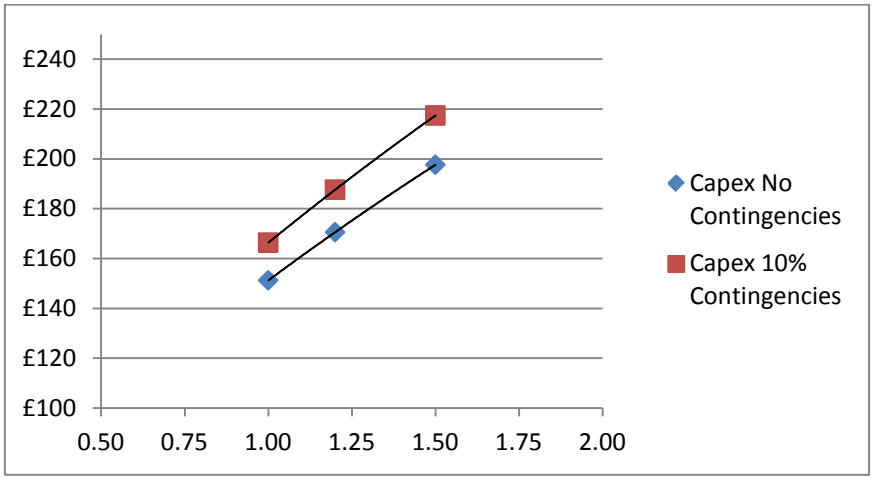
By using cost estimating techniques, it would be possible to estimate the following results;

- Capex without contingencies = £136.47m.
- Capex with 10% contingencies = £150.12m.
- Here again the estimating accuracy is no more than plus/minus 15%.

In this theoretical case the investment for the Brownfield site is assumed to be 80% of the cost of a completely new Greenfield plant installation.

Capital cost benchmarking different integrated cement plant capacities

In ICC experience over the years, a graph showing the typical cost (£m) versus capacity (cement mtpa) can be constructed based on actual costs of projects over the years. A sample of such curves is shown in the figure below;



Generally speaking the capital cost increases by a power law with higher capacity [✂].

[✂], E.g.;

- Cement 1.0 mtpa and capex £151.24 m without contingencies = £151/tonne cement.
- Cement 1.2 mtpa and capex £170.58m without contingencies = £142/tonne cement.
- Cement 1.5 mtpa and capex £197.64m without contingencies = £132/tonne cement.

Curves such as these are very helpful to identify the authenticity of any publically quoted or feasibility study estimates that are far out from the range expected.

Typical Project Timescale

The typical project implementation periods are taken as 24-28 months for a Brownfield site and 30-36 months per Greenfield site based upon the period from contract award to **completion** of commissioning. E.g. sometimes shorter periods of time are quoted in the media for producing first clinker, rather than the period required for a project to reach its full completion test certificate. This agreed achievement of the completion tests is the point in time when the EPC contractor hands over full responsibility of the plant to the new owner.

These time period estimates do not include the period for obtaining planning permission, conducting a public enquiry, etc… Shorter timescales are frequently reported for completing new projects but this may not be applicable in the UK scenario, with tighter planning and environmental controls in place in comparison to other countries.

Therefore based upon the 1.2 mtpa cement plant with 100% new plant supply, the schedule for investment has been based upon a 28 month period as follows (figures in brackets include 10% contingencies);

- Year 1= £76.76m (£84.44m).
- Year 2 = £68.23m ((£75.05m).
- Year 3 (4 months) = £25.59m (£28.15m).

- **Total = £170.58m (£187.64m).**

The cost of capital to fund the project will depend upon how the project is funded, E.g. via external loans or via internal resources, etc… Typical figures experienced by ICC for recent projects have been in the range of 5% to 10%. For the UK example, it would not be unreasonable to use the 10% figure. The cost of the debt incurred due to interest during the construction period has not been included in the total capital cost estimates above but sensitivity analysis when financial modelling should indicate the significance of the interest rates applied and to what proportion of the capital cost. E.g. 30% could be from internal funds, and 70% could be from external loans. These % values can differ significantly. This example of capital cost phasing is reasonable for use by the UKCC during their financial analysis of reviewing the financing costs of such a project.

Appendix A – Capital Cost Estimate General Assumptions

The capital costs ("capex") for modern cement making processes vary significantly and depend upon a wide range of factors. In order to provide realistic benchmarking figures, the following assumptions have been made;

- The altitude of the plant is no more than 400 meters above the mean sea level. Plants built at high altitudes are penalised in having higher investment costs per tonne output due to factors such as the higher specific process gas volumes/lower gas density associated with their location.
- The design and supply used for the full plant is to be based upon proven, reliable and efficient European contractors. The plant must comply with the latest European environmental standards for emission limit values (ELV's) as well as European safety standards.
- The capital cost estimates contained within this report are considered to be "budget" costs and are based upon averaging four different cost modelling techniques. The accuracy of all such "budget" estimates is not greater than plus/minus 15%. Actual costs will depend upon market conditions at the time of tendering.
- The Capital Costs are shown both with and without a standard ICC contingencies allowance of 10%.
- The costs estimates relate to costs applying in January 2007 as requested by the Competition Commission.
- Ground conditions are assumed to be good for supporting the foundations of the new plant. If ground conditions are poor, civil costs can increase significantly.
- Working capital is not included within any of the capital cost estimates.
- It is assumed that no purchase of land is required for the Brownfield plant expansion.
- Allowances are included for minimum essential working spare parts and first fill lubricants.
- The M+E supply cost includes an allowance for the plant supplier's basic engineering.
- The overall cost includes an allowance for consultancy costs plus some of the owner's team costs including training.
- Obtaining the raw materials reserves or completing the planning permission for a new kiln line at Brownfield/Greenfield sites is generally a lengthy and costly process. It is not straight forward to quantify these costs and they will vary significantly. All costs associated with obtaining planning permission, environmental permits, public consultations etc… are not included in the estimates as the variations of costs for this are significant, and strongly dependent on what was previously approved when the plant was originally built and the existing operational licenses. However, for the purposes of this estimate, ready access to reserves of both limestone and the other raw materials required for cement making lasting 50+ years is assumed.
- Power generation/waste heat recovery (WHR) is not included as this has not tended to be used within the new UK cement plants. With increasing energy costs and CO2 reduction considerations, the use of WHR may become more attractive in the future.
- Process Design Parameters;

- In order to minimise capital expenditure, single units are used for raw/cement/fuel milling with a single kiln line.

- An Air Separate precalciner kiln process with 5 preheater cyclone stages (SP5) process is assumed although the actual design is site specific and depends upon factors such as the raw material moisture content.
- Minimum Clinker output around 3,040 tpd annual average with a guarantee of at least 3,200 tpd assuming 90% annual average run time. The target run time is typically 87% to 90% but 90% has been assumed in order to minimise investment costs.
- High plant reliability is a prime design requirement.
- The average raw material feed moisture is assumed to be below 5% and the raw mix is assumed to have medium grindability and average combinability characteristics.
- The baseline plant capacity is 1.0 mtpa clinker with a cement to clinker (C/K) ratio of 1.2 producing 1.2 mtpa cement per annum. Please note that alteration of the C/K ratio has a significant impact upon plant total costs as it alters the relative size and cost of the clinker making and cement milling stages.
- It is assumed that there will be typically around 5 cements different produced in both bagged and bulk form with rail loading facilities.
- A kiln bypass system (10% design with operation around 5%) is included in order to allow for the burning of alternative fuels such as RDF/SRF whilst avoid build ups due to chlorine input.
- The plant design would be sufficiently sized to allow it to burn alternative fuels (AF) such as tyres, MBM, RDF etc in order to be competitive in terms of its cost of operating costs ("opex").
- The capital costs for AF storage, handling and firing are not included initially as this would have to be justified and permitted by a stage wise approach.
- Facilities would also be provided to allow operation with up to 100% coal or petroleum coke firing.
- Cement sales – the seasonality of cement sales is assumed to be around 18% average and so it is not necessary to oversize the cement milling system for peak demand periods. Cement grindability is assumed to be average.
- Clinker storage is 14 days with 10 days cement storage.
- The pyritic sulphur content of the raw materials is sufficiently low so that an SO2 scrubber is not required for the main exhaust gases. NOX reduction – the use of Multistage Combustion and SNCR (Selective Non Catalytic Reduction) are allowed for.
- The plant location is close to the quarry avoiding long overland conveyors. Quarrying costs allow for the raw material crushing and conveying but not contractors mobile plant.
- Adequate road, rail and power supplies are located close to the cement plant.
- The baseline case is a Greenfield site and it is assumed that the new line requires standalone facilities i.e. the existing plant do not have surplus storage or milling capacity.
- The capital cost of many Brownfield site projects may be typically 70% to 90% of the cost of an equivalent Greenfield site and so this scenario has been shown as an example. Actual Brownfield site costs vary significantly worldwide depending upon whether or not the existing plant is retained, modified or replaced.

- VAT is not allowed for in the ICC Capital Cost estimates.
- The basis for ICC capital costs is £ Sterling but note that exchanges in the Euro/Sterling exchange rate make it difficult to estimate 2007 costs accurately. Hence ICC has assumed an estimating accuracy no greater than plus/minus 15%.
- The cost of capital is assumed to be typically 5% to 10% of the total capex.

- Depreciation of the plant would be based upon a 25 year life. Actual plant life will depend upon raw material reserves, the financial viability of future modernisation, the design standards a plant was built to and how well the plant is operated and maintained.
- CO2 allocation – There are no allowances included for the costs associated with the right to buy CO2 emissions under the EU ETS Phase 111 scheme. The benchmark of 0.766 kg CO2 per tonne clinker would require the plant to maximise the use of bio fuels and achieve efficient operation. Hence facilities to store transport and fire bio fuels such as MBM, PSP or partial bio fuels such as RDF/SRF would need to be sought in order to reduce CO2 emissions.
  (N.B. The CO2 allocation figures have changed since 2007).

Appendix B – Further factors affecting the Capital Cost of a new Brownfield Cement Plant

Increases

The following list is not an extensive list but highlight additional potential reasons for capital cost estimates for completing projects being beyond expected limits; [✂].

Decreases

The following list is not an extensive list but highlight additional potential reasons for capital cost estimates for completing projects being below expected limits; [✂].

Estimating the customer detriment arising from the AECs in cement

Introduction

1. This appendix sets out our approach to estimating the customer detriment due to the AECs in cement. We used two different approaches to quantify the customer detriment arising from high cement prices:

   (a) profitability-based approach, and

   (b) estimate of the customer detriment based on comparing average cement prices and a benchmark price that would prevail in a well-functioning market ('cost-based approach').

2. Our results are the following. Using the profitability-based approach, we estimate the annual customer detriment from high cement prices to be of the order of £30 million per year on average for the period 2007 to 2012. For the reasons set out in paragraph 6.84, we think that this estimate of the customer detriment substantially underestimates the harm to customers that would be avoided by the introduction of effective measures to remedy the Coordination AEC, because the period that we have investigated includes a very severe and prolonged economic downturn.

3. Using the cost-based approach, we find a total customer detriment of £92 million in 2011. However, as a result of some of the assumptions used to estimate this customer detriment, we think this is likely to be an overestimate of the customer detriment.

4. For these reasons, we use the profitability-based estimate of the customer detriment as our baseline estimate for the customer detriment arising from the AEC in our proportionality assessment, bearing in mind that this is likely to be a significant underestimate of the customer detriment.

Estimate of the customer detriment in cement using the profitability approach

5. In paragraphs 8.271 to 8.273 of the provisional findings, we provided one estimate of this customer detriment by reference to our analysis of the profitability of GB cement producers.[1] As set out in Appendix 1, we received extensive comments on the profitability analysis in our provisional findings. We also obtained an independent expert view on the approach we had applied to analysing cement profitability and commissioned a report about the cost of a new cement works from an independent cement consultancy. As a result of both the comments of the GB cement producers and the advice we ourselves commissioned we have adjusted our approach to analysing and positioning the profitability of the GB cement producers in some important respects. We have also updated the analysis to include the 2012 information about the financial performance of the GB cement producers. The results of our updated analysis of the profitability of GB cement producers are presented in Appendix 1.

6. Having updated our profitability analysis, we updated our estimates of the customer detriment arising from high cement prices using the profitability approach. We set out in this section our calculations of the customer detriment based on the profitability approach.

7. Table 1 below is based on Table 4 of Appendix 1. We have calculated the excess industry return as the industry return (after impact of impairment), as estimated in Table 4 of Appendix 1, less a cost of capital of 10 per cent. This cost of capital represents the midpoint of our estimate of the GB cement producers' cost of capital, as set out in Appendix 4.2 of the provisional findings. Excess industry profit in each year is excess profitability in that year (after impact of impairment) multiplied by

[1] We subsequently corrected an error in this analysis; see the announcement published on our website on 01/08/13: www.competition-commission.org.uk/assets/competitioncommission/docs/2012/aggregates-cement-and-ready-mix-concrete/notice_cc_corrects_detriment_estimate.pdf.

capital employed in that year (ie total net assets after impairments). Excess profit per tonne is excess profit divided by cement sales. This is our estimate of the overcharge in cement prices using this methodology.

TABLE 1 **Estimate of excess profits of the GB cement producers based on profitability**

	2007	*2008*	*2009*	*2010*	*2011*	*2012*	*Period average*
Total net assets after impairment (£m)	1,259	1,252	1,237	1,213	1,165	1,118	1,207
Profits after impact of impairment, based on continuing costs of supply (£m)	150	84	145	170	195	157	150
Profits / average capital employed (%)	11.9	6.7	11.7	14.0	16.7	14.0	12.4
Cement sales (m tonnes)	12.2	10.5	7.8	8.1	8.7	8.4	9.3
Excess industry return (%)	1.9	–3.3	1.7	4.0	6.7	4.0	2.4
Excess industry profit (£m)	24.1	–41.2	21.3	48.7	78.5	45.2	29.4
Excess profit per tonne (£)	2.0	–3.9	2.7	6.0	9.0	5.4	3.2

Source: CC, based on Table 4 of Appendix 1.

8. The estimated excess profit per tonne varies considerably from year to year. We have calculated excess profit per tonne based on average capital employed across the period, average industry return across the period and average annual cement sales across the period. This results in an average excess profit per tonne of £3.20, or an average excess industry profit of £29.4 million per year for the period 2007 to 2012.

9. We therefore estimate the annual customer detriment from high cement prices to be around £30 million per year for the period 2007 to 2012, using the profitability approach. We note, however, that the period during which we calculated this customer detriment includes a very severe and prolonged downturn, and therefore substantially underestimates the harm to customers that would be avoided by the introduction of effective measures to remedy the Coordination AEC. This is discussed further in paragraph 6.84.

Estimating the competitive price of cement from cost and demand data

10. In this section, we seek to estimate the customer detriment using another method, namely by comparing the average cement prices and the cement price that we would

expect to observe under effective competition. We refer to this difference as the overcharge in cement. To do this, we aimed to establish a benchmark price that would prevail in a well-functioning market and compared that benchmark price with the actual price of cement. The difference between the benchmark price and the actual price allowed us to quantify some aspects of the customer detriment in cement.

11. To establish our benchmark price, we have derived a competitive supply curve of cement. The competitive supply curve is derived from producers' costs of supplying cement. In a well-functioning market, the interaction of competitive supply and demand would be expected to establish a market-clearing, competitive price of cement.

12. We find a benchmark price for 2011 of about £69.50 per tonne, around £10.50 less than the average price of a tonne of cement in 2011. Based on 8.78 million tonnes of cement sold in GB in 2011, an overcharge of £10.50 per tonne translates to a customer detriment of £92 million in 2011.

The approach

13. In this appendix our aim is to estimate the *overcharge* in cement, ie the difference between the average price of cement in GB cement markets and the price of cement under effective competition. We aimed to establish a benchmark price that would prevail in a well-functioning market, and compared that benchmark price with the actual price. The difference between the benchmark price and the actual price allowed us to quantify some aspects of the customer detriment in cement.

14. Coordination may have an impact on any dimension of competition, including price and output levels, the scope of firms' geographic operations, investment or

innovation.[2] The overcharge measures only the impact on price due to coordination and thus may not capture the full customer detriment due to coordination. It does not take into account losses from any output reduction associated with higher prices.[3] Neither does it measure any longer-term or dynamic aspects of customer detriment, for example due to reduced investments in efficient production technology or reduced investments in research and development.

15. In our approach to estimating a benchmark price for cement we took existing cement works' capacities and costs as given. We used data on capacities and costs to derive a competitive short-run supply curve of cement. Between them, the supply curve and the demand for cement will pin down a market-clearing price of cement. Since the supply curve was derived based on the assumption of cement suppliers acting competitively, the market-clearing price gives a reasonable indication of what would constitute a competitive price of cement. The cement overcharge was the difference between the benchmark price and the actual price.

16. We used data on 2011 costs, capacities and demand to estimate a benchmark price and compared this with the 2011 weighted average price. Our reasons for using 2011 data were the following:

(a) it is the most recent year for which detailed data on prices, costs and capacities are available to us; and

(b) after several years of large changes in demand and supply conditions (2008 and 2009), demand and supply conditions stabilized in 2010 and 2011. Indeed, the demand for cement declined sharply between 2007 and 2009.[4] This resulted in

[2] The Guidelines, paragraph 241.
[3] When the price is higher than in a well-functioning market, the most price-sensitive customers refrain from buying cement. Some of these customers may have bought more cement at the competitive price. These forgone sales represent a customer detriment which is not captured by estimates of the overcharge. The customer detriment due to forgone sales could in principle be estimated if the elasticity of demand for cement in GB were known. Due to the absence of reliable estimates of the elasticity of demand for cement in GB we have chosen not to estimate customer detriment due to forgone sales. However, the demand for cement is likely to be relatively inelastic, which means the customer detriment due to forgone sales will be limited.
[4] See the provisional findings, Figure 2.3.

GB cement producers closing or mothballing cement production capacity in 2008 to 2010.[5] In 2011, supply conditions appeared to be stable, and we also note that demand for cement stabilized in 2010 and 2011.

17. Hanson told us that restricting analysis to use of 2011 data would limit the analysis very significantly and unacceptably. It submitted that by using 2011 data, the analysis omitted the financial distress experienced by the GB cement producers and the competitive actions they took to remove capacity during the recession. It also told us that cement producers would be expected to try to recover some of these impairments through pricing during 2011. Our reasons for using 2011 data are set out above in paragraph 16. We note that this is one of two approaches to estimating the customer detriment, and that the profitability-based estimate of the customer detriment (as set out in paragraphs 5 to 9) takes into account the whole of the period 2007 to 2012 and would therefore take account of the years with lower demand and actions to remove capacity by the cement producers.

18. We begin by describing the assumptions we made to derive a competitive supply curve and the data upon which we based our estimate of the supply curve. We then describe how we constructed a demand curve and an equilibrium to arrive at a competitive price.

Deriving a competitive supply curve

19. In order to derive a competitive supply curve we made the following assumptions:

(a) one-shot outcome, ie no scope for repeated interaction to influence behaviour;

(b) firms are price takers;

[5] See the provisional findings, Appendix 7.2, Table 11.

(c) one plant's production decision does not take into consideration its effect on other plants (ie plants act as if they were all operated by distinct firms, each firm caring only about its own profit); and

(d) firms do not engage in price discrimination.

20. Assumptions *(a)* to *(c)* capture the competitive nature of the market we use to establish our benchmark competitive price. Assumption *(d)* simplifies our analysis. However, we would expect the scope for price discrimination to be limited in a competitive market, as prices for all customers would tend towards the market-clearing level.

21. The first assumption was made to rule out repeated interaction. If repeated interaction were considered, there may be scope for coordination. Such outcomes would not be informative about the competitive price.

22. Assuming firms to be price takers allowed us to identify a competitive outcome.[6] Given plants' fixed and variable costs, we determined whether or not a given plant would be active at a given price. Since we assumed that firms would not engage in price discrimination, there was only one price that had to be taken into consideration. This simplifying assumption enabled us to derive the amount of cement that would be supplied at a given price.

23. In addition to assumptions *(a)* to *(d)* above, we assumed for the purpose of exposition that there was no geographic differentiation between cement works. We maintain that assumption for the purpose of explaining the basics of this approach.

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[6] We do this using a *tâtonnement* process. A tâtonnement process is a process for finding a competitive price. A hypothetical auctioneer announces a price. Each producer states the quantity they would be willing to supply at that price, and each buyer announces the quantity they would be willing to buy at that price. If there is an imbalance between supply and demand, the price is not market clearing and the auctioneer announces a revised price. The process stops when supply and demand balance.

We then relaxed this assumption to allow for a specific type of geographic differentiation. We describe the approach we took to dealing with geographic differentiation in the subsection titled 'Dealing with geographic differentiation' in paragraphs 42 to 48.

24. In this analysis, we assume that, absent coordination, cement producers would behave as price takers and would thus not be able to act strategically or exercise unilateral market power. In reality, GB cement producers may have a degree of unilateral market power even in the absence of coordinated behaviour. If this were the case, the price that would prevail absent coordination may be higher than the price we estimate here.[7]

Individual plants' supply decisions

25. The assumptions *(a)* to *(d)* above are in themselves not sufficient to derive a supply curve for cement. In addition, it was necessary to assess whether or not each individual plant would be active at a given price, and the volume that active plants would supply at that price. According to assumption *(c)* above, each plant decides independently whether or not to supply. We note that cement plants are capacity constrained, and took the view that they will supply when the price of cement exceeds an appropriate measure of the plant's costs. This subsection describes how we reasoned about individual plants' supply decisions. In particular, it sets out which costs we considered relevant in these decisions.

[7] The assumptions that plants operate independently and that there is no geographic differentiation could also diminish the degree of unilateral market power exhibited by market participants in the model. Since the assumption that firms are price takers already rules unilateral market power out, the assumptions of independence and lack of differentiation are unlikely to make a difference. Only if the assumption of price-taking behaviour were relaxed would the assumptions of independence and lack of differentiation matter in terms of the degree of market power displayed in the model.

26. For this analysis, we relied to a large extent on the same data as the analysis in Appendix 6.5 in the provisional findings. We therefore adopted the same terminology with respect to costs as in Appendix 6.4 of the provisional findings:

(a) Distribution costs are the distribution and haulage charges paid by customers for delivery of the goods from the seller's sites to the customers' job sites.[8] Distribution costs do not include the costs of transporting goods or raw materials between a seller's sites. The costs of transporting goods or raw material between a seller's sites are included in the variable cost, as described below.

(b) Variable costs are those costs that necessarily vary in line with small changes in production volumes (and to a lesser extent, sales volumes) during a normal production run at an active production site. A key assumption underpinning our definition of variable costs is that changes in production take place within existing production capacity limits, such that production could be increased without necessitating any further investment into plant or equipment. Our definition of variable costs thus excludes large step-changes in cost associated with increasing capacity or bringing mothballed capacity back on stream.

(c) Fixed costs are the converse of our definition of variable costs, ie costs that do not necessarily change in line with production or sales volumes. We subdivided fixed costs into the following subcategories:

(i) site fixed costs;

(ii) divisional fixed costs;

(iii) central costs; and

(iv) depreciation and amortization.

[8] As far as possible, we have used charges paid by customers to cement producers as a proxy for the distribution cost. In the case of Hanson and Tarmac we used actual distribution costs, since these producers did not explicitly charge customers for haulage. We believe delivery charges are a reasonable measure of distribution costs since we do not believe haulage to be a profit centre. If cement producers are in fact making a positive margin on haulage, we would be over-estimating the distribution cost. This, in turn, would lead to an over-estimate of the competitive price and an under-estimate of the overcharge in cement.

27. A price-taking firm's decision about whether to produce at a plant or not depends on the plant's costs and the prevailing cement price. In deciding whether to produce or not, an operator of an existing plant will not take sunk costs into consideration since these costs have by definition already been incurred or will be incurred regardless of whether the plant is used for production or not. We considered any central or divisional fixed costs as being sunk for the purpose of this analysis. If variable costs and site fixed costs are covered at the prevailing price, there will be a positive contribution to central or divisional costs. Foregoing this contribution would not be rational. We also considered depreciation and cost of capital as being sunk for the purpose of this analysis, since these costs would be incurred regardless of whether the plant were used for production or not.

28. We defined a plant's operating costs to include the plant's site fixed cost, the plant's variable cost and the cost of distributing the plant's output (ie distribution cost). The operating cost thus excludes divisional and central fixed costs, depreciation and cost of capital. The operating cost excludes costs which are avoidable only in the long term and are therefore considered sunk. The operating costs are thus the relevant costs in deciding whether to use a plant or not in the short term.

29. A plant's unit operating cost is operating cost divided by output. Unit operating cost obviously depends on a plant's output. Unless otherwise stated, our convention has been to calculate unit operating cost based on a plant's maximum output, ie when operating at full capacity. We employ this convention because the unit operating cost calculated based on a plant's maximum output is the lowest price at which it could at all be rational to have the plant in operation.

30. If the market price of cement is too low to even cover a plant's operating costs (ie total site cost less depreciation and cost of capital, which are sunk), it will be rational

to close or mothball the plant. If the market price is sufficiently high for a plant to cover its operating costs, it will be rational to operate the plant. This will be the case even if the price is not high enough to cover the plant's sunk costs, since those costs would not decrease even if the plant were to be mothballed.

31. For the purpose of deriving a supply curve, we thus assumed that each plant would be prepared to supply up to its capacity as long as the price was sufficiently high to cover the plant's operating cost.[9,10]

Demand

32. For the purposes of this analysis, we took the demand for cement as given and equal to realized GB demand in 2011. This simplified the analysis somewhat and also reflected the fact that cement demand is likely to be relatively inelastic.[11] However, we recognized that this assumption could have implications for our conclusions: a more elastic demand curve will, in general, contribute to establishing a higher benchmark price. A higher benchmark price will in turn result in a lower estimate of customer detriment due to prices. On the other hand, a more elastic demand curve will mean that there is a larger customer detriment arising from higher prices due to lower volumes being sold as a result of these higher prices (see paragraph 14 above). Therefore, the effect of a more elastic demand on the overall estimate of customer detriment is not clear-cut: the direct price effect is likely to be less, but the effect due to lower volumes being sold will be higher.

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[9] Note that this is not equivalent to a plant always being active when the price is above the plant's unit operating cost (as calculated based on the plant's maximum output). It could be that the plant is not in a position to sell more than a fraction of the quantity the plant could produce, in which case the plant would be able to cover its operating cost only if the price were above unit operating cost as calculated based on the plant's maximum output.

[10] For a plant to be able to commit to not selling at any price which covers operating cost, it would need some degree of unilateral market power. This assumption is thus not independent, but rather a consequence of the assumption that firms are price takers.

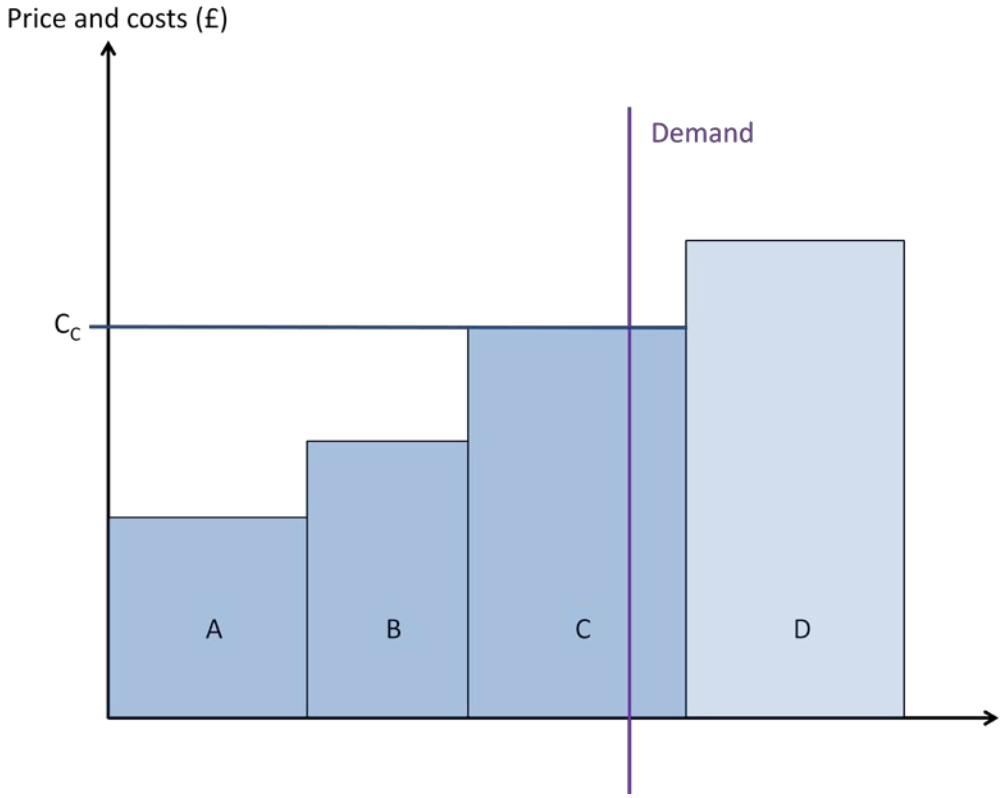
[11] Cement is an intermediate good; it serves as an input to various construction projects, has very few substitutes and the cost of cement represents only a relatively small proportion of the final price of such projects. Therefore, the demand for cement is unlikely to respond much to changes in prices of cement.

33. We maintained the assumption of given demand in our analysis, and chose to discuss the implications of this assumption when assessing our results. Our analysis of how the conclusions change when demand is more responsive to changes in price is in Annex D.

34. Once we had constructed a demand curve, we calculated the market-clearing prices. This is illustrated in Figure 1. The demand curve is shown as a vertical line in the figure, and the supply curve is pictured as a sequence of blocks denoted A–D. Each block corresponds to a production plant. The width of a block represents the corresponding plant's capacity and the height of a block represents the corresponding plant's unit operating cost. In the figure, it can be seen that the price would have to be above the unit operating cost of plant C in order for the market to clear. At any lower price, there would be too little cement to meet demand. It can also be seen that if the price were to exceed the unit operating cost of plant D, then plant D would have an incentive to produce and there would be excess supply.

FIGURE 1

A supply curve, a demand curve and the marginal plant



Source: CC.

35. We refer to the least efficient plant that has to operate in order to fill demand as the marginal plant. In the figure, plant C is the marginal plant.

36. Since cement producers' production capacities are limited, prices can rise above the marginal plant's unit operating cost due to customers competing for limited quantities. On the face of it, such situations appear to be non-competitive in the sense that firms are selling at prices above marginal or average incremental cost. This would seem at odds with price competition—usually one would expect there to be an incentive to gain additional business by under-cutting rivals' prices. However, this assumes that firms can expand output without incurring high incremental costs. If all plants are operating at full capacity, this is clearly not the case. Thus, no plant would have an incentive to expand its output and thereby depress the market price.

37. This shows that the marginal plant's unit operating cost is only a lower bound on the market-clearing price. If we identify the marginal plant for the GB cement market, we can use cost data for this plant to estimate a lower bound for the competitive price of cement.

38. The set of prices that can be supported by a competitive outcome in a given market configuration is bounded from above by the cost of bringing additional capacity online.[12] In the figure, plant D represents idle capacity which would be brought online if the price were to rise sufficiently.

39. Additional capacity can be brought online in many ways: de-mothballing of a moth-balled plant, expanding the capacity of an existing plant (eg *debottlenecking*), or building a new plant. In addition to this, imported cement or imported clinker ground in GB could also act as a form of entry. Imported cement is different from other types of entry as an importer's capacity does not come in discrete increments to the same extent as domestic producer's capacity. Whether the upper bound is given by imports, de-mothballed capacity or new capacity depends on which the marginal plant is and which mothballed capacity exists.

40. Since capacity comes in 'lumps' and we assumed that demand is given, it will in general not be possible to have an exact match between demand and supply. If demand is such that the marginal plant can only sell a small fraction of its potential output, it would not be economically rational to keep the plant operational unless the cement price is far above the plant's unit operating cost.[13] If the marginal plant has to supply a volume close to its capacity in order to satisfy demand, we will use the

[12] This is subject to the caveat in paragraph 31.
[13] There is also a more theoretical point related to existence of equilibrium. Unless we assume that plants get to serve customers according to efficiency, ie the most efficient plant gets to sell all its output before the second most efficient plant gets to sell etc, it would be the case that all plants that can economically supply at a given price will want to produce at capacity. This would lead to supply and demand not balancing. An assumption that plants get to serve customers in order of efficiency might be unrealistic outside a very structured, auction-like setting. In a structured setting such behaviour might arise in equilibrium.

marginal plant's unit operating cost as an indicator of the lower bound on the competitive price.

41. Cement imports may be used to fill any gaps between supply and demand if domestic supply is not well matched to domestic demand. Another alternative would be for GB suppliers to operate the marginal plant at or close to full capacity and export any excess cement. Given that GB producers' exports are very limited, the latter option seems less plausible. A third possibility is that all plants operate at slightly lower capacity and the price is slightly above the unit operating cost of the marginal plant.

Dealing with geographic differentiation

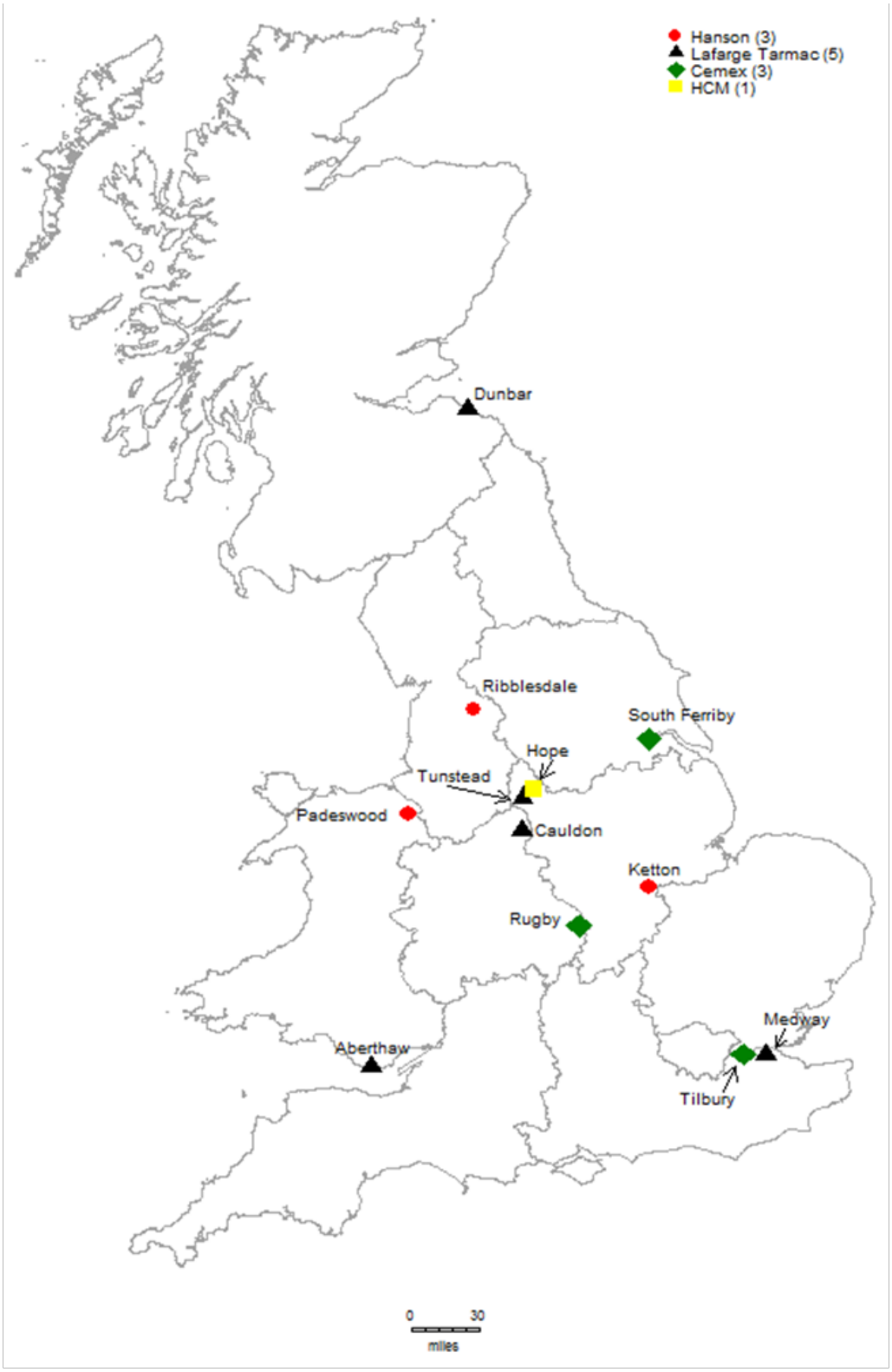
42. The cost of transporting cement represents a meaningful fraction of the price a customer pays for the product. We therefore considered how best to reflect differentiation between cement works in terms of geographic location and other aspects of logistical efficiency in identifying a benchmark price.

43. Figure 2 shows that most cement plants are located in a fairly small geographic area, with Lafarge's Dunbar and Aberthaw being exceptions. The latter are located in southern Scotland and southern Wales, respectively. We have captured this geographic differentiation by assuming that these plants will sell in their local areas (Scotland and Wales),[14] and that any residual capacity at these plants can then be used to supply England. We have also estimated the cost of supplying cement into England from these plants.

[14] Dunbar sold [✂] per cent of its output in Scotland in 2011. Aberthaw sold [✂] per cent of its output to Wales in 2011.

FIGURE 2

Map of the Majors' cement plants in the UK, 2012



Source: Top 3 cement producers (FY11 transactions data).
Note: 'Medway' represents a site where Lafarge Tarmac has planning permission to construct a new 1.4 Mt cement plant. 'Tilbury' is a stand-alone grinding station, which is owned by Cemex.

44. The reason for focusing on the price of supplying cement to England is that England accounts for about 88 per cent of GB cement consumption. To assess customer detriment, we compare our estimated benchmark price to a volume-weighted average of the GB cement price.[15]

45. Effectively, we allocated some capacity at each cement works to Scotland and Wales. This mainly affected the Aberthaw, Ribblesdale, South Ferriby and Dunbar cement works. Capacity which had not been allocated to Scotland and Wales could be used to supply England. We called the capacity which has not been allocated *effective capacity*. GB cement works capacities and effective capacities are found in Annex A.

46. Hanson told us that it considered our approach of calculating the effective capacity in England to be artificial and that it did not reflect market reality. Hanson submitted that it commonly engaged with customers on a national basis, that the stylized approach ignored the varying role that importers played in different regions of the country, and that the approach was inconsistent with the CC's view of a national geographic market for cement. Our reason for not including importers in this analysis was that we found that these operated at higher unit costs than the GB cement producers[16] (and therefore, in the competitive equilibrium we derive, we would not expect imports because the competitive price of cement would not be sufficiently high for importing to be profitable). Our approach of modelling the demand for cement in England took into account the fact that the costs of transporting cement into England from plants located in Scotland and Wales may be relatively high, and was therefore done in

[15] Estimating the overcharge by subtracting the benchmark price for England from the GB-wide weighted average is an approximation. A more comprehensive approach would have been to estimate benchmark prices for England, Wales and Scotland, calculate the weighted average of these benchmark prices and then subtract the result from the actual GB-wide average. We have only estimated the price that would prevail in England in a well-functioning market. If the benchmark prices for Scotland and Wales were equal to the benchmark price for England, subtracting the benchmark price for England from the actual GB-wide weighted average does not introduce an error into the overcharge estimate. We note that the gain in precision from following the more comprehensive approach is limited. By way of example, if the benchmark price for England were £70 per tonne and the benchmark prices for Scotland and Wales were £77 per tonne, the error introduced by our approximation is less than £1 per tonne. This is due to the large weight given to England in the weighted average.
[16] See the provisional findings, Appendix 7.5.

order to take into account a degree of geographic differentiation between different cement plants. We do not think that this is inconsistent with a GB geographic market.

47. We were concerned that the distribution cost would not properly reflect the costs faced by the Dunbar and Aberthaw works when serving customers in areas outside Scotland and Wales, respectively. For this reason we imputed revised distribution costs to these plants. Costs and imputed distribution costs are found in Annex B.

48. Figures relating to demand for cement and the residual demand (ie demand once certain quantities have been allocated to Scotland and Wales) are in Annex C.

Results

49. Table 2 shows unit operating cost and effective capacity to supply England of all GB cement works. The cement works have been ranked in ascending order according to unit operating cost, which means that the most efficient plant appears at the top of the table and least efficient plant appears at the bottom of the table. The table also shows cumulative capacity. For a given cement works, the cumulative capacity is calculated by summing the effective capacities of all plants which are at least as efficient as the cement works in question. Comparing the table with Figure 1, the cumulative capacity on the row of a given plant corresponds to the total capacity of the plant and of all plants to the left of the plant. Annex B sets out how we arrived at unit operating costs and Annex A sets out how we arrived at effective capacities.

TABLE 2 **Unit operating costs and effective capacities to supply England of GB cement works**

			tonnes/year
Plant	*Unit operating cost*	*Effective capacity*	*Cumulative effective capacity*
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]
[✂]	[✂]	[✂]	[✂]

Source: GB cement producers' profit and loss data, GB cement producers' replies to market questionnaire, CC calculations.

50. We have defined the marginal plant as the least efficient plant that has to be active to fill demand. The marginal plant is thus found by comparing residual demand to cumulative effective capacity. We have used a residual demand of 7.7 million tonnes, see Annex C. It follows from Table 2 that [Plant 1] is the marginal plant. [Plant 2] and all plants more efficient than [Plant 2] have an effective capacity of less than 7.7 million tonnes per year. This means that these plants do not have sufficient effective capacity to fill residual demand and that the market-clearing price must be above £63 per tonne. [Plant 1] and all plants more efficient than [Plant 1] have a cumulative effective capacity of just over 7.7 million tonnes per year, which is just sufficient to fill the residual demand of 7.7 million tonnes per year. This implies that the market-clearing price must be at least £66.60 per tonne. If the price were to rise above £69.50 per tonne, [Plant 3] would have an incentive to produce cement. This would create a situation where there is more supply than there is demand. A price above £69.50 per tonne would thus not be market clearing. It follows that the market-clearing price is in the range of £66.60 to £69.50 per tonne, since the plants that will be supplying cement when the price is in this range have sufficient capacity to fill demand.

51. The conclusions of our analysis could potentially change if the [✂] kiln at [Plant 4], [✂]. We therefore considered it likely that cement prices would have to increase significantly to make it rational for [✂] to [✂] kiln [✂].

52. We noted in Annex A that [Plant 5's] variable cost of serving areas outside [✂] may in fact be higher than indicated by Table 2. As [Plant 5's] unit operating cost is considerably below those of [Plant 1] and [Plant 3], [Plant 5's] variable cost could rise considerably before the outcome of our model is affected.

53. We noted above that our assumption of given demand could affect our conclusions. Annex D of this appendix deals with this issue. The analysis in Annex D shows that a scenario where [Plant 3] is active and the benchmark price is close to £69.50 per tonne is consistent with a reasonable degree of elasticity of demand. In a scenario where [Plant 1] is the marginal plant, demand for cement would have to be very inelastic for supply and demand to balance. We therefore considered this scenario less plausible.

54. GB producers' average price of cement in GB was approximately £80 per tonne in 2011.[17] A benchmark price of £69.50 per tonne suggests that the overcharge was around £10.50 per tonne in 2011. Based on 8.78 million tonnes of cement sold in GB in 2011, this translates to a customer detriment due to elevated prices of £92 million in 2011.[18]

55. We also note that that price of £69.50 per tonne represents the lowest price at which [Plant 3] would be operating. The plant would be prepared to supply at any price above £69.50 per tonne. If demand is sufficiently elastic, the competitive price would

[17] Volume-weighted average of GB cement producers' price of bulk cement sold to independent buyers in 2011, as found in Table 1 in Appendix 7.8 of the provisional findings.
[18] We assume here that the £69.50 benchmark price would also apply to Scotland and Wales.

be above £69.50 per tonne. As we believe the demand for cement to be inelastic, we do not believe that the competitive price is materially above £69.50 per tonne.

The role of EU ETS

56. Trading of CO2 allowances could change producers' incentives to supply cement. If the ability to trade CO2 allowances gives some plants an incentive to reduce output in order to sell excess CO2 allowances on the open market, this could affect the price that would prevail in a well-functioning market.

57. Since we are comparing the 2011 outcome to a 2011 benchmark, we consider EU ETS Phase II as the relevant framework for assessing the incentives introduced by emissions trading.[19] There was no partial cessation rule in EU ETS Phase II, and therefore we do not consider it likely that any plant could have an incentive to expand production due to emissions trading incentives. For this reason, we have restricted our attention to incentives to reduce output arising from emissions trading.

58. Under EU ETS Phase II, the closing of a plant would mean that the plant's allocation of allowances would usually be forfeited.[20] For this reason, we rule out the option of closing a plant (and thereby avoiding the entire operating cost) and selling all the plant's allowances. In order to be able to sell allowances, a plant would thus have to incur site fixed cost.

59. A cement works is thus faced with a trade off between producing cement and selling allowances, and considers site fixed cost as unavoidable when making this choice. Using the variable and distribution costs in Annex B, Table 1 and the revised distribution costs for Aberthaw and Dunbar, the margin between the cement price

[19] Please refer to Appendix 2.2 of the provisional findings for a description of the EU ETS emissions trading framework.
[20] Cases where the operator of a plant closed an inefficient plant were an exception. In such cases, the operator could transfer the closed plant's allowances to a more efficient plant.

and variable and distribution costs is above £14.50 per tonne for all cement works at a cement price of £69.50 per tonne. The 2011 average price of allowances was about €14 per tonne of CO2,[21] or about £13.50 at the 2011 exchange rate. This suggests that, given the competitive price of cement of £69.50 per tonne, it would always be more profitable for GB cement producers to produce cement than to sell allowances. The competitive price of cement would need to fall to about £68.50 per tonne in order for this not to be the case, and even if the price were to fall below this point the resulting output reduction would be very limited.[22] This bound is conservative, since one tonne of cement corresponds to less than one tonne of CO2. The market price of cement could therefore drop further before incentives to sell allowances rather than cement arise. We therefore do not believe that EU ETS affects our estimate of the competitive price of cement.

60. Lafarge Tarmac told us that the CC analysis did not recognize that the cost of CO2 was an important opportunity cost which Lafarge Tarmac considered in its business decisions, because producing and selling a unit of cement meant foregoing a sale of a carbon allowance. Lafarge Tarmac submitted that in doing so, the CC under-estimated the competitive benchmark price.

61. Hanson made a similar observation. Hanson submitted that the cost of carbon was a relevant opportunity cost for plants when determining the level of production, and that it was possible for a firm not to operate at full capacity, choosing to sell the unused carbon allowances. Hanson told us that the higher the cost of carbon, the less production there would be. Hanson also told us that the EU ETS Phase III fundamentally changed the way the market worked so that the CC's model had no applicability going forward.

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[21] Provisional findings, Appendix 2.2, Figure 4.
[22] [✂]

62. Our analysis takes into account the fact that the cost of carbon is a cost to cement producers by comparing the revenues from producing and selling cement (and incurring the costs of producing cement) with the revenues from not producing cement and selling carbon allowances instead (see paragraphs 58 and 59 above). We do not think it is appropriate to include the costs of CO2 as an opportunity cost because, once a cement plant is active and has incurred the fixed costs of producing cement, the relevant trade-off is between, on the one hand, producing cement and, on the other hand, selling the corresponding number of allowances. Since we assume price-taking behaviour and a constant variable and distribution cost, the producer faces a choice between either producing cement up to capacity or selling all its allowances.

Summary of parties' comments on the methodology

63. We received a number of comments from Cemex, Hanson and Lafarge Tarmac on the cost-based approach to estimating the overcharge in cement prices. In this section, we present the parties' comments on our methodology and our assessment of these comments.

Inconsistency between the profitability-based approach and the cost-and-demand-based approach

64. Lafarge Tarmac told us that the customer detriment estimates derived using the cost and demand data were inconsistent with our profitability analysis. It told us that the customer detriment calculated using the cost and demand data was almost as much in a single year as the total customer detriment calculated using the profitability analysis for a five-year period. It also told us that there was an inconsistency between the CC's competitive price analysis and the CC's profitability analysis, because the CC's profitability analysis assumed that newer plants were more efficient whereas in the CC competitive price analysis, Hope and Cauldon, both of

which were substantially older than Tunstead, were both assumed to be [✂] cost plants than Tunstead.

65. Cemex told us that the benchmark we used in this approach was inconsistent with the approach used by the CC to estimate whether prices were excessive using the profitability approach, which recognized that firms need to cover their total economic costs including earning a return on capital employed.

66. Hanson told us that the model of competition we used was inconsistent with our approach to calculating profitability in that it did not allow some firms to recover their total economic costs, including depreciation and a return on capital.

67. The profitability approach and the cost-based approach to estimating the customer detriment are different methodologies and we would therefore not expect the estimates to be the same. As we set out in paragraph 6.84, we consider that the estimate of customer detriment based on the profitability approach substantially underestimates the harm to customers that would be avoided by the introduction of effective measures to remedy the Coordination AEC, because the period that we have investigated includes a very severe and prolonged economic downturn. In contrast, the methodology based on the cost approach is less heavily affected by the economic cycle.

The benchmark chosen for the estimation of a competitive price is not appropriate

68. Lafarge Tarmac told us that the competitive price used in the CC analysis was the wrong benchmark. It told us that the AEC finding was based on coordination, and that the relevant counterfactual was one that would arise in a non-coordinated market (rather than a perfectly competitive market). It told us that effective competition in a non-coordinated market (eg characterized by Cournot competition) is entirely con-

sistent with prices set above the marginal cost of the marginal plant, as a result of which the CC's benchmark price is too low.

69. Cemex told us that the CC analysis relied on a model of short-run competition, which assumed that it was rational for cement producers to supply at any price that exceeded their short-run operating costs. Cemex submitted that it was wrong to infer that any price above these unit operating costs was excessive, because if firms priced at this level in the long run, they would not be able to fund the annual capital maintenance and replacement of their assets. Cemex also told us that the GB cement market had a limited number of plants, with fixed capacities which could not easily be varied in the short run. Given these characteristics, it submitted that economic theory would predict that the competitive outcome could well lead to prices that were higher than costs. In particular, prices could be higher than either the costs of the marginal plant or the costs of the next most expensive plant.

70. Cemex told us that the benchmark we had used was inconsistent with the approach most competition authorities used to assess whether pricing may be exclusionary. It told us that it was commonly recognized that prices that were below long-run average incremental costs could be exclusionary. Cemex submitted that the approach used by the CC would find that prices at (or even below) the long-run average incremental costs would be excessive.

71. Hanson told us that our model described a setting that was not sustainable or achievable in the long run. It told us that because our model did not allow firms to recover the costs of replacing depreciated assets or to make a return on capital, the model was not a long-run equilibrium model. It submitted that by excluding those costs, firms would exit the market in the long run and no firms would enter. It told us

that the price estimated by the model understated the cost of supply and so overestimated the alleged customer detriment.

72. We agree that the benchmark we used for competition in this approach is not the only possible benchmark, and noted in paragraph 24 above that GB cement producers may have a degree of unilateral market power even in the absence of coordinated behaviour. If this were the case, the price that would prevail absent coordination may be higher than the price we estimate here. Therefore, in this respect, the competitive price that we estimate with the cost-based approach can be interpreted as a lower bound for the price that would prevail had we allowed for oligopolistic competition and kept other features of the model unchanged.

73. With respect to Hanson's comments, we note that in the benchmark we use, some firms (those with plants which are more efficient than the 'marginal plant') would earn a return on capital. However, we acknowledge that, because the benchmark we use is based on a relatively short-term model of competition, some of the less efficient plants may not be able to recover costs of capital in equilibrium. We note that our approach of calculating the customer detriment based on the profitability approach allows firms to make a return on capital.

74. With respect to Cemex's submission that the approach is not consistent with the approach used by other competition authorities to assess whether pricing is exclusionary, we note that our aim is to estimate the amount by which prices of cement may be above a competitive benchmark because of the AEC we identified. This does not have any read over to exclusionary pricing cases, where the question would usually be whether a firm in a dominant position is setting downstream prices so as to foreclose competitors.

The assumptions in the model do not reflect the reality of the GB cement industry

75. Lafarge Tarmac told us that the CC analysis did not capture the reality of the GB cement industry. In particular, it told us that the CC analysis:

(a) incorrectly predicted that a non-coordinated industry would have closed down cement plants that were less efficient than the marginal plant in 2011. Lafarge Tarmac submitted that given that cement demand was cyclical and the closing/ mothballing of plants was costly, a non-coordinated cement industry would not have closed down cement plants in 2011 since demand was expected to recover in the future;

(b) incorrectly assumed that cement producers were myopic and did not take account of rational, forward-looking behaviour by cement firms in 2011 in relation to EU ETS Phase III (ie the effect of plant closure on carbon allowances);

(c) did not take into account the difference between internal and external sales, and the fact that cement producers would often choose to supply their downstream business even when transport costs were large and there was a competitor cement plant located closer to their downstream business;

(d) incorrectly assumed that there was no geographic differentiation: Lafarge Tarmac submitted in this respect that distribution costs would be influenced by, among other factors, the costs of supplying internal downstream customers; and that the fact that a plant distributed cement further away would, other things being equal, result in the CC's methodology categorizing this plant as a higher-cost plant; and

(e) incorrectly assumed a homogeneous commodity product market when in reality there was significant variation in product.

76. With respect to (a) above, our estimate of the benchmark competitive price is based on estimating the price at which supply is sufficient to satisfy demand. We do not agree with Lafarge Tarmac's interpretation that the analysis predicts closure of the less efficient plants in 2011—rather, it predicts that, with competition, cement prices

would settle at a level for which supply is sufficient to satisfy demand. In the model, this would mean that one plant [Plant 3] is not utilized in equilibrium. With respect to the role of carbon allowances in the future and the effect of closure on future carbon allowances, we note that we took into account the role of carbon allowances in immediate production decisions, but we did not take into account the fact that cement producers may decide to produce more today in order to maintain carbon allowances in the future. We note that, if this were the case, this is likely to mean that supply of cement would be greater, at given costs, than implied in our model (because not producing cement would in effect be costly in the future), and therefore may result in a lower benchmark competitive price, as certain plants may be willing to produce cement even if the price of cement is low.

77. With respect to (c), (d) and (e), we made certain simplifying assumptions in the analysis. However, we do not think these assumptions are likely to materially impact our results. In particular, we looked at the ranking of plants depending on costs when transportation costs are excluded, and found that this ranking was very similar to the ranking where we include transportation costs. It does not therefore appear that firms which distribute cement further away are categorized as higher-cost plants. Whilst we agree that there is a degree of differentiation in cement products, there is a large degree of substitutability at the supply level, and therefore this is unlikely to affect our results.

78. Cemex told us that the analysis implicitly assumed that any uplift in the price of cement would be fully passed through by intermediate customers (eg RMX producers) to consumers. Cemex submitted that it is more likely that part or even all of any such uplift would be absorbed by RMX producers and none or only part would be passed on to consumers. Cemex submitted that this was true even in highly competitive markets such as RMX, and that it was therefore possible that by implicitly

assuming 100 per cent pass through, the CC analysis overestimated the resulting customer detriment. Our aim was to estimate the customer detriment arising from high cement prices (which will include customers purchasing cement to make RMX), rather than to estimate the customer detriment to downstream consumers from high cement prices. Even then, we do not accept Cemex's argument: given that RMX is a competitive market, we would expect high prices of cement to be passed through by RMX producers to their customers.

79. Hanson told us that our model relied on highly stylised assumptions which were far removed from the reality of the cement market. In particular, Hanson pointed out that our model:

(a) assumed perfect transparency of demand and of prices which in reality was not evident in the market;

(b) made the unrealistic assumption that all plants acted as if they were operated by a distinct firm, thereby ignoring the benefits associated with the synergies that came from operating a portfolio of plants; and

(c) ignored all relevant and essential central head office costs that the plants would have to incur, and which would be part of site fixed costs, if each plant were to operate on a stand-alone basis.

(d) ignored the fact that cement could be stored, so that demand might be met from excess production from infra-marginal plants in previous periods rather than the marginal plant which was likely to affect the benchmark price;

(e) incorrectly assumed that a plant could be brought on and off line in a frictionless and cost-free fashion. Hanson pointed out that it was very costly to restart a mothballed kiln and that there were significant costs in decommissioning a plant too. Hanson also told us that the model did not consider the time required to turn plants back on; and

(f) ignored any facilities that did not produce clinker such as grinding facilities and import terminals, despite these being a key feature of the industry.

80. Hanson told us that the above set of assumptions would, in general, tend to maximize the alleged overcharge.

81. Hanson is right to remark that the model assumes transparency of prices and of effective demand, point (a) above. This is a simplifying assumption. It is made so that the model is not made unduly sophisticated by having to specify a more complicated mechanism of how information flows in the market. We consider that it is also a reasonable assumption to make in the light of the static nature of the model—capacities and effective demand are assumed to remain unchanged. Given this, had we not assumed transparency in the first instance and had we specified how plants collect and update information about demand levels and prices, then we expect that plants would learn what the market-clearing prices would be and would decide on production levels accordingly; the outcome of that process would be the same as the outcome when we assume from the start that there is transparency of prices and of effective demand.

82. With respect to point (b), the model's assumption is that the decision to produce or not at a given plant is made without taking into consideration its effect on other plants, namely on other plants that are in fact run by the same producer. This assumption does not negate the synergies that exist from running a network of plants in the sense that, to the extent that such synergies exist and have an impact on the operating costs of the different plants, these will be reflected in our calculated unit operating cost of each plant.

83. The point Hanson raises at (c) relates to the model's assumption that plants behave as if they stand alone. However, that assumption is that firms make a decision on whether or not a particular plant should be active and, once active, on the amount of cement to produce, without considering how this impacts on other plants, including on other plants belonging to the same firm; it is an assumption about behaviour. It is not an assumption that each plant must in fact be a stand-alone operation, having to incur the relevant additional central head office costs.

84. The model we constructed is a static one, in the sense that there is no temporal dimension to it, and, as such, it does not consider fluctuations in demand from one period to another. This is a simplifying assumption, made to allow for an analytically tractable model that allows us to study the key features of interest. In this light, the model does not deal with considerations such as the ability to store cement from one period to another or with the costs of mothballing and of reactivating a plant, points (d) and (e) above. However, our understanding is that the time period over which cement can be stored is relatively limited, and therefore taking into account ability to store cement (beyond storage to smooth production over the year, which is taken into account in our model) is unlikely to change the results. We note that clinker can be stored for longer than cement, though only for a finite period.

85. With respect to the costs of mothballing and de-mothballing plants, our analysis of GB cement capacity is based on current active capacity, ie mothballed capacity was not included in the total capacities. We find that current active capacity is larger than GB demand, and therefore that there is no need to incur costs of de-mothballing plants in our analysis.[23] Moreover, we do not agree with Hanson's argument that not incorporating the costs of mothballing in the model would increase the estimated

[23] If, however, GB demand for cement were substantially higher than current demand, and de-mothballing existing capacity were necessary in order to satisfy GB demand, we agree that costs of de-mothballing would become relevant and this could result in a higher estimate of the benchmark competitive price.

overcharge. Had we taken account of the costs of mothballing and of reactivating plants, then we would expect active plants to be less likely to choose temporarily to close down when in a period of relatively low demand, and this could tend to make the benchmark price lower than in our model, in which the possibility of mothballing was not considered.

86. With respect to point (f), we discussed earlier (paragraph 46) our reason for not including importers in this analysis; we found that importers operated at higher unit costs than the GB cement producers, and therefore, in the competitive equilibrium we derive, we would not expect them to be active as the market price of cement would not be sufficiently high for importing to be profitable.

Conclusions on the cost-based estimate of the customer detriment

87. Based on the above, we find that [Plant 3] is likely to be the plant whose costs constrain the price of cement in our model, and the benchmark price derived from our model is about £69.50 per tonne. This corresponds to a 2011 overcharge of around £10.50 per tonne. Based on 8.78 million tonnes of cement sold in GB in 2011, an overcharge of £10.50 per tonne translates to a customer detriment of £92 million in 2011.

88. However, we think that this estimate is likely to represent an overestimate of the customer detriment, because the model we use to derive this estimate is a relatively short term model of competition which considers costs of capital as sunk, and because the model we use does not take into account the possibility of oligopoly competition.

Capacities and effective capacities

1. In this annex we describe the measures of capacity we have relied on in estimating the competitive price of cement. We also describe the effective capacities we calculated to capture geographic differentiation between cement works. The effective capacity measures a cement works' capacity to supply England.

Capacity of GB cement works

2. Cement is ground clinker. This means there are two capacity constraints that matter in the production of cement: kiln capacity and grinding capacity. When ground, 1 tonne of clinker will produce approximately 1.1 tonnes of CEM I. We have used the lesser of 1.1 times a cement works' clinker capacity and its grinding capacity in our analysis.

3. We use figures from Appendix 7.2 of the provisional findings for GB cement works' clinker capacity. These figures take kilns' planned and unplanned downtime into account and are thus below kilns' nameplate capacities. Lafarge Tarmac told us that the capacity figures that we had used were based upon a proper full year of plant operation, and that given the peaks and troughs in demand, effective capacity would in practice be lower than those used in our analysis. Lafarge Tarmac submitted that its own capacity would be at most [✂] per cent of the capacity values used by the CC in its analysis. As a result of this, Lafarge Tarmac submitted that its unit operating costs were underestimated in the analysis (by an estimated £[✂] per tonne in 2011) and that this correction would reduce the CC's calculated total GB capacity by approximately 900 kt in 2011, with the likely result that a different (higher-cost) marginal cement plant would be identified by the CC. We note, however, that the capacity estimates we use in this analysis (and which are derived from figures in Appendix 7.2 of the provisional findings) take into account downtime due to

maintenance and performance factors, and are therefore below nameplate capacities. Moreover, although there are some peaks and troughs in the demand for cement, it is possible to store cement for 3 months which would allow smoothing of production.

4. As set out in Appendix 7.2, Lafarge submitted clinker capacities for its cement works, as well as a measure called 'expected cement capacity'. It describes this as 'a synthetic view of what cement is capable of being produced in the "context" of the constraints for that year'.[1] To assess whether Lafarge's cement works' capacities were constrained by clinker capacity or grinding capacity, we divided expected cement capacity by clinker capacity. If the binding constraint on a cement works is its clinker capacity, the ratio between expected cement capacity and clinker capacity should be close to 1.1. If the cement works' output is constrained by some other factor, the ratio should be significantly below 1.1.

5. The clinker capacity and expected cement capacity of Lafarge's cement works can be found in Table 1. This table also contains the ratio between expected cement capacity and clinker capacity for each cement works. The ratios suggest that Cauldon and Hope are constrained by their clinker capacities, while Aberthaw and Dunbar are constrained by other factors. This is consistent with Lafarge's statement that Aberthaw is 'grinding constrained'.

TABLE 1 **Lafarge's cement works clinker capacities and expected capacities**

Plant	*Clinker capacity (tonnes/year)*	*Expected cement capacity (tonnes/year)*	*Expected/ clinker*
Aberthaw	[✂]	[✂]	[✂]
Cauldon	[✂]	[✂]	[✂]
Dunbar	[✂]	[✂]	[✂]
Hope	[✂]	[✂]	[✂]

Source: Lafarge's response to the market questionnaire, CC calculations.

[1] Lafarge Tarmac told us that expected cement capacity was affected by factors outside of its control, including market demand, customer specifications, employment and weather, and that these might impact on the ability to produce at 'expected cement capacity'.

6. For our analysis, we thus used expected cement capacity for Aberthaw and Dunbar as the measure of cement capacity. For Cauldon and Hope, we used 1.1 times clinker capacity as the measure of cement capacity. Data submitted by Cemex and Hanson suggested that their cement works are constrained by clinker capacity rather than grinding capacity.[2] For these cement works, we used 1.1 times clinker capacity as a measure of cement capacity. The capacities of GB cement works we used in our analysis can be found in Table 2. Note that with our definition of capacity, these capacities pertain to CEM I. We have not included mothballed capacity in cement works' capacities. The potential for mothballed capacity to alter our conclusions will, however, be considered in our analysis.

TABLE 2 **Capacities of GB cement plants**

Plant	*Capacity (tonnes/year)*
Rugby	[✂]
S Ferriby	[✂]
Ketton	[✂]
Padeswood	[✂]
Ribblesdale	[✂]
Aberthaw	[✂]
Cauldon	[✂]
Dunbar	[✂]
Hope	[✂]
Tunstead	[✂]

Source: GB cement producers' response to the market questionnaire, CC calculations.

Cement works' effective capacities to supply England

7. In order to take into account the geographic differentiation between cement works, we calculated the effective capacity of each GB cement work to supply England. The effective capacity of a cement works is its remaining capacity once volumes supplied to Scotland and Wales have been subtracted and measures the cement works' capacity to supply England.

8. To calculate a cement works' effective capacity, we subtracted from actual capacity the volume supplied to Scotland and Wales in 2011 by the works in question. Since

[2] Cemex told us that its cement capacity far exceeded its clinker capacity because of Tilbury, a grinding and blending plant.

we measured a cement works' capacity in terms of potential output of CEM I, we converted any non-CEM-I volumes to CEM I. We assumed that any non-CEM-I volume was 70 per cent CEM I, for example one tonne of CEM II was converted to 0.7 tonnes of CEM I. The resulting CEM-I-equivalent volumes supplied to Scotland and Wales by GB cement works are found in Table 3.

TABLE 3 **Volumes supplied to Scotland and Wales in 2011**

tonnes

Plant	*Scotland*	*Wales*
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
[✂]		[✂]
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
[✂]	[✂]	
[✂]		[✂]
[✂]	[✂]	

Source: GB cement producers' transaction data, CC calculations.

Note: Volumes have been converted to CEM I equivalent.

9. Cemex's transaction data did not distinguish between works of manufacture. For this reason we assumed that any volumes sold by Cemex to customers in Scotland were manufactured at South Ferriby and any volumes sold by Cemex to customers in Wales were manufactured at Rugby. This assumption is motivated by the cement works' locations and the fact that neither cement works is rail linked.[3]

10. Table 4 contains GB cement works' effective capacities. These effective capacities were obtained by subtracting volumes in Table 3 from the capacities in Table 2.

[3] While Cemex's transaction data does not distinguish between works of manufacture, it does distinguish between shipping facilities. The data shows that volumes shipped from the Rugby works to Scotland in 2011 were very limited, which is broadly consistent with our assumption.

TABLE 4 **GB cement works' effective capacities**

Plant	*Effective capacity tonnes/year*
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]

Source: GB cement producers' responses to market questionnaire, GB cement producers' transaction data, CC calculations.

Costs and revised distribution costs

GB cement works' operating costs

1. As stated in paragraph 28 above, plants' operating costs are the relevant costs in assessing whether or not the plant will be active at a given price. Operating costs include site fixed cost, plants' variable costs and plants' distribution costs, but exclude depreciation and cost of capital as well as divisional and central costs. Table 1 shows GB cement works' operating costs. These figures are based on the GB cement producers' profit and loss data.

TABLE 1 **Cement works' 2011 operating costs**

Plant	*Site fixed cost* £	*Variable cost* £/tonne	*Distribution cost* £/tonne
Rugby	[✂]	[✂]	[✂]
S Ferriby	[✂]	[✂]	[✂]
Ketton	[✂]	[✂]	[✂]
Padeswood	[✂]	[✂]	[✂]
Ribblesdale	[✂]	[✂]	[✂]
Aberthaw	[✂]	[✂]	[✂]
Cauldon	[✂]	[✂]	[✂]
Dunbar	[✂]	[✂]	[✂]
Hope	[✂]	[✂]	[✂]
Tunstead	[✂]	[✂]	[✂]

Source: GB cement producers' profit and loss data, CC calculations.

2. The Cauldon, Rugby, Padeswood and South Ferriby plants are not rail linked. This potentially affects their distribution costs.

3. Note that the operating costs in Table 1 pertain to a cement works' entire output. The costs also include the costs of those depots and blending depots that are part of the delivery networks of the cement plants. To the extent that a cement works produces CEM II or other blended products, the cost of producing that output is included in the operating costs. This introduces some imprecision in our analysis as we use the overall variable cost as one of the components of unit operating cost based on CEM I

capacity. We do not think that this approximation introduces any material difference as most output is CEM I.

4. Lafarge Tarmac told us that the CC had excluded depreciation and amortization costs, and that, to some extent, critical investments made in earlier years were captured by depreciation and amortization costs. Lafarge Tarmac submitted that as a consequence, these were site-specific costs that should be included as operational costs to capture the long-term dynamics of the cement industry.

5. Lafarge Tarmac told us that the CC had excluded divisional and central costs from its calculation of plant operational costs. It submitted that these would all be site-specific costs in the CC's single plant model and should not have been excluded. Lafarge Tarmac submitted that these excluded costs would add an estimated £[✂] per tonne to the CC's competitive cement price.

6. Cemex told us that the analysis underestimated its unit operating costs, because it had treated as sunk costs a number of costs which are avoidable in the short run, including:

   (a) maintenance costs: Cemex submitted that its expenditure for the annual capital maintenance of its [✂];

   (b) packaging costs for bagged cement, which are [✂]; and

   (c) costs of customer service, planning, commercial and technical teams, which are included in Cemex's [✂].

7. Cemex submitted that, in the CC analysis, step changes in costs associated with brining mothballed capacity back on stream were ignored. It submitted that in practice, any significant increase in output by Cemex would require the [✂].

8. Hanson told us that the calculation of the operating costs did not take account of all relevant and essential central-head costs (eg operational expertise, brand marketing, product sales, carbon trading and IT infrastructure) that a plant would itself have to incur, and which would be part of site fixed costs, if it were to operate on a stand-alone basis, as is the assumption of the CC's model.

9. Some of the above comments made relate to the model not taking account of divisional and central costs when, at the same time, the model assumes that plants behave as if they were run on a stand-alone basis. We addressed this comment earlier in paragraph 83. We consider the comment to be misplaced: the model assumes that plants behave as if they were run on a stand-alone basis—making production decisions without considering the impact on other plants operated by the same producer.

10. We also addressed earlier, in paragraphs 84 and 85, the comment relating to the costs associated with mothballing a plant and bringing it back online. We also address earlier in paragraph 67 the comments on sunk costs not being taken into account in the model.

11. Regarding Cemex's comment in paragraph 6, we note that we did include site-specific maintenance costs in our analysis of site unit operating costs. Whilst bagging costs and certain costs listed in (c) were not included, these are relatively low and would be unlikely to significantly change the results.

Distribution costs

12. Distribution costs are significant in relation to a cement works' variable costs. The distribution costs in Annex B, Table 1 were not well adapted to capturing geographic differentiation and differentiation terms of logistic efficiency. We only observed

cement works' distribution costs in aggregate. By dividing a given cement works' total distribution cost by its output we got a distribution cost per tonne. Since we did not control for the typical distance over which a cement works' output is transported, we could not arrive at a measure of distribution cost per tonne per mile. It appears plausible that a cement works primarily serves the customers it is best placed to serve, and that cement works with less efficient distribution supply over smaller distances than cement works with more efficient distribution. The observed distribution cost per tonne would reflect this, and thus not be particularly informative about a cement works' location and how efficient a cement works' distribution is.

13. In particular, the observed distribution cost would not represent a good measure of the cost faced by a cement works when supplying customers further afield. The cost of supplying distant customers is likely to be important when assessing how the Dunbar and Aberthaw works affect the competitive price in England. For this reason, we estimate in the next subsection the costs faced by these plants when supplying customers in England.

Revised distribution costs for Dunbar and Aberthaw

14. Lafarge's transaction data contained an estimated haulage cost of shipments. Since the transaction data distinguishes between regions and identifies a shipments works of manufacture, the data can be used to estimate the cost of hauling cement from works of manufacture to a given region. We have used 2011 transactions for our estimates.

15. Lafarge estimated haulage costs in its transaction data. To evaluate the reliability of these estimates, we compared the volume-weighted 2011 average haulage cost per tonne to the average 2011 distribution cost per tonne as estimated from Lafarge's profit and loss data.

16. Table 2 below contains Lafarge's cement works' haulage costs as estimated from transaction data and distribution costs as estimated from profit and loss data. Note that we excluded collected sales when we calculated haulage costs based on transactions data. We did so on account of collected sales not being informative of haulage cost.

FIGURE 1

Lafarge's cement works haulage and distribution costs

[✂]

Source: Lafarge transaction data, Lafarge profit and loss data, CC calculations.

TABLE 2 **Estimated haulage cost and distribution cost per cement works**

	£/tonne	
	Estimated cost based on	
Works	*Transaction data*	*Profit and loss data*
Aberthaw	[✂]	[✂]
Cauldon	[✂]	[✂]
Dunbar	[✂]	[✂]
Hope	[✂]	[✂]

Source: Lafarge transaction data, Lafarge profit and loss data, CC calculations.

Note: We excluded collected sales when calculating the haulage costs from transaction data.

17. Figure 1 shows that the average estimated haulage cost based on the transaction data is generally below the average distribution cost based on the profit and loss data. For Aberthaw, there is a discrepancy of approximately £[✂] per tonne. In the case of Dunbar, there is a discrepancy of around £[✂] per tonne.

18. Because of the discrepancy between haulage costs (as estimated from transaction data) and distribution cost (as estimated from profit and loss data), we have decided not to base our estimates of Aberthaw's and Dunbar's costs of supplying England on the transaction data haulage cost alone. We believe the profit and loss data to be more reliable as a measure of average distribution cost per tonne. The transaction data haulage costs appear to be approximated based on radial distances. Since cement will in practice not be transported in straight lines, this approximation will

underestimate the cost of haulage. However, we believe that the transaction data can be informative about the relative costs of hauling cement to various regions. To reconcile these views we rescale the costs of hauling to England in an a manner that makes the average haulage cost equal to the average distribution cost, as estimated from the profit and loss data.

Dunbar

19. Table 3 shows estimated haulage costs for the Dunbar works.

TABLE 3 **Volume-weighted average 2011 haulage costs for destinations inside and outside Scotland**

Destination	*Haulage cost £/tonne*
Scotland	[✂]
Other	[✂]

Source: Lafarge transaction data.

Note: We excluded collected sales when calculating the haulage costs from transaction data.

20. Since there is an economically significant difference in the cost of haulage depending on whether the destination is in Scotland or not, we believe there is a need to revise the distribution cost to reflect this.

21. The distribution cost, as estimated from profit and loss data, is a weighted average of the cost of distributing cement to customers in Scotland and the cost of distributing cement to customers outside Scotland.[1] We assume that sales collected by customers do not incur delivery costs. Based on the figures in Table 3, we assume that the cost of distributing cement to customers outside Scotland is approximately 1.2 times the cost of distributing cement to customers in Scotland. These two

[1] Let c be the distribution cost as estimated from profit and loss data. Then $c=(q^C c^C+q^S c^S+q^O c^O)/Q$, where c^C is the cost incurred when customer collects and c^S and c^O are the costs of distributing to Scotland and outside Scotland, respectively, q^C is the volume collected by customers, q^S is volume distributed to Scotland, q^O is volume distributed outside Scotland and $Q= q^C +q^S+q^O$. The costs c^S and c^O are unobserved, while q^S and q^O are observable in e.g. transaction data.

restrictions identify the cost of distributing cement to customers in Scotland and the cost of distributing cement to customers outside Scotland.[1]

22. Based on the Lafarge transaction data, we have calculated the volume delivered from Dunbar to destinations in Scotland in 2011, the volume delivered from Dunbar to destinations outside Scotland in 2011 and the volume collected at Dunbar by customers in 2011. The results are in Table 4. Based on these volumes, we calculated the weights we used in the first restriction described in the previous paragraph. The 2011 average distribution cost is £[✂] per tonne (see Table 3). Our estimate of the distribution cost for destinations outside Scotland is thus £[✂] per tonne.

TABLE 4 **Dunbar 2011 volumes according to destination**

	Volume tonnes
Collect	[✂]
Scotland	[✂]
Outside Scotland	[✂]
Total	[✂]

Source: Lafarge transaction data.

Aberthaw

23. Table 5 shows estimated haulage costs for the Aberthaw works. These are higher for destinations outside Wales than for destinations in Wales. We believe that the differences could potentially be economically significant.[2]

TABLE 5 **Volume-weighted average 2011 haulage costs for destinations inside and outside Wales**

Destination	*Haulage cost £/tonne*
Wales	[✂]
Other	[✂]

Source: Lafarge transaction data.

Note: We excluded collected sales when calculating the haulage costs from transaction data.

[1] We have assumed that $c^S=\gamma c^O$, with $\gamma=1.25$ and that $q^C=0$. From these restrictions and the restriction set out in the previous footnote, it follows that $c^S=c/(q^S/Q+\gamma q^O/Q)$.
[2] Lafarge Tarmac told us that transporting from Aberthaw involved payment of a toll when supplies were transported into England over the Severn Bridge.

24. Since there is an economically significant difference in the cost of haulage depending on whether the destination is in Wales or not, we believe that there is a need to revise the distribution cost to reflect this fact. We adjusted the cost in the same way as we adjusted Dunbar's distribution cost. Based on the figures in Table 5, we assume that the cost of distributing cement to customers outside Wales is approximately 2.2 times the cost of distributing cement to customers in Wales.

25. Based on the Lafarge transaction data, we have calculated the volume delivered from Aberthaw to destinations in Wales in 2011, the volume delivered from Aberthaw to destinations outside Wales in 2011 and the volume collected at Aberthaw by customers in 2011. The results are in Table 6.

TABLE 6 **Aberthaw 2011 volumes according to destination**

	Volume tonnes
Collect	[✂]
Wales	[✂]
Outside Wales	[✂]
Total	[✂]

Source: Lafarge transaction data.

26. Aberthaw's 2011 average distribution cost is £[✂] per tonne (see Annex B, Table 1). Our estimate of the distribution cost for destinations outside Wales is thus £[✂] per tonne.

27. Hanson told us it did not understand why, in the context of adjusting distribution costs, we had not considered the challenges of Padeswood for which Hanson gave as an example the fact that that plant was not located on a quarry. The adjustment we made to the distribution costs of Aberthaw and Cauldon stems from the fact that we identified a significant enough difference between the estimated distribution costs from those plants as reported in the transaction data supplied to us by Lafarge and the distribution costs for those plants as calculated from P&L. We have no grounds to

revisit the distribution costs for Padeswood as reported in the transaction data Hanson provided to us.

Demand and residual demand

1. In this annex, we set out our model of GB demand for cement. In order to capture the effect of cement works' locations, we calculate a residual demand. This is the demand that remains once GB cement works have filled the demand they face in Scotland and Wales. The annex has two sections. In the first section, we describe GB demand. In the second section, we derive the residual demand.

GB cement demand

2. CEM I is the appropriate product to consider in this case, since capacities as set out in Annex A measure cement works' capacity to produce CEM I. CEM I is blended to produce other types of cement. Sales of cement other than CEM I thus indirectly contribute to demand for CEM I. We assumed that blended cement and bagged cement contained on average 70 per cent CEM I.[1]

3. Table 1 below contains demand for various types of cement in GB in 2011. Based on the figures in Table 1 and our assumption that blended cement and bagged cement contain on average 70 per cent CEM I, we estimated demand for CEM I in GB in 2011 at 8.78 million tonnes. We assumed that unclassified sales are CEM I, on the grounds that these are sales made by minor importers and our understanding that most imported cement is CEM I.

TABLE 1 **GB 2011 demand for cement**

tonnes

Bulk			
CEM I	*Non-CEM-I*	*Bagged*	*Unclassified*
6,187,410	1,412,413	1,712,545	409,039

Source: GB cement producers' and importers' transaction data, CC calculations.

[1] This figure is consistent with MPA data on members' clinker production and GB cement producers' transaction data.

4. Our estimate of demand for CEM I was not particularly sensitive to changes in the assumption about the proportion of CEM I in blended cement and bagged cement. Changing the proportion of CEM I by ten percentage points changed the estimated demand for CEM I by less than 4 per cent. This was a consequence of most GB cement sales being sales of CEM I.

5. GB cement works' total active capacity in 2011 was just over 9.5 million tonnes of CEM I per year. The available capacity was thus sufficient to meet demand in 2011. GB cement works meeting GB demand would have required cement works operating at approximately 92 per cent of full capacity.

Residual cement demand

6. We defined the residual demand as the demand that remains once GB cement works have filled the demand they face in Scotland and Wales. We calculated the demand faced in Scotland and Wales in 2011 from Table 3 in Annex A by summing up the volumes supplied by each cement works in these regions. This gave us an estimated demand of 1.07 million tonnes, which we subtracted from the GB demand of 8.78 million tonnes to arrive at an estimated residual demand of 7.7 million tonnes.

Dealing with elastic demand

1. In our analysis, we assumed that demand for cement was given, ie that customers would buy the same quantity of cement irrespective of price. While we believe demand for cement is likely to change only moderately in response to price changes,[1] we recognize that assuming that demand is given can affect the conclusions of our analysis. In this annex, we evaluate the consequences of this assumption.

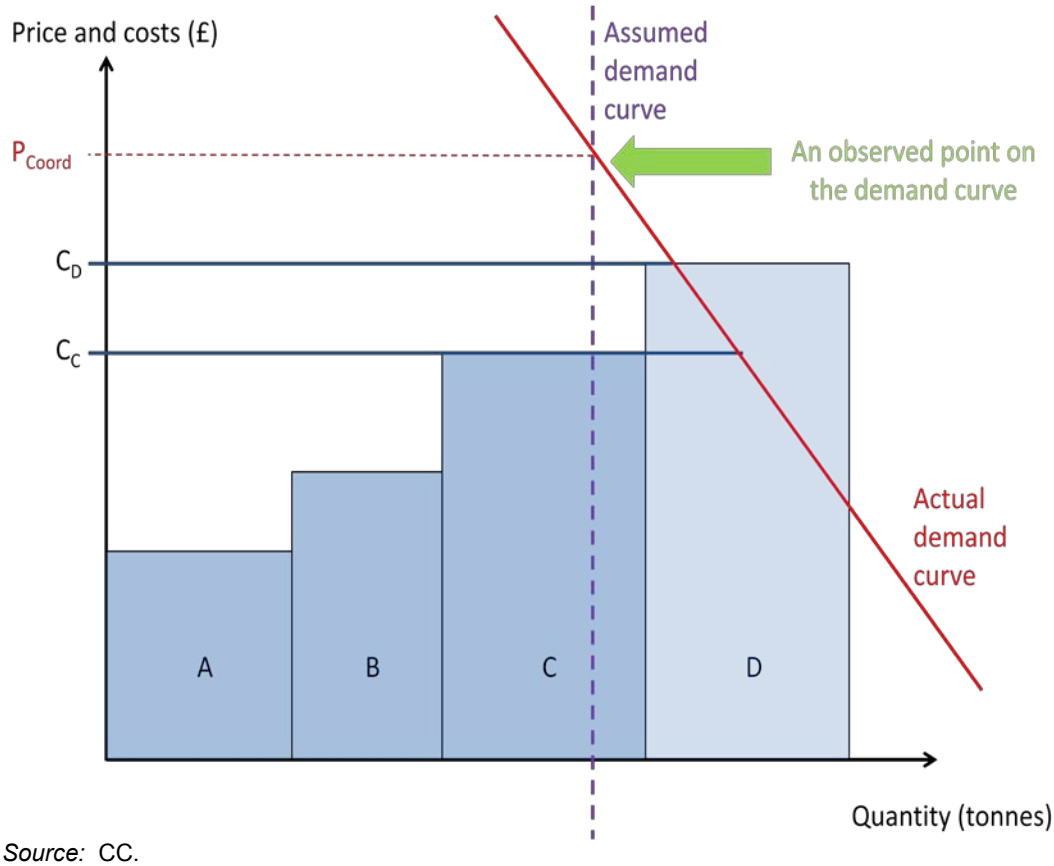
2. In our analysis, we assumed that the GB demand for cement was equal to the quantity of cement sold in GB in 2011 and that customers would demand this quantity irrespective of price. Realized GB demand in 2011 is a point on the demand curve for cement. We believe the price in 2011 was elevated due to coordination between GB cement producers and the GGBS arrangements. If demand for cement is, in fact, somewhat elastic, then demand would be higher at any price below the 2011 price. In particular, demand would be higher at a market-clearing price calculated based on a competitive supply curve and a given demand.

3. If the demand curve is elastic, a competitive price estimated based on an assumption of given demand might thus fail to be a market-clearing price. This failure results from demand potentially exceeding supply at such a price. Available capacity might simply not be sufficient to accommodate expanded demand due to the lower price. This is illustrated in Figure 1 below, where there would be excess demand at any price between the unit operating cost of the marginal plant if demand is given (Plant C) and the most efficient inactive plant (Plant D).

[1] Cement is an intermediate good. It serves as an input and typically accounts for a limited fraction of the total cost of the final product. Cement price increases are thus likely to be passed on to customers of the final product.

FIGURE 1

Demand at decreased price depending on elasticity of demand



Source: CC.

4. We note that while elastic demand means that the benchmark price will increase, it does not follow that total customer detriment will necessarily decrease as a consequence. This is apparent from inspection of Figure 4. When demand is responsive to price, any price below the coordinated price implies increased demand. Sales forgone due to the elevated price represent a source of customer detriment. If demand were actually elastic, plant D would be the marginal plant. The customer detriment due to forgone sales is represented by the triangle between the vertical, assumed demand curve, the actual demand curve and the line representing the unit operating cost of plant D. If demand were responsive to price, this customer detriment would be non-zero. There are thus two opposing effects at work and the effect on total customer detriment is therefore not clear-cut. In particular, it is not

obvious that the assumption of given demand would result in an overestimate of total customer detriment.

5. While we did not have access to an estimate of how elastic the GB demand for cement is, we could derive an upper bound on how elastic demand can be and still accommodate an expansion in demand due to a lower price. If the demand for cement would have to be unreasonably inelastic for the market to balance at our estimated competitive price, we would have less confidence in the validity of our estimate.

6. We calculated bounds on the elasticity for demand in two scenarios:
   (a) a scenario where [Plant 1] is active but [Plant 3] is not; and
   (b) a scenario where [Plant 3] is active.

7. Throughout the analysis, we assumed that the coordinated price was £80 per tonne. Our analysis relied on the observation that in any scenario, demand could expand by at most a quantity equal to available spare capacity (measured relative to 2011 demand) before balance of supply and demand is violated.

8. In the first scenario, the competitive price is between £66.60 per tonne and £69.50 per tonne. These prices correspond to reductions of 16 and 13 per cent relative to the coordinated price, respectively. There would be virtually no available spare capacity at any price below £69.50 per tonne. Demand would need to be very inelastic for supply and demand to balance.[1]

[1] Our estimate of the elasticity of demand was the negative of the relative change in demand divided by the relative change in price. This is equivalent to assuming that the demand curve is linear. Compared with the elasticities implied by a constant elasticity of demand system, the approximation results in slightly more elastic demand.

9. In the second scenario, the competitive price is £69.50 per tonne or above. A price of £69.50 per tonne represents a reduction of 13 per cent relative to the average price of cement in 2011. With both [Plant 1] and [Plant 3] active spare capacity would be around [✂] kt per year. In this scenario, demand could thus expand by just under 4 per cent relative to realized 2011 GB demand before demand exceeds supply. To a first approximation, demand price elasticity would, in absolute terms, have to be 0.3 or less for supply and demand to balance at the competitive price.

Summary of views on the Notice of possible remedies

Overview of remedy options being explored by the CC

1. The CC considered the following remedy options to address the AEC it provisionally found in the GB markets for bulk and bagged cement through coordination.

Divestiture remedies

C1. Market structure and concentration: divestiture of cement production capacity by one or more of the Top 3 cement producers.

C2. Vertical integration: divestiture of RMX plants by one or more of the Top 3 cement producers.

Measures to enhance countervailing power of cement purchasers

C3. Buyer-side issues: the creation of a cement buying group or groups.

Restrictions on supplier conduct that have the effect of facilitating coordination

C4. Price announcement behaviour: prohibition on GB cement producers sending generalized cement price announcement letters to their customers.

Restriction on publication of information by Government and other bodies

C5. Transparency of sales and production shares: restrictions on the disclosure of cement market data by the UK Government and by GB cement producers to private sector organizations.

C6. Transparency of sales and production shares: recommendations to the UK Government/European Commission on the publication of GB cement producers' verified emissions data under the EU ETS.

2. The CC also considered the following remedy option to address the AEC it provisionally found in the GB markets for bulk and bagged cement in relation to the production of GGBS and its primary input, GBS.

Divestiture remedy

C7. GGBS supply: structural measures to address the AEC in relation to GGBS/GBS production in GB.

3. In addition, the following remedy options were put to the CC in responses received from the parties.

Z1. In respect of cross-sales, a mechanism for mandatory competitive tendering for the external supply of cement for RMX requirements (to address concerns arising from vertical integration facilitating coordination).

Z2. 'Fire walls' or 'information barriers' designed to limit within vertically integrated organizations the transfer of price information between cement and RMX divisions.

Z3. Divestiture of a stand-alone grinding station.

Responses from parties

4. The CC received responses to its Notice of possible remedies from 27 individual parties and held a number of subsequent response hearings. In respect of the proposed structural remedies, the Top 3 cement producers were the only parties

against the cement plant divestiture remedy (C1). Of the other parties who gave a view on that particular remedy, seven were in favour of it and two were neutral. Similarly, the Top 3 cement producers plus Aggregate Industries were against the RMX plant divestiture remedy (C2). Of the other parties who gave a view on that particular remedy, six were in favour and two were neutral. In respect of the GGBS/GBS divestiture remedy (C7) eight parties were in favour, two against and four were neutral.

5. In respect of the proposed behavioral remedies, nine parties were against the cement buying group remedy (C3), three were in favour and one was neutral. In respect of the prohibition on generalized price announcement letters remedy (C4), seven parties were in favour, one against and two were neutral. In respect of the restriction of cement market data remedy (C5), nine were in favour, one was against and two were neutral. In respect of the publication of EU ETS data remedy (C6), two were in favour, three were against and four were neutral.

6. In respect of the remedy options put to the CC, three parties were for the mandatory competitive tendering remedy (Z1), four were against and three were neutral. In respect of the information barriers remedy (Z2), only one was in favour and six were against. In respect of the stand-alone grinding station remedy (Z3), four parties were in favour, five were against and one was neutral.

Summary of views

Lafarge Tarmac

7. Lafarge Tarmac submitted a single response to both the CC's Notice of possible remedies and provisional findings. It also attended a response hearing on 3 July 2013.

C1

8. Lafarge Tarmac considered that a cement (or RMX) divestment would not remedy the AEC identified by the CC and that less intrusive remedies would be effective. It also considered that a cement or RMX divestment would be wholly disproportionate.[1]

9. Lafarge Tarmac stated that a divestment would be ineffective on the basis that it was arbitrary for the CC to assume that having five GB cement producers would prevent coordination.[2] Lafarge Tarmac was not entirely clear why the CC considered that a divestiture of a plant or plants would be effective to remedy the alleged AEC. It stated that it was not enough 'to consider that merely because a particular remedy would serve to reduce a particular measure of industry concentration' it would make it effective and that 'such a mechanistic approach would be profoundly misguided'.[3] If the divestment remedy was driven by the desire to address the leadership position of Lafarge Tarmac as opposed to market concentration, 'neither of the CC's allegations of Lafarge Tarmac's leadership require[d] a structural remedy'.[4]

10. Lafarge Tarmac asserted that the CC only needed to remedy one of the three cumulative conditions for coordination (monitoring the terms of coordination, internal sustainability and external sustainability) and that the behavioural remedies proposed by the CC would address each of those rendering the divestment remedy options unnecessary.[5]

11. Lafarge Tarmac considered that the CC's profitability assessment and estimate of consumer harm was 'entirely misconceived' and that 'the evidence does not indicate excessive profits or supra normal pricing'.[6] On that basis, it would not be

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[1] Lafarge Tarmac response to the Notice of possible remedies, paragraph 192.
[2] Lafarge Tarmac response to the Notice of possible remedies 192(a).
[3] Lafarge Tarmac response to the Notice of possible remedies 221.
[4] Lafarge Tarmac response to the Notice of possible remedies, paragraph 222.
[5] Lafarge Tarmac response to the Notice of possible remedies, paragraph 192(b).
[6] Lafarge Tarmac response to the Notice of possible remedies, paragraph 241.

proportionate for the CC to require 'such substantial and costly remedies given the absence of any evidence of customer harm'.[7]

12. Lafarge Tarmac considered that a divestment would be disproportionate as the CC had failed to satisfy the criteria set out the in the CAT's judgment in *Tesco v Competition Commission* and *BAA v Competition Commission.*[8] Lafarge Tarmac noted that the BAA case was the first time in recent history that the CC had imposed a divestiture remedy and considered that the scenario in the BAA case was 'quite incomparable to the present case'.[9]

13. Lafarge Tarmac considered that the divestment remedy option was inconsistent with the structural remedy required in the recent merger review. It pointed out that in the merger review the CC required the joint venture to divest RMX sites in order to 'increase the JV's exposure to the external market' to ensure that the level was similar to the pre-merger level of Lafarge. Yet, 'according to the CC's logic in the current MIR, the CC team assessing the JV should *not* have required a substantial RMX divestment because the more that the JV had internal sales, the less effective any punishment of the JV would be, as it could rely more on its internal sales in the event of a price war. In turn, if it was harder to punish the JV from deviating and more attractive for the JV to deviate, the coordination would become less stable'.[10] On this basis, Lafarge Tarmac considered that the CC had no coherent basis for requiring a structural remedy from it in relation to cement plants (or RMX sites).[11]

14. Lafarge Tarmac also considered that a divestment remedy would result in consumer harm. This was because the current industry structure enabled significant economies

[7] Lafarge Tarmac response to the Notice of possible remedies, paragraph 249.
[8] Lafarge Tarmac response to the Notice of possible remedies, paragraph 192(c).
[9] Lafarge Tarmac response to the Notice of possible remedies, paragraph 220.
[10] Lafarge Tarmac response to the Notice of possible remedies, paragraph 226.
[11] Lafarge Tarmac response to the Notice of possible remedies, paragraph 227.

of scope and scale which, if altered by way of divestiture, would lead to increased costs of production and disruption from forced sales, which was likely to well exceed any speculative benefits that may accrue in the form of increased competition.[12] Lafarge Tarmac stated that it currently operated at full capacity at its operations at Aberthaw, Tunstead and Cauldon and a divestment would undermine its operational efficiency.[13] It also considered that an additional player with only one cement plant would only be able to produce a limited number of products and it would not gain efficiencies.[14] It followed that any new competitor would find it near impossible to increase output and therefore reduce prices.[15]

15. Lafarge Tarmac considered that the CC's proportionality requirements must be read in light of the stringent requirements imposed by Article 1 of the First Protocol to the European Convention on Human Rights and that any interference with property rights required particularly cogent justification and close scrutiny.[16] It was concerned that the conditions of a forced sale rendered it highly unlikely that a seller would obtain full or fair value for divested assets and considered that there would likely be 'very few, if any, purchasers for such an asset or assets'.[17] It considered that the market had changed following the entry of HCM and the significant growth of importers, and therefore any potential investor would be more likely to invest in a developing market rather than in GB.[18] It contended that 'any forced divestiture would (in order to meet the requirements of proportionality) have to be structured by the CC in such a way so as to ensure that the following essential conditions were met: (a) there were safeguards to ensure that the purchaser was obliged actually to operate the cement

[12] Lafarge Tarmac response to the Notice of possible remedies, paragraph 219.
[13] Lafarge Tarmac response to the Notice of possible remedies, paragraph 237.
[14] Lafarge Tarmac response hearing summary, paragraph 21.
[15] Lafarge Tarmac response hearing summary, paragraph 11.
[16] Lafarge Tarmac response to the Notice of possible remedies, paragraph 217.
[17] Lafarge Tarmac response to the Notice of possible remedies, paragraph 234.
[18] Lafarge Tarmac response to the Notice of possible remedies, paragraph 23.

plant as such and not to convert it to another use; and (b) the sale was not at a significant undervalue to its true value'.[19]

16. Lafarge Tarmac stated that 'the CC, in evaluating the necessity and proportionality of prospective remedies, must seek to extrapolate to the likely state of the market at such time in the future when such remedies may be expected to take effect' and that in the case of a divestiture, this could not realistically take effect before 2016.[20] Furthermore, that 'the CC must first seek fairly to assess whether the significantly enhanced fourth GB producer (HCM) offers (or will in the medium term be likely to offer) a sufficiently enhanced competitive constraint, whether alone or in combination with the strengthening importers (in particular from Ireland) to substantially remedy the alleged AEC'.[21] Lafarge Tarmac considered that the critical question was why five producers would be so much better than four especially when HCM was 'competing hard already, with additional material scope for greater competition from CRH'.[22]

17. Lafarge Tarmac considered that a divestiture of a cement plant would not necessarily require a rail link and one without could be brought a lower cost. However, a plant without a rail link would have a more limited network with less opportunity to reach customers.[23]

18. Lafarge Tarmac considered that a cement plant divestiture did not also require a RMX divestiture, as there was no shortage of available RMX customers to be serviced and there were a number of RMX producers with no cement such as Breedon Aggregates. Lafarge Tarmac was concerned by the level of vertical integration that had been given to HCM as a result of the joint venture. It believed this

[19] Lafarge Tarmac response to the Notice of possible remedies, paragraph 236.
[20] Lafarge Tarmac response to the Notice of possible remedies, paragraph 229.
[21] Lafarge Tarmac response to the Notice of possible remedies, paragraph 230.
[22] Lafarge Tarmac response to the Notice of possible remedies, paragraph 231.
[23] Lafarge Tarmac response hearing summary, paragraph 20.

to be in the region of 50 per cent where as it considered a level of 15 to 20 per cent appropriate.[24]

C2

19. As noted above, Lafarge Tarmac considered that a cement or RMX divestment would be wholly disproportionate and would not in any event remedy the AEC identified by the CC.

20. In respect of the addressable market, Lafarge Tarmac considered that there was no evidence to suggest that importers had found it difficult to enter and expand their supply to the independent sector and it estimated that importer share in that sector had increased from 13 per cent in 2007 to 18 per cent in 2010. It noted that six new import terminals had opened since 2007 with CRH well set to expand further.[25] The fact that importers increased market share by what Lafarge Tarmac had estimated to be approximately 6 per cent, suggested that there was no basis for RMX divestments.[26]

21. Lafarge Tarmac believed that the growth of importers over the past five years was linked to the growth of independent RMX businesses.[27] With low barriers to entry, smaller operators could set up a local business. However, such small operations could not necessarily buy a large number of RMX plants or have the expertise and nationwide coverage to be able to effectively compete.[28]

22. Lafarge Tarmac noted that the CC had identified that cement prices were individually negotiated on a customer-by-customer basis. Therefore, it considered that the

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[24] Lafarge Tarmac response hearing summary, paragraph 18.
[25] Lafarge Tarmac response to the Notice of possible remedies, paragraph 259.
[26] Lafarge Tarmac response to the Notice of possible remedies, paragraph 260.
[27] Lafarge Tarmac response hearing summary, paragraph 26.
[28] Lafarge Tarmac response hearing summary, paragraph 27.

enhanced power of any given buyer did not benefit weaker buyers. Accordingly, it considered that a divestment of RMX assets would not be effective in improving the negotiating leverage of smaller customers.[29] Lafarge Tarmac stated that it was incumbent on the CC to explain why the creation of a cement buyer group would not prove to be a better solution.[30]

23. Lafarge Tarmac noted the CC's view that cross-sales increased price transparency via both price announcement letters and agreed prices but considered that the CC had not demonstrated that this concern warranted a structural remedy.[31] It considered that a prohibition on sending price announcement letters would be sufficient to address this concern.[32] Lafarge Tarmac also rejected the view that Lafarge sales to Cemex and Hanson increased transparency or acted as a signal.[33] In addition, Lafarge Tarmac noted the decrease in cross-sales in recent years as a result of significant changes in the market which rendered a structural remedy unnecessary.[34] It asserted that 'the simplest way to reduce the scope for cross-sales is entirely to prohibit them' whereby 'the alleged problem [was] instantly removed'. Lafarge Tarmac considered that the divestment of RMX sites would not prevent cross-sales from taking place and would not therefore be an effective remedy.[35]

24. Lafarge Tarmac noted the CC's view that if the Top 3 cement producers had a lower degree of internal cement, each might compete harder for external customers. However, it considered that it 'already had by far the lowest share of internal demand for cement' which indicated that further RMX divestments would not be appropriate or proportionate. Lafarge Tarmac considered that the CC was taking 'an entirely contradictory approach in the MIR to that taken in the Merger Review by asserting

[29] Lafarge Tarmac response to the Notice of possible remedies, paragraph 261.
[30] Lafarge Tarmac response to the Notice of possible remedies, paragraph, 262.
[31] Lafarge Tarmac response to the Notice of possible remedies, paragraph 263.
[32] Lafarge Tarmac response to the Notice of possible remedies, paragraph 264.
[33] Lafarge Tarmac response to the Notice of possible remedies, paragraph 266.
[34] Lafarge Tarmac response to the Notice of possible remedies, paragraph 267.
[35] Lafarge Tarmac response to the Notice of possible remedies, paragraph 269.

that Lafarge's high exposure to the external market was a feature that made coordination more likely'.[36]

C3

25. In its response to the CC's Notice of possible remedies, Lafarge Tarmac considered that the organization of any CBG would be a matter for comment by its potential members and would not therefore propose to comment further.[37] However, during its response hearing it stated that it did not believe that the establishment of a CBG would be an effective remedy. It had striven to develop its individual customer relationships and did not wish to be a commodity driven company. It considered that larger cement purchasers would not willingly become part of a CBG as this would mean they could not differentiate themselves from their competitors by exercising their procurement expertise. Furthermore, most customers believed they could gain competitively by negotiating themselves rather than on par with their competitors. Overall, Lafarge Tarmac believed that CBGs would not necessarily benefit the customer and noted that there was currently nothing preventing CBGs from being set up.[38]

C4

26. Lafarge Tarmac contended that price announcement letters were 'not an effective directional signal of how prices will move', that they did 'not provide a meaningful indicator for how any individual customer price would change', they had 'no commitment power' and were 'unlikely to soften customer resistance to price changes'.[39] While Lafarge Tarmac contended that price announcement letters 'do not harm competition' it noted 'that the most straightforward remedy to a concern about such letters [was] to prevent them from being sent'. It considered that a structural

[36] Lafarge Tarmac response to the Notice of possible remedies, paragraph 270.
[37] Lafarge Tarmac response to the Notice of possible remedies, paragraph 215.
[38] Lafarge Tarmac response hearing summary, paragraph 37.
[39] Lafarge Tarmac response to the Notice of possible remedies, paragraph 104.

remedy was unnecessary and would not prevent such letters from being sent.[40] Instead, it suggested that behavioural remedies, to include a prohibition of generalized price announcement letters, 'would be effective in addressing all of the concerns identified in the CC's provisional findings.[41]

27. During the response hearing, Lafarge Tarmac stated that it was ready to stop sending generic price announcement letters. In future, price announcement letters would be individualized for each customer based on the products that customers purchased and would specify a proposed price per tonne rather than a general price increase. Lafarge Tarmac explained that price announcement letters were still in demand from customers who used them for budgetary and negotiating purposes. Lafarge Tarmac considered that individualized price announcement letters should apply to all cementitious products. While this remedy would result in some additional administration costs, Lafarge Tarmac considered that it would be of benefit to the industry as it would focus cement companies on negotiating individually with its customers.[42]

C5

28. In its response to the CC's Notice of possible remedies, Lafarge Tarmac stated that it did not propose to comment on the proposed market data remedies on the basis that 'publication of data by these public authorities is a matter for them alone, and Lafarge Tarmac has no ability or wish to influence the manner in which these authorities choose to exercise their functions'.[43] However, during the response hearing Lafarge Tarmac stated that [✂].[44] Lafarge Tarmac also noted that, in the context of the CC's

[40] Lafarge Tarmac response to the Notice of possible remedies, paragraph 228.
[41] Lafarge Tarmac response to the Notice of possible remedies, paragraph 288.
[42] Lafarge Tarmac response hearing summary, paragraph 38.
[43] Lafarge Tarmac response to the Notice of possible remedies, paragraph 199.
[44] Lafarge Tarmac response hearing summary, paragraph 39.

Merger Review, both Lafarge and Tarmac had indicated to the CC that they would be prepared to limit the JV's participation in any cement data exchange.[45]

C6

29. Lafarge Tarmac considered that the ETS data was not only available on cement but covered other products such as asphalt and other industries' data. If ETS data was published at a more aggregated level it would not have any adverse impact on Lafarge Tarmac.[46]

C7

30. Lafarge Tarmac's position was restricted to the production of GBS. It had no activities in the conversion of GBS to GGBS or in the downstream supply of GGBS to customers. GBS facilities were co-located with steel and iron-producing works and by their nature, GBS operations could not be operated away from the steel works.[47] Lafarge Tarmac estimated that its 2011 activities in GBS contributed £[✂] to its EBITDA (before SG&A).[48]

31. Lafarge Tarmac had agreements with Tata Steel and SSI to remove all slag produced at their respective steel plants.[49] In addition, Lafarge Tarmac had an exclusive contract with Hanson for the supply of GBS until 2029. It could only sell GBS to third parties or grind it itself once its stockpiles exceeded a specified amount provided that Hanson was given first refusal to supply the identified customer. Only the amount which exceeded the specified stockpile could be sold and to an entity

[45] Lafarge Tarmac response to the Notice of possible remedies, paragraph 200.
[46] Lafarge Tarmac response hearing summary, paragraph 40.
[47] Lafarge Tarmac response to the Notice of possible remedies, paragraph 273.
[48] Lafarge Tarmac response to the Notice of possible remedies, paragraph 274.
[49] Lafarge Tarmac response hearing summary, paragraph 29.

who would not use it for the production of GGBS or any other cementitious product within GB or for resale within GB.[50]

32. Lafarge Tarmac considered that the focus on GBS/GGBS provided the CC with 'a unique opportunity to produce highly pro-competitive outcomes in the GB cement market' as 'the ability to secure access to low-cost local source of GGBS has the potential radically to change the structure of the GB cementitious market'.[51]

33. Lafarge Tarmac noted that Hanson did not grind GBS in its existing cement works but operated four facilities that were dedicated to grinding GBS and that those facilities were either co-located in or within the steel works or were located very close to them.[52] Lafarge Tarmac considered that whilst it was possible to operate GBS activities separately from GGBS activities, efficiencies may arise if operated together, more especially in the reduction of transport costs.[53]

34. Lafarge Tarmac noted that it would be possible for three separate and independent parties to each operate a GGBS/GBS facility at each steel works but that this might dissuade potential purchasers on the basis of 'high levels of uncertainty facing the long term operations of these [steel] works'.[54] Lafarge Tarmac considered that 'the operation by the steelworks themselves of the liquid blast furnace activities to produce GBS may overcome these problems'[55] and suggested that 'an appropriate remedy would involve the sale of GBS granulation activities back to the steelworks who would then be able to produce GBS and sell it on the open market to any willing purchaser'.[56] It noted that similar structural changes to the supply of GBS were

[50] Lafarge Tarmac response hearing summary, paragraph 28.
[51] Lafarge Tarmac response to the Notice of possible remedies, paragraph 275.
[52] Lafarge Tarmac response to the Notice of possible remedies, paragraph 278.
[53] Lafarge Tarmac response to the Notice of possible remedies, paragraph 279.
[54] Lafarge Tarmac response to the Notice of possible remedies, paragraph 280.
[55] Lafarge Tarmac response to the Notice of possible remedies, paragraph 281.
[56] Lafarge Tarmac response to the Notice of possible remedies, paragraph 282.

recently introduced in Germany[57] and gave the example of Tata in Europe where it owned and ran the granulators and sold GBS directly to the open market.[58]

35. Lafarge Tarmac understood that, currently, approximately 1.5 Mt of GBS was available from what was produced by the steelworks but was not ultimately ground to produce GGBS. It contended that if it were made available to any willing purchaser, it would immediately release 1.5 Mt of GGBS to the market. On the basis that GGBS can be blended with CEM I at a rate of 40 to 50 per cent, this would equate to an additional 2.5 Mt of blended grey cement which would 'place considerable downward pressure on cement prices in GB'.[59]

Z1

36. Lafarge Tarmac did not believe cross-sales were an issue for its business due to its existing network and limited demand from the other majors to buy externally. Lafarge Tarmac purchased what it considered to be a 'de minimis' quantity of cement from Hanson and Cemex.[60]

Z2

37. Lafarge Tarmac did not believe that information firewalls between the RMX and cement divisions of its businesses would be a viable remedy. Any firewall would need to be strong and Lafarge Tarmac would likely lose efficiency across its business in terms of its ability to manage its businesses. In addition, Lafarge Tarmac valued the ability of the businesses to work together to enlarge its offering to customers. Implementation of a firewall would also be difficult.[61]

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[57] Lafarge Tarmac response to the Notice of possible remedies, paragraph 285.
[58] Lafarge Tarmac response hearing summary, paragraph 29.
[59] Lafarge Tarmac response to the Notice of possible remedies, paragraph 283.
[60] Lafarge Tarmac response hearing summary, paragraph 42.
[61] Lafarge Tarmac response hearing summary, paragraph 43.

Z3

38. Lafarge Tarmac believed the divestment of a stand-alone grinding station would attract more potential purchasers than the divestment of a cement plant. However, there would need to be a ready supply of clinker. Clinker could be imported from outside of the ETS area. Imported clinker would have to be ground whereas imported cement was a ready product to be placed. As such, Lafarge Tarmac could not understand why it would be more beneficial for companies to import clinker rather than cement. The high price of electricity in the UK would also be a disadvantage to any potential purchaser of a grinding station to locally grind clinker.[62]

Cemex

39. Cemex submitted a response to the CC's Notice of possible remedies plus a response to issues for comment in relation to the proposed remedies. Cemex also attended a response hearing on 28 June 2013. Further to the response hearing, Cemex submitted a supplemental submission and a further submission on other parties' responses to the CC's provisional findings report and Notice of possible remedies.

C1

40. Cemex strongly disagreed with the CC's provisional findings in respect of the cement market.[63] It considered that the CC had 'not been able to demonstrate that there is an AEC in the GB cement market and that therefore no remedies are necessary'.[64] Cemex considered the cement plant divestiture remedy 'intrusive and irreversible',

[62] Lafarge Tarmac response hearing summary, paragraph 44.
[63] Cemex response to the Notice of possible remedies, paragraph 1.2.
[64] Cemex response to the Notice of possible remedies, paragraph 2.1.

'disproportionate' and 'draconian'. It also considered that it would 'not be effective in remedying the AEC'.[65]

41. In respect of the effectiveness of this remedy, Cemex considered that its asset base was particularly unsuited to divestiture remedies and would not lead to the creation of an effective or efficient competitor.[66] This was because it had only two cement plants.[67] In addition, Cemex did not believe that the CC needed to create a new player in the market as there already existed a new player in the form of HCM.[68]

42. In respect of the proportionality of this remedy, Cemex stated that there were uncertainties in the CC's profitability and margins analysis[69] and consequently, an overstatement of the harm to consumers.[70] Cemex also considered that the CC had not taken sufficient account of the impact that the entry of HCM and the formation of Lafarge Tarmac would have on any alleged coordination in the GB cement market.[71] It noted that HCM was fully operational and competing strongly for volumes. In addition, there had been a continuous growth in importers (in particular CRH[72]) and Cemex had suffered significant price reductions for its products in the market just as costs were rising.[73] It asserted that the GB cement market was 'in flux and, to the extent that any AEC exists, the market may self-correct as a result of the changes taking place'.[74]

43. In a later submission, Cemex described HCM as 'a new aggressive force, pursuing a volume strategy' and 'the CC was wrong to assume that HCM will simply step into

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[65] Cemex response to the Notice of possible remedies, paragraph 2.16.
[66] Cemex response to the Notice of possible remedies, paragraph 3.50.
[67] Cemex response to the Notice of possible remedies, paragraphs 3.51 & 5.7.
[68] Cemex response hearing summary, paragraph 22.
[69] emex response to the Notice of possible remedies, paragraphs 3.6–3.13.
[70] Cemex response to the Notice of possible remedies, paragraphs 3.14 &3.15.
[71] Cemex response to the Notice of possible remedies, paragraph 3.16.
[72] Cemex response hearing summary, paragraph 4; Cemex considered that CRH was more than likely in the process of becoming a major new importer. At paragraph 8, Cemex response hearing summary, Cemex said that prices had dropped [✂] in 2013 as a consequent of Lafarge Tarmac and HCM competing hard for capacity.
[73] Cemex response hearing summary, paragraph3.
[74] Cemex response to the Notice of possible remedies, paragraph 3.19.

the shoes of Tarmac'. In particular, having had sight of Lafarge Tarmac's response to the CC's provisional findings, Cemex has noted that Lafarge Tarmac had estimated HCM's output to be 1.5 Mt whereas Cemex had previously estimated it to be 1.2 Mt. Cemex therefore considered HCM to be a bigger threat than it originally believed. Cemex also considered that 'given HCM's incentive to operate the Hope plant at close to full capacity it is likely that HCM's share of GB sales will actually be greater than 16% and its share of sales to the external GB cement market will be significantly higher'.

44. Cemex asserted that despite the UK market fundamentally changing in recent years, the CC had continued to place significant emphasis on historical evidence.[75] Again, Cemex pointed to the fact that it had only two cement plants and if the CC required Cemex to divest one of these, it would no longer be able to compete effectively in the GB cement market.[76] As it was, Cemex [✂] and therefore, if it was forced to divest a cement plant it would have a greater impact on it rather than its competitors.[77]

45. Cemex's cement plant at Rugby accounted for approximately [✂] of Cemex's clinker production capacity and over [✂] of Cemex's cement production. The sale of Rugby would therefore result in [✂].[78]

46. [✂][79]

47. Cemex expressed concern that if the CC were to impose a cement (or RMX) divestiture remedy, it would lead to the sale of assets at less than fair value on the

[75] Cemex response hearing summary, paragraph 2.
[76] Cemex response to the Notice of possible remedies, paragraph 5.15(c)., 'Cemex notes that Hanson has submitted that in order to continue to serve its current and future customer obligations with only two plants, Hanson would incur additional costs amounting to millions of pounds' and that 'this applies even more strongly to Cemex as the divestment of either of Cemex's two cement plants would mean that Cemex would have to serve its current and future customer obligations with only one plant'. Cemex also stated that a divestment of its Rugby plant [✂].
[77] Cemex response hearing summary, paragraph 15.
[78] Cemex response to the Notice of possible remedies, paragraph 5.16.
[79] Cemex response to the Notice of possible remedies, paragraph 5.18.

basis that the sale of the assets would take place 'in the midst of a severe economic downturn and most, likely, at the bottom of the economic cycle'.[80] Cemex considered that a forced sale of assets at an undervalue would undermine its financial viability given that [✂] which was a relevant factor for the CC to consider in its assessment of proportionality[81] and that [✂] which would lead to an [✂] and would restrict its ability to compete effectively in the market.[82] In a later submission, Cemex observed that 'Hanson notes that where possible it strategically matches its RMX sites to its aggregates sites' and that 'Cemex follows a similar strategy and any divestment of RMX sites by Cemex would adversely affect its aggregates business'.

48. Cemex considered that only one further cement producer with adequate capacity to serve the external market was necessary to achieve an effective remedy. However, Cemex believed that to the extent that there was any coordination in the GB cement market, the entry of HCM had already 'greatly disrupted the market and contributed to a reduction in cement prices'.[83]

49. Cemex was unable to comment on whether a divestiture of cement production capacity from Hanson or Lafarge Tarmac should be considered[84] or on the specific plants of Hanson or Lafarge Tarmac which would most likely form the basis of an effective divestiture package. However, Cemex considered that in order to constitute an effective remedy, the divested cement plant should, at a minimum, have the following characteristics:

(a) it should have adequate capacity to compete and take advantage of economies of scale. Cemex considered that such a plant should have 1.2 Mt as a minimum;

[80] Cemex response to the Notice of possible remedies, paragraph 3.36.
[81] Cemex response to the Notice of possible remedies, paragraph 3.37.
[82] Cemex response to the Notice of possible remedies, paragraph 3,38.
[83] Cemex response to Issues for Comment in the CC's Notice on remedies, paragraph 2.3.
[84] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 2.5.

(b) it should ideally be rail-linked;[85]

(c) it should be situated close to its quarry site and security of supply should be ensured; and

(a) it should follow a fully dry process of cement production (as opposed to semi-dry or a semi-wet process which are more energy intensive resulting in increased production costs).[86]

50. Cemex considered that given the [✂], and the requirement for the CC to address the AEC swiftly, that latent production capacity should be disregarded in assessing the extent of divestiture necessary.[87] In particular, Cemex considered that the [✂][88] and assumed that [✂].[89] It also stated that it needed to retain a certain amount in order to cope with any potential upturn in the market.[90]

51. Cemex considered that it was unnecessary for a cluster of RMX plants to be divested along with cement production capacity in order to be effective.[91] Should such a producer decide that they wished to build or acquire their own ready-mix plant they could do so easily.[92] [✂][93] without such a capacity and had competed successfully in both ready-mix and cement.[94] [✂]

52. In respect of purchaser suitability, Cemex considered that it would serve as an advantage for an acquirer of a cement plant to have previous experience of operating

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[85] From a supply-side perspective, Cemex viewed the market as national in that each cement plant, in its own right, could reach every part of the country. Therefore, location was a factor that an investor would have to balance against other aspects of the plant in question. Rail links would be a critical factor to consider for such an investor and would affect the purchase price. (Cemex response hearing summary, paragraph 23.)
[86] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 2.10.
[87] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 2.8.
[88] However, Cemex said during the response hearing held on 28 June 2013 that, 'although it was not technically difficult to bring capacity online at a plant such as Ferriby, it would be very expensive.
[89] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 2.7.
[90] Cemex response hearing summary, paragraph 24.
[91] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 2.12.
[92] Cemex response hearing summary, paragraph 27.
[93] In respect of [✂] Cemex had no RMX operations when it entered those geographic markets and was able to operate viably and Cemex continues to operate in those markets with very low levels of vertical integration. It also operated stand-alone cement plants in the [✂].
[94] Cemex response hearing summary, paragraph 26.

in the GB cement (or closely related) markets. Cemex saw no reason why [✂] would not be a suitable purchaser of divested cement capacity.[95] Cemex considered that the CC should allow at least 6 to 10 months to agree final undertakings and a further 12 months to complete divestiture of the cement capacity.[96] Cemex considered that a reasonable divestiture period was required to obtain a fair value for the asset and to ensure that the relevant asset can be properly separated from the business and handed over to the purchaser. Undertakings which imposed a general duty to maintain the divesture package in good order and not to undermine the competitive position of the package were appropriate.[97]

C2

53. Cemex noted that the CC had not found an AEC in the RMX market rendering the forced divestiture of RMX plants unnecessary.[98] Its primary objection to this remedy was that it would not be effective in achieving the aims set out in the CC's Notice of possible remedies and was disproportionate.[99]

54. Regarding increasing the size of the addressable market, Cemex stated that the current size of the market was 4.5 million tonnes which accounted for approximately 50 per cent of GB cement production. As such, Cemex considered that an addressable market of that size already provided a sufficient incentive to enter and expand in the GB cement market.[100] Cemex contended that there had been little indication from customers or competitors that the size of the addressable market constituted a barrier to entry.[101] In addition, there was no evidence to show that if the addressable market increased in size it would result in more cement producers

[95] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 2.14.
[96] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 2.16.
[97] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 2.17.
[98] Cemex response to the Notice of possible remedies, paragraph 5.26.
[99] Cemex response to the Notice of possible remedies, paragraph 5.27.
[100] Cemex response to the Notice of possible remedies, paragraph 5.28.
[101] Cemex response to the Notice of possible remedies, paragraph 5.29.

entering the market or existing cement importers expanding their operations.[102] Cemex considered that no expansion by importers was possible because of the cost disadvantage they faced.[103]

55. In a subsequent submission, Cemex rejected the argument that the size of the addressable market around import terminals acted as a barrier to entry. It stated that 'as there is no separate market around import terminals it is disingenuous to suggest that the size of the addressable market around import terminals acts as a barrier to entry' which was highlighted 'by the entry of CRH which operates only import terminals but is able to supply of GB'. It also asserted that the addressable market for independent cement producers was not restricted to supplying fixed RMX plants and noted that 'in recent years, there has been a drift away from fixed RMX plants to volumetric trucks and precast concrete'.

56. While Cemex noted that, in theory, a reduction in cross-sales would lead to less transparency, it contended that 'a divestiture of RMX plants sufficient to stop all cross-sales would clearly be disproportionate'.[104] It also noted that the CC had acknowledged a reduction in cross-sales in recent years and therefore 'the imposition of an intrusive and irreversible remedy such as divestment would be unreasonable when the feature of the market it attempts to address has been greatly reduced'.[105]

57. Cemex considered that countervailing buyer power would not be created even where a large number of RMX plants were divested to a single purchaser. This was because most customers bought at 'job-site level and not at customer level' meaning that a single job-site would not have any more buyer power that such sites have at

[102] Cemex response to the Notice of possible remedies, paragraph 5.30.
[103] Cemex response to the Notice of possible remedies, paragraph 5.32.
[104] Cemex response to the Notice of possible remedies, paragraph 5.33.
[105] Cemex response to the Notice of possible remedies, paragraph 5.34.

present.[106] Cemex contended that the creation of cement buying groups 'would be a less intrusive, and therefore more proportionate, method of achieving this objective'.[107] It also considered that 'a remedy implementing a mechanism for mandatory competitive tendering for a specified quantity of cement for all the vertically integrated producers' RMX plants (to include HCM) would be more proportionate than a RMX divestiture'.[108]

58. Cemex considered this remedy to be particularly disproportionate and cited the same reasons that it did in respect of the cement plant divestiture remedy namely, that it had not contributed to the allegedly [✂] in the GB cement market, that it had not contributed to consumer harm and that a forced divestiture of RMX plants would lead to sales of assets at below market price.[109]

59. Cemex considered that the divestment of RMX plants would not be substantially different from that of cement plants. The only difference Cemex noted was that the due diligence for a potential buyer would be more complicated due to the large number of locations involved and the need for an environmental analysis of each site.[110]

60. Cemex considered that this remedy should be implement only for a period of up to three years which would go some way towards achieving the CC's aims of increasing the size of the addressable market and encourage entry, while providing a new cement entrant with sufficient time to establish a reputation and/or set up its own RMX network.[111]

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[106] Cemex response to the Notice of possible remedies, paragraph 5.36.
[107] Cemex response to the Notice of possible remedies, paragraph 5.37.
[108] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 3.3.
[109] Cemex response to the Notice of possible remedies, paragraph 5.42.
[110] Cemex response hearing summary, paragraph 29.
[111] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 3.4.

61. Initially, Cemex considered that 'a target VI ratio could be adopted' but that 'it cannot be applied in an indiscriminate manner, which would result in the loss of GB producers' profitable RMX plants.[112] In particular, Cemex considered that it would not be appropriate to 'apply the same VI ratio to all of the Top 3 producers, without taking account of the impact the divestments would have on each producers' overall profitability.[113] However, in a subsequent submission, Cemex noted 'that if the CC were to require Cemex and Hanson to reduce their levels of vertical integration by divesting RMX plants, this would have the unintended consequence of making Cemex, Hanson and Lafarge more symmetrical' which would not accord with the CC's Market Investigation Reference Guidelines.[114] Cemex also noted that 'the risks posed by Cemex, Hanson and Lafarge each having a similar level of vertical integration was expressly recognised by the CC in its assessment of the *Lafarge/Tarmac* merger' and 'even if the CC does not accept that it is formally bound by its statements in the *Lafarge/Tarmac* merger inquiry, it would be absurd, and contrary to the principles of legal certainty, if the CC were to impose remedies which resulted in the exact scenario which it went to great lengths to avoid'.

62. Cemex considered that there should be no restriction on the Top 3 producers from acquiring new RMX capacity[115] even if forced to divest current RMX capacity. This was because the average age of Cemex's RMX plants was 35 years and it would need to replace or replenish them.[116]

63. In terms of the timing for implementing this remedy, Cemex reiterated the same timings and need for undertakings that it set out in respect of the cement plant divestiture remedy.

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[112] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 3.7.
[113] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 3.10.
[114] CC Market Investigation Reference Guidelines, paragraph 252*(d)*.
[115] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 3.14.
[116] Cemex response hearing summary, paragraph 28.

C3

64. Cemex considered that this remedy could be combined with remedy C5 in the event that the CC felt that remedy C5 was not adequate in isolation.[117] However, Cemex was of the view that C5 alone would 'undermine the alleged coordination such that there will be no requirement to create buyer power'.[118]

65. It considered that remedy C3 'would significantly increase buyer power in the GB cement market'[119] and cement buying groups should get a better price due to buying in bulk.[120] In addition, cement buying groups 'would create a number of large buyers and thereby undermine the alleged coordinated agreement by increasing incentives for cement producers to deviate'.[121] Subject to the following three conditions, Cemex agreed with the CC's proposal to create cement buying groups:

(a) there was no requirement to sell a specific proportion of cement to cement buying groups on the basis that it would be disproportionate and interfered with GB cement producers' freedom to contract. There was also a risk that cement buyers groups could hold 'GB cement producers to ransom' and 'will result in cement being sold below the competitive price' unless the CC imposed a minimum price and acted as a regulator;

(b) it would not be mandatory for cement producers to join a cement buying group; and

(c) that there was no requirement on any GB cement producer to be required to administer or pay for the cement buying groups.

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[117] Cemex response to the Notice of possible remedies, paragraph 5.46.
[118] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 4.4.
[119] Cemex response to the Notice of possible remedies, paragraph 4.54.
[120] Cemex response hearing summary, paragraph 31.
[121] Cemex response to the Notice of possible remedies, paragraph 4.56.

66. Cemex considered that demand for cement was on a regional basis and therefore regional cement buying groups would meet the needs of customers better.[122] It also considered that membership of a cement buying group should be open to all independent cement purchasers including intermediaries and builders' merchants.[123]

67. Cemex considered that contracts between cement buying groups and cement producers should be 'freely negotiated' and strongly objected to any requirement which prohibited cement buying group members from negotiating prices bilaterally on the basis that it would be 'grossly disproportionate and market distorting'.[124] Cemex also considered that 'the supplier should be able to take full account of whether a potential customer is credit worthy and be free to refuse to supply to a customer if terms cannot be agreed'.[125]

68. Cemex considered that there would be technical problems with cement buying groups due to the fact that when buying bulk cement, ready-mix companies would need two to three weeks to test it in order to understand its particular qualities and how it might perform with different mixtures.[126] However, Cemex did not believe that it would be difficult to establish regional buying groups from an administrative perspective, once the technical difficulties concerning the specification of cement had been overcome.[127]

C4

69. Cemex noted that the adverse effects of sending generalized price announcement letters identified by the CC (ie price leadership, price following and softening customer resistance to price increases) was not the primary AEC identified by the

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[122] Cemex response to the Issues for Comments in the CC's Notice on Remedies, paragraph 4.6.
[123] Cemex response to the Issues for Comments in the CC's Notice on Remedies, paragraph 4.10.
[124] Cemex response to the Issues for Comments in the CC's Notice on Remedies, paragraph 4.14.
[125] Cemex response to the Issues for Comments in the CC's Notice on Remedies, paragraph 4.8.
[126] Cemex response hearing summary, paragraph 30.
[127] Cemex response hearing summary, paragraph 33.

CC.[128] However, Cemex acknowledged that generalized price announcement letters played a 'secondary role of pricing information'[129] and considered that it was 'clear that a prohibition on generalized price announcement letters would reduce transparency and address a number of the CC's concerns'.[130]

70. Cemex stated that it would still need to communicate price increases to customers in writing and proposed that GB cement producers should be permitted to send individualized pricing letters.[131] It considered that a blanket prohibition on sending individualized price letters to customers would be disproportionate and would create transaction costs for both cement producers and customers. Individualized price letters would 'contain a new customer-specific price rather than a percentage increase'[132] but a general template 'would unduly restrict the commercial freedom of the cement producers and customer to negotiate in their preferred manner'.[133]

71. Cemex reiterated that remedy C5 by itself should be adequate to address the AEC identified by the CC but if the CC was not satisfied, remedy C4 could be combined with remedy C5.[134] Cemex stated that the CC's concerns related to transparency of pricing information in the cement market and not to other markets and therefore, there was no reason to restrict price announcements in markets other than bulk and bagged cement.[135]

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[128] Cemex response to the Notice of possible remedies, paragraph 4.40.
[129] Cemex response to the Notice of possible remedies, paragraph 4.41.
[130] Cemex response to the Notice of possible remedies, paragraph 4.47.
[131] Cemex response to the Notice of possible remedies, paragraph 5.53.
[132] Cemex response to the Issues for Comments in the CC's Notice of Possible Remedies, paragraph 5.6.
[133] Cemex response to the Issues for Comments in the CC's Notice of Possible Remedies, paragraph 5.8.
[134] Cemex response to the Notice of possible remedies, paragraph 4.48.
[135] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 5.3.

72. Cemex considered that for there to be an effective remedy, a restriction on sending generalized price announcement letters should apply to all GB cement producers (including HCM) and importers into GB in the interests of equity.[136]

C5

73. Cemex considered that this remedy option 'would be adequate in itself to remedy the AEC identified' but if the CC did not, it could be combined with all or any of remedy options C3, C4, C6 and Z2.[137] Cemex contended that the remedy option was sufficient in isolation to address the alleged AEC on the basis that the CC considered that for each GB cement producer, the focal point is its own share of GB cement sales.[138] However, Cemex did not agree with the CC's assertion that the Majors used MPA/BIS data to distort competition, rather that 'it aided Cemex in planning its volumes'.[139]

74. Consistent with the CC's analysis Cemex considered 'that publication of cement sales and production data after a time lag, such that it would no longer be of use to GB cement producers in monitoring their own shares of sales and production or those of its rivals, would be a particularly effective remedy to eliminate completely the alleged coordination in the GB cement market'.[140] It considered that a time lag of three months would be appropriate in that it would ensure that GB cement producers were 'not able to reliably monitor their own share of monthly production and this would be sufficient to undermine any alleged coordination'.[141]

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[136] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 5.4.
[137] Cemex response to the Notice of possible remedies, paragraph 2.5.
[138] Paragraph 4.20, Cemex response to the Notice of possible remedies, which makes reference to paragraph 8.164 of the CC's provisional findings.
[139] Cemex response hearing summary, paragraph 17.
[140] Cemex response to the Notice of possible remedies, paragraph 4.15.
[141] Cemex response to the Issues for comment in the CC's Notice on Remedies, paragraph 6.3.

75. Cemex considered that the MPA data was required to reach a revised coordinated agreement[142] and that other sources of information which might increase transparency such as win/loss data, information from customers and information obtained as cement buyers were 'supplemental' to the main MPA/BIS data[143] and could not, on their own, permit monitoring of the alleged coordinated agreement.[144] Cemex pointed out that there had been significant changes to parties' shares of capacity following the formation of HCM and Lafarge Tarmac meaning that the terms of the alleged coordination based on shares of sales required revision which 'would not be possible in the absence of data showing GB cement production and sales'. That being the case, 'the absence of recent MPA data would not only make monitoring of any coordinated agreement impossible, but it would also not be possible to reach a revised tacit agreement necessitated by changes in the capacity of each market participant'.[145]

76. Cemex considered that it was not necessary to make provision for disclosure of aggregated cement market data before the expiry of the specified time lag.[146] It also considered that GB cement producers should be able to supply sales and production volume data to trade associations and other private sector organizations after the expiry of an appropriate time lag, which it considered should be no more than three months in the case of monthly data.[147] Cemex considered that it would not be problematic to remove the regional breakdown of data as while it would make Cemex's long-term planning process more difficult, 'it would also prevent its

[142] Cemex response to the Notice of possible remedies, paragraph 4.25.
[143] Cemex response to the Notice of possible remedies, paragraph 4.23.
[144] Cemex response to the Notice of possible remedies, paragraph 4.24.
[145] Cemex response to the Notice of possible remedies, paragraph 4.28.
[146] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 6.5.
[147] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 6.7.

competitors from tracking the impact of other players in particular parts of the county'.[148]

C6

77. Cemex noted that remedy option C6 was aimed at reinforcing the reduction of transparency envisaged by remedy option C5[149] and that while remedy option C5 would be adequate in itself to address the AEC identified by the CC, remedy option C6 would provide a further layer of security.[150] Cemex noted that the CC viewed the EU ETS data 'as supplemental to the primary data facilitating coordination' being the MPA data and that it was therefore only appropriate to implement this remedy if the CC was of the view that remedy option C5 would be insufficient to address the alleged AEC.[151]

78. Cemex said that the EU ETS data did not play a significant role for Cemex commercially rather it was used by its sustainability team to validate whether its emissions figures were accurate.[152] It considered that six months would be a sufficient time lag for the publication of annual verified carbon emissions data[153] and that a delay in publication would be an effective and proportionate remedy which would reduce transparency while at the same time allow the EU ETS to achieve its objective.[154]

79. Cemex noted that 'this remedy option would require a change in how the European Commission reports and presents its published data for GB'.[155]

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[148] Cemex response hearing summary, paragraph 19.
[149] Cemex response to the Notice of possible remedies, paragraph 4.32.
[150] Cemex response to the Notice of possible remedies, paragraph 4.35.
[151] Cemex response to the Notice of possible remedies, paragraph 4.38.
[152] Cemex response hearing summary, paragraph 20.
[153] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 7.3.
[154] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 7.5.
[155] Cemex response to the Notice of possible remedies, paragraph 4.33.

C7

80. Cemex stated in its written response to the CC's Notice of possible remedies that [✂].[156] During the response hearing, Cemex said that even if there were more competition in the market for GGBS and this resulted in lower prices, Cemex would not look to increase the amount of GGBS that it purchased.[157]

81. Cemex did not know whether increased competition would drive down prices as this factor was dependent upon negotiation. Cemex often used PFA as opposed to GGBS for certain mixes of material depending on its clients' requirements.[158]

Z1

82. Cemex considered 'that a remedy implementing a mechanism for mandatory competitive tendering for a specified quantity of cement for the all the [sic] vertically integrated producers' RMX plants (including HCM's RMX plants) would be more proportionate than a RMX divestiture'.[159] It rejected any suggestion that this remedy would be difficult to monitor and noted the safeguards proposed by Hanson. However, Cemex also noted the reduction in cross-sales in recent years[160] and that [✂].[161]

Z2

83. Cemex considered that 'relatively simple and specific information barriers can be put in place between GB cement producers' cement and RMX divisions to reduce the transparency arising as a result of vertical integration' which would entail a prohibition on the following information being shared:

- the price paid for cement to competitors;

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[156] Cemex response to the Notice of possible remedies, paragraph 2.27.
[157] Cemex response hearing summary, paragraph 35.
[158] Cemex response hearing summary, paragraph 36.
[159] Cemex response to the Issues for Comment in the CC's Notice on Remedies, paragraph 3.3.
[160] Cemex response to the Notice of possible remedies, paragraph 5.34.
[161] Cemex response to the Notice of possible remedies, paragraph 5.35.

- cement price announcement letters received from competitors;
- information received from competitors on prices of cement charged to other RMX customers; and
- the price charged to RMX competitors for cement.[162]

84. Cemex noted that this proposed remedy was 'a variant of the CC's Remedy X3' which the CC had decided not to pursue on the basis that it would be very difficult to specify, monitor and enforce and effective code of conduct without intrusive ongoing surveillance and supervision of the internal activities of the Top 3.[163] Cemex disagreed with the CC and considered that its proposed remedy 'would not create any specification, circumvention, distortion or monitoring and enforcement tasks'.[164] It said that it already had such a mechanism in place as it was Cemex's policy to run its business as separate entities to a certain extent.[165]

Z3

85. Cemex considered that a divestiture of its [✂] grinding mill would not contribute to the creation of an effective competitor on the basis that:

[✂][166,167,168]

86. However, if the CC was of the view that the sale of [✂] would be effective as it could grind imported cement, Cemex noted that [✂]. Therefore, it would be

[162] Cemex response to the Notice of possible remedies, paragraph 4.50.
[163] Cemex response to the Notice of possible remedies, paragraph 4.51.
[164] Cemex response to the Notice of possible remedies, paragraph 2.13.
[165] Cemex response hearing summary, paragraph 37.
[166] Cemex response to the Notice of possible remedies, paragraph 5.13 (a).
[167] Cemex response to the Notice of possible remedies, paragraph 5.13(b).
[168] Cemex response to the Notice of possible remedies, paragraph 5.13(c).

disproportionate to require Cemex to divest [✂].[169] Furthermore, Cemex considered that [✂].[170]

Hanson

87. Hanson submitted a response to the CC's Notice of possible remedies and attended response hearings on 2 July and 23 July 2013.

C1

88. Hanson did not agree with core findings of the CC's provisional findings in as far as they related to cement and GGBS[171] and on that basis, Hanson believed that there was no AEC to address in any of the relevant markets and therefore, no remedies were required.[172]

89. Hanson considered that the cement divestiture remedy (and the RMX and GGBS divestiture remedies) 'would be highly intrusive and involve interference with property rights' which were protected under the European Convention of Human Rights. Accordingly, 'a higher standard of proof', 'stronger requirements for procedural fairness' and 'a greater focus on the reasonableness of proportionality of such remedies' were required.[173] Hanson asserted that the CC 'should consider, as a maximum, a package of behavioural remedies (for example remedies C3, C4, C5 and C6)' plus it volunteered a further remedy requiring external purchases of cement by GB cement producers to be subject to a tendering process (remedy Z1).[174]

90. In respect of proportionality, Hanson stated that there were 'a number of factors which demonstrated that it would not be proportionate to impose any remedy

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[169] Cemex response to the Notice of possible remedies, paragraph 5.20.
[170] Cemex response to the Notice of possible remedies, paragraph 5.21.
[171] Hanson response to the Notice of possible remedies, paragraph 1.3.
[172] Hanson response to the Notice of possible remedies, paragraph 1.4.
[173] Hanson response to the Notice of possible remedies, paragraph 1.7 & 2.14.
[174] Hanson response to the Notice of possible remedies, paragraph 1.14.

designed to alter the structure of the cement, RMX or GGBS sectors' to include the 'damaging potential impact of any such remedies', 'the lack of evidence of detrimental effects' and the 'dynamic market situation'.[175]

91. Regarding the impact on Hanson of the cement divestiture remedy, Hanson stated that mandatory divestment of a cement plant by Hanson 'would be catastrophic for the Hanson business'. In particular, it would suffer [✂] impairment costs and stated that the divestment of [✂] would result in [✂] impairment costs.[176] Hanson considered that without the [✂] clinker capacity of [✂], it would not be able to service its current level of demand and that a divestment of its [✂] would 'reduce Hanson's capacity [✂]' which would be 'unduly punitive on Hanson and would remove from the competitive market an operator having a suitably strong production capacity and status as an effective major competitor'.[177] It also said that [✂] was an integral part of its logistics and overhead structure and therefore a key part of its portfolio.[178] Hanson also stated that 'such a divestment would more likely result in a collapse in Hanson's market share, causing a reduction in operation and footprint as a GB cement major resulting in [✂] business that ultimately increased costs for customers and consumers. Hanson considered that a reduction in the number of cement plants from three to two 'would threaten Hanson's underlying business model and could [✂].'[179]

92. Regarding lack of detrimental effects, Hanson stated that the CC had not shown that the perceived AEC had led to any adverse effects on direct, or indirect, customers,[180] that the CC placed 'significant weight on its findings of excessive profitability'[181] even though the CC's approach to calculating industry profitability was 'fundamentally

[175] Hanson response to the Notice of possible remedies, paragraph 1.10.
[176] Hanson response to the Notice of possible remedies, paragraph 3.5.
[177] Hanson response to the Notice of possible remedies, paragraph 3.7.
[178] Hanson response hearing summary, 2 July 2013, paragraph 18.
[179] Hanson response to the Notice of possible remedies, paragraph 3.6.
[180] Hanson response to the Notice of possible remedies, paragraph 3.10.
[181] Hanson response to the Notice of possible remedies, paragraph 3.11.

flawed'.[182] Hanson asserted that even if the CC's profitability figures were correct,[183] 'they would not provide sufficient grounds on which to conclude that a divestment remedy is proportionate'.[184]

93. Hanson considered that a cement divestiture would not be effective and that the CC had 'not considered how a structural remedy and the consequential creation of a fifth or sixth cement producer would remedy any AEC'.[185] It asserted that case law had 'shown that, in nearly all of five-to-four merger cases, a 'well functioning market' has been maintained and the merger has been approved'[186] and that 'it would appear that the [CC was] looking to create a theoretical position of 'perfect competition'' and that such an approach would clearly be disproportionate.[187]

94. Hanson stated that the dynamic nature of the market was 'fundamental to any theory of harm relating to cement markets' and 'to any decision on remedies'[188] yet the CC had not 'performed any form of cogent assessment or analysis of the very significant recent markets developments highlighted in any of Hanson's responses to Working Papers' and that this represented 'a substantial procedural failure' on the part of the CC which 'would result in any proportionality analysis being fundamentally flawed'.[189] Hanson asserted that the impact of the Lafarge Tarmac JV, establishment of HCM and the scaling up of CRH meant that it was 'impossible for the Commission to predict the market outlook and development of competition in the future'.[190]

95. Hanson considered that 'HCM's supply chain within the wider Mittal group will give it a significant competitive advantage' with 'access to overseas clinker and GBS to

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[182] Hanson response to the Notice of possible remedies, paragraph 3.12.
[183] The customer detriment figure contained in the CC's provisional findings was £180 million.
[184] Hanson response to the Notice of possible remedies, paragraph 3.13.
[185] Hanson response to the Notice of possible remedies, paragraph 3.27.
[186] Hanson response to the Notice of possible remedies, paragraph 3.28.
[187] Hanson response to the Notice of possible remedies, paragraph 3.29.
[188] Hanson response to the Notice of possible remedies, paragraph 3.30.
[189] Hanson response to the Notice of possible remedies, paragraph 3.31.
[190] Hanson response to the Notice of possible remedies, paragraph 3.32.

grow market share and aggressively attract customers away from other Majors'.[191] Hanson believed that HCM will have a 16 per cent market share in cement capacity being a 60 per cent increase in comparison to Tarmac's pre-JV share of 10 per cent which meant that 'HCM now sits alongside Hanson and Cemex as a leading, and one of the largest, cement and concrete companies in the UK'.[192] Hanson stated that 'Tarmac's business model was one of focus on self-supply, whereas Hope's is the opposite with the necessary reliance on external sales to achieve its share. Unlike Tarmac, HCM is 'long' in cement with very significant surplus to carry out external sales'. According to Hanson, the entry of HCM 'fundamentally changes the market dynamic'[193] having [✂] and having gained 'significant contracts from key customers for large quantities of cement'.[194] Hanson said it had observed a higher level of tendering in the market following the entry of HCM which created greater competition and downward pressure on pricing.[195] Hanson considered that the creation of HCM following the Lafarge Tarmac JV had 'scope to undermine any perceived coordination in the GB cement markets' and 'it would now seem extraordinary for the [CC] to work immediately to levy further remedies, when it has only just implemented the most severe and fundamental remedy that is possible'.[196]

96. Hanson also considered that 'recent acquisitions by CRH introduces further structural change and uncertainty to the market' and pointed to CRH's acquisition of Southern Cement from Cementos Portland Valderrivas (CPV) in February 2013 plus 'numerous assets of the Dudman importer business'.[197] Hanson considered that CRH had 'significantly scaled up its GB operations now having access to five import terminals (compared with one previously), allowing it to become a major player in the

[191] Hanson response to the Notice of possible remedies, paragraph 3.33.1.
[192] Hanson response to the Notice of possible remedies, paragraph 3.33.2.
[193] Hanson response to the Notice of possible remedies, paragraph 3.33.3.
[194] Hanson response to the Notice of possible remedies, paragraph 3.33.4.
[195] Hanson response hearing summary, 2 July 2013, paragraph 6.
[196] Hanson response to the Notice of possible remedies, paragraph 3.36.
[197] Hanson response to the Notice of possible remedies, paragraph 3.38.

GB cement market'[198] and that CRH had 'internal access to virtually unlimited quantities of locally produced cement (through Irish Cement's facilities in Castlemungret, Limerick and Platin Co, Meath)'. As such, Hanson did not consider that the cost penalty disadvantage faced by imports applied to CRH.[199] Hanson considered that the expansion of CRH in the UK was representative of the trend towards overseas cement producers establishing a significant presence in the market[200] who might see the UK as an attractive outlet for the excess capacity overseas.[201] Hanson noted that Paragon had started to sell surplus cement on the open market which contributed to the changing market dynamic.[202]

97. Hanson did not believe that there was room in the market for a new competitor as it would impact the financial viability of existing players and so prove adverse. It considered that a fifth GB cement producer would not have the effect of reducing prices as it believed there was already sufficient competition in the market. It suggested that any new player would have to price cement in a manner that would generate sufficient returns to cover the substantial fixed costs involved in operating a cement plant and the subsequent volumes required to achieve this could potentially be severe for the viability of the established players in the market.[203]

98. Regarding potential divestiture of latent capacity, although Hanson had a [✂]. Hanson considered that without some form of latent capacity its ability to compete in the market and expand would be significantly reduced.[204]

99. Hanson believed it was difficult to comment on which cement plants might be suitable for divestiture. Numerous factors had to be considered such as capacity, access to

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[198] Hanson response to the Notice of possible remedies, paragraph 3.39.1.
[199] Hanson response to the Notice of possible remedies, paragraph 3.39.2.
[200] Hanson response hearing summary, 2 July 2013, paragraph 8.
[201] Hanson response hearing summary, 2 July 2013, paragraph 10.
[202] Hanson response hearing summary, 2 July 2013, paragraph 8.
[203] Hanson response hearing summary, 2 July 2013, paragraph 19.
[204] Hanson response hearing summary, 2 July 2013, paragraph 21.

customers, rail-linkage, access to sufficient resources and associated planning permission. It considered that the specific criteria would depend upon the strategy of any new investor. However, it believed London and the South-East was the most important market and therefore, a new player would need to be able to access that market.[205] Hanson considered that there were a range of possible purchasers of a divested cement plant such as CRH, AI/Holcim, a steel company or private equity entity.[206]

100. Hanson did not consider that it was necessary for any potential purchaser of a divested cement plant to own RMX plants alongside a cement plant. It also considered that the CC's suggestion of divesting RMX plants along with a cement plant was counter-intuitive given the CC's concerns regarding vertical integration. Given the low barriers to entry of the RMX market, it would be easy for a purchaser to acquire RMX plants.[207]

C2

101. Hanson stated that the divestiture remedy relating to RMX (and GGBS) 'would, if addressed to Hanson, seek to unwind an industry structure which has been expressly approved by the European Commission ... in its *Heidelberg/Hanson* merger decision'.[208] Accordingly, Hanson believed that as a result, it was now beyond the CC's power to order a structural remedy[209] but if the CC disagreed, the CC should consider the decision of the EC in its analysis of proportionality.[210] Hanson noted that the OFT had the opportunity to request a reference back to the UK if it considered at the time that the merger was either of significant importance to

[205] Hanson response hearing summary, 2 July 2013, paragraph 23.
[206] Hanson response hearing summary, 2 July 2013, paragraph 24.
[207] Hanson response hearing summary 2 July 2013, paragraph 20.
[208] Hanson response to the Notice of possible remedies, paragraph 4.1.
[209] Hanson response to the Notice of possible remedies, paragraph 4.2.1.
[210] Hanson response to the Notice of possible remedies, paragraph 4.2.2.

the UK or that it had some other legitimate interest in doing so[211] but the OFT failed to do so which Hanson interpreted to mean that 'the OFT did not have any significant objections to the alterations to the degree of vertical integration on cement and GGBS markets'.[212]

102. Hanson stated that its business strategies and contractual arrangement had 'been based on the reasonable belief and legitimate expectation that the inter-relationship between Hanson's cement business with both RMX and GGBS did not have an anti-competitive effect' and as there had been no material change in circumstances since the acquisition, 'it would be disproportionately detrimental to Heidelberg Cement and Hanson to order structural remedies'.[213]

103. Hanson did not consider that coordination existed in the RMX market and that 'even if it were to exist, the vertical integration between cement and RMX/concrete products producers is not a factor materially facilitating that coordination'.[214]

104. With regard to the size of the addressable market, Hanson considered that a market where 'some 60 per cent of GB bulk cement demand is already represented by non-GB cement producers' was sufficient and it pointed to the *Airtours* decision. It also stated that the independent RMX sector had been growing despite the downturn and that the relative growth of importers suggested 'that the size of the addressable market is in no way a barrier to entry'.[215] Hanson considered that any new RMX competitor would simply be viewed as another customer and would not affect the dynamics of the customer base.[216]

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[211] Hanson response to the Notice of possible remedies, paragraph 4.7.
[212] Hanson response to the Notice of possible remedies, paragraph 4.8.
[213] Hanson response to the Notice of possible remedies, paragraph 4.17.
[214] Hanson response to the Notice of possible remedies, paragraph 5.1.
[215] Hanson response to the Notice of possible remedies, paragraph 5.3.1.
[216] Hanson response hearing summary, 2 July 2013, paragraph 27.

105. With regard to cross-sales, Hanson stated that there were only very limited cross-sales now that the various internalisation processes had completed in the market. It also commented that whilst the CC noted the possibility of an increase in cross-sales in the event on an upturn in demand, it saw no evidence of an improvement in demand in the foreseeable future. It considered that a mandatory divestment of RMX sites to justify concerns regarding cross-supply would 'be overly onerous and disproportionate, and given the absence of cross supply in the new market would be both unnecessary and would do nothing of any effect in this respect'.[217]

106. With regard to countervailing buyer power, Hanson considered that with some [55–70 per cent] of bulk cement sold to the independent RMX and concrete products sectors, the RMX sector already had significant buyer power where independent RMX customers had multiple choices of supplier and the ability to switch which showed that there was no need to improve the bargaining power of the independent RMX sector. Hanson also considered that it was the strength of countervailing buyer power that had led to importers taking their strong and growing market share from nothing in recent times. On this basis, Hanson considered that 'any mandatory RMX divestment would be disproportionate and without material effect, if it were carried out with the objective of increasing buyer power, since no material change would result from such a remedy with regard to such buyer power'.[218]

107. Hanson also stated that it relied upon external customers for [55–70 per cent] of its cement sales (the majority of which were RMX and concrete products customers).[219]

108. Aside from being disproportionate and lacking in effect on the perceived AEC, Hanson stated that this remedy 'would undermine RCBs in the aggregates market'

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[217] Hanson response to the Notice of possible remedies, paragraph 5.3.2.
[218] Hanson response to the Notice of possible remedies, paragraph 5.3.3.
[219] Hanson response to the Notice of possible remedies, paragraph 5.3.4.

which derived from vertical integration.[220] Hanson explained that every tonne of concrete sold necessitated the sale of two tonnes of aggregate. Accordingly, any divestment of RMX sites by Hanson would be harmful to Hanson's aggregates business.[221] Hanson stated that the RMX divestiture remedy would also 'result in mothballing and closures of a commensurate proportion of Hanson's aggregates sites, creating less supply and reducing competition in local aggregates markets, with less choice and higher costs resulting for the aggregates consumers'.[222]

109. Hanson also considered that some [30–45 per cent] of Hanson's cement sales were 'in effect dependent upon the successes and failures at the level of its own downstream RMX business' and if 'Hanson's footprint in RMX were in any way reduced, that same amount of dependent cement business would cease to be determined at the extremely competitive downstream level of RMX; and instead revert to the cement sales market itself, with a much smaller number of competitors'. Therefore, Hanson considered that it would damage benefits to the end customer if this 'extremely competitive indirect channel/outlet for cement sales would be removed or diminished'.[223] Hanson also noted that this remedy would 'produce the unintended effect of leaving Hope as the new undisputed market leader in RMX (even if Hope did not purchase any of the divested assets),[224] without the strong competition at the RMX level now afforded by the current market model' and that 'this could directly adversely affect what is now a very competitive and efficient RMX market operating on the lowest of margins, and so could prove damaging to customers at the RMX level and for the associated public interest'.[225]

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[220] Hanson response to the Notice of possible remedies, paragraph 5.5.
[221] Hanson response to the Notice of possible remedies, paragraph 5.6.
[222] Hanson response to the Notice of possible remedies, paragraph 5.7.
[223] Hanson response to the Notice of possible remedies, paragraph 5.8.
[224] Hanson response hearing summary 2 July 2013, paragraph 30.
[225] Hanson response to the Notice of possible remedies, paragraph 5.9.

110. With regard to the target VI ratio, Hanson noted that there was 'enormous variance in the VI Ratios between the different GB majors'[226] and as such 'it would be artificial and incorrect to assume that there exists such a thing as an ideal VI ratio'.[227] In terms of relevant customer benefits, Hanson also stated that a VI ratio would undermine significant efficiencies created by vertical integration and that the CC had not weighed its benefits into its decision.[228]

111. Hanson believed that any RMX plants that were divested from an existing, vertically integrated competitor would most likely be purchased by other established RMX players. However, from a practical perspective, Hanson considered that 'divestment of a package of RMX sites from a range of different companies, and indeed for the purposes of complementing a cement divestment from yet another company, would be an extremely burdensome and costly process. This would not merely be for any sellers in terms of arranging the necessary corporate and personnel structures and processes, but more significantly for the buyer, in terms of having to deal with a large number of separate assets and employees from several different sellers, causing problematic and costly integration hurdles'.[229]

C3

112. Insofar as an AEC did exist, Hanson considered that this remedy would be effective and proportionate.[230]

113. Hanson believed that cement buying groups could attain a level of purchasing power and noted the existence of buying groups that existed in the packed cement business. However, it considered that there could be complications in respect of

[226] Hanson response to the Notice of possible remedies, paragraph 5.15.
[227] Hanson response to the Notice of possible remedies, paragraph 5.17.
[228] Hanson response to the Notice of possible remedies, paragraph 5.21.
[229] Hanson response to the Notice of possible remedies, paragraph 5.22.
[230] Paragraph 3.1, Annex to the published Hanson response to the Notice of possible remedies.

RMX given the need for a variety of materials (some quite specific) and the location and structure of silo capacity.[231]

114. Hanson noted that the creation of cement buying groups could result in Hanson being able to supply groups that contained purchasers which Hanson would otherwise not consider creditworthy.[232] It also noted that buyer groups had the advantage of being able to pool credit and structure better guarantee arrangements with banks which could lead to more favourable pricing where this might otherwise be adversely impacted by worse credit risk for an individual customer.[233]

115. Hanson suggested that when considering this remedy, the CC should take into account the advantages which independent RMX operators could achieve through individual negotiation. It considered that RMX companies used quasi-tendering processes and/or the threat of switching to secure better terms which pointed to the need for an 'opt-in' system.[234] Hanson suggested that the CC should also consider 'the potential shortcomings of imposing a requirement on GB producers to sell a significant proportion of their cement production to any such buying group(s)' which 'would undermine the freedom and flexibility of cement producers, and the ability of independent RMX companies outside the buying group(s) to negotiate the best possible terms on an individualised basis'.[235]

C4

116. Insofar as an AEC did exist, Hanson considered that this remedy would be effective and proportionate[236] although Hanson did not agree with the CC that price announcement letters had the effect of facilitating price leadership, price following

[231] Hanson response hearing summary 2 July 2013, paragraph 32.
[232] Hanson response hearing summary 2 July 2013, paragraph 34.
[233] Hanson response hearing summary 2 July 2013, paragraph 35.
[234] Hanson response to the Notice of possible remedies, paragraph 7.14.1.
[235] Hanson response to the Notice of possible remedies, paragraph 7.14.2.
[236] Paragraph 4.1, Annex to the published Hanson response to the Notice of possible remedies.

and softening customer resistance to price increases. Hanson believed the CC had 'not shown that the practice of sending price increase proposal letters is inconsistent with a well-functioning market'.[237] However, Hanson conceded that 'any concerns which the Commission continues to hold would, in theory, be addressed by a prohibition on the issue of these generalized price increase proposal letters, since the opportunity to attempt to read national target increases would be reduced'.[238]

117. Hanson suggested that when considering this remedy, the CC should:

(a) 'Acknowledge the need for cement producers to recover increased costs through price increases to current customers;[239]

(b) 'Recognise the need for customers to have suitable advance notice of any price increases for business planning purposes (and that the current practice of sending out letters in advance to customers has arisen due to customer requirements);[240] and

(c) 'Preserve the benefits to customers of a price proposal from a cement producer in advance which allows the customer to negotiate, seek other offers and, as the Commission has seen from its own analysis, secure a considerably more favourable deal for itself than that proposed'.[241]

118. Hanson considered that this remedy 'should not prevent individualised proposals being sent to customers by cement producers (i.e. identifying only the new price to be paid by the customer) in order to commence a process of negotiation'.[242] Hanson did not foresee any problems in individualizing its price announcement letters as it

[237] Hanson response to the Notice of possible remedies, paragraph 7.9.
[238] Hanson response to the Notice of possible remedies, paragraph 7.10.
[239] Hanson response to the Notice of possible remedies, paragraph 7.10.1.
[240] Hanson response to the Notice of possible remedies, paragraph 7.10.2.
[241] Hanson response to the Notice of possible remedies, paragraph 7.10.3.
[242] Hanson response to the Notice of possible remedies, paragraph 7.11.

viewed them merely as a starting point for negotiations. They also benefitted customers as they allowed them to plan ahead.[243]

119. Hanson considered that personalized letters for cement would probably influence the cement substitutes market as well due to products such as GGBS being intrinsically linked to cement. Hanson did not see the need for such measures with regards to the substitute market although it did not have any particular objections.[244]

C5

120. Insofar as an AEC did exist, Hanson considered that this remedy would be effective and proportionate.[245]

121. Hanson considered that a 'three month time lag would very much reduce the level of any transparency which could in theory contribute to coordination. If a producer could not detect any changes in its own market share for three months, this could have the inevitable effect of reducing the alleged focus on market shares (as each party's own market share changes would be very much difficult to track and detect in a timely manner)'.[246]

122. Hanson considered that a time lag of three months would not unduly affect its planning. Whilst Hanson received the data on a monthly basis it sought to identify long-term trends in the data to see how the market was evolving in order to plan its budget and production efficiently. It saw nothing of value in single month data and believed that it was not in fact reliable.[247] However, Hanson considered that if the

[243] Hanson response hearing summary, 2 July 2013, paragraph 36.
[244] Hanson response hearing summary, 2 July 2013, paragraph 38.
[245] Paragraph 5.1, Annex to the published Hanson response to the Notice of possible remedies.
[246] Hanson response to the Notice of possible remedies, paragraph 7.5.1.
[247] Hanson response hearing summary 2 July 2013, paragraph 39.

data was delayed for up to six months, it would be damaging to the industry's ability to allow efficient business and production planning.[248]

123. Hanson was concerned that restricting regional coverage of data would prevent it from making informed decisions regarding the logistics of its regional operations. Hanson's senior management had not realized that such regional cement data was available until the CC had informed Hanson of its existence.[249]

124. Hanson suggested that the CC should consider a suitable exceptions regime be put in place to allow for the provision of data where required by law or for other justified reasons.[250]

C6

125. Insofar as an AEC did exist, Hanson considered that this remedy would be effective and proportionate.[251]

126. Hanson stated that EU ETS data was only of use to it in terms of determining what its carbon allocations would be for carbon credits. Hanson did not use the data to analyse the market. Hanson explained that it did make the information available externally in the form of sustainability reports and external statements as various stakeholders were interested in Hanson's compliance.[252]

127. Hanson noted that this remedy option would make it more difficult for a GB cement producer to monitor its market shares and would introduce a considerable degree of further uncertainty into the market.[253] However, Hanson also noted that it required

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[248] Hanson response hearing summary 2 July 2013, paragraph 40.
[249] Hanson response hearing summary 2 July 2013, paragraph 42.
[250] Hanson response to the Notice of possible remedies, paragraph 7.5.2.
[251] Paragraph 6.1 Annex to the published Hanson response to the Notice of possible remedies.
[252] Hanson response hearing summary 2 July 2013, paragraph 43.
[253] Hanson response to the Notice of possible remedies, paragraph 7.7.

careful consideration and discussion with the EC and that environmental regulation was a complex and developing area of law.[254]

C7

128. Hanson did not agree that an AEC existed but even if one did, it considered that remedy option C7 would not be effective or proportionate.[255]

129. The Hanson section of this Annex has set out (above) Hanson's concerns regarding the three divestment remedies which are not repeated here. In addition to those concerns, Hanson stated that it had 'fundamental concerns over the procedure leading up to and following the publication of the provisional findings in respect of the analysis of GGBS and PFA'.[256] For example, Hanson considered that the CC's interest in GGBS and PFA was only indicated a very late stage in the investigation[257] and the timing and lateness of the CC's focus on GGBS has meant that its analysis of GGBS and PFA was 'extremely rudimentary and superficial'.[258] Hanson has asserted that overall, procedural shortcomings on the part of the CC meant that the GGBS/PFA sectors have not been properly understood or analysed by the CC and Hanson has not had a proper opportunity to engage with the CC on GGBS. Therefore, Hanson believed that it 'would be unsafe to consider such extensive and intrusive remedies' under remedy option C7.[259]

130. Hanson considered that there was no case for remedies in relation to GGBS on the basis that the CC had 'not established a credible, comprehensible or suitably detailed case or analysis that any AEC arises in relation to GGBS'.[260] In particular, it considered that the CC had underestimated and downplayed the significance of the

[254] Hanson response hearing summary 2 July 2013, paragraph 7.6.
[255] Paragraph 7.1, Annex published Hanson response to the Notice of possible remedies.
[256] Hanson response to the Notice of possible remedies, paragraph 6.1.
[257] Hanson response to the Notice of possible remedies, paragraph 6.1.1.
[258] Hanson response to the Notice of possible remedies, paragraph 6.1.2.
[259] Hanson response to the Notice of possible remedies, paragraph 6.2.
[260] Hanson response to the Notice of possible remedies, paragraph 6.3.

PFA market and the considerable supply of PFA as an alternative to GGBS. It asserted that 'these products are clearly within the same cement substitute market, meaning that the Hanson share in this market has been incorrectly stated as very significantly greater than it is'.[261] Hanson also considered that the CC had underestimated and understated that role, scope and ability of both GBS and GGBS imports, in particular given the entry of HCM 'with its parent company's virtually unlimited access to the raw material granulate'.[262] It considered that the CC had 'rushed to assume dominant or even unilateral or monopoly market power for Hanson'.[263] It also considered that the CC had not undertaken analysis of the stated detriment or perceived harm to competition of either the steel producers' exclusive slag supply arrangements with Lafarge Tarmac or Lafarge Tarmac's exclusive GBS supply arrangements with Hanson.[264] In addition, that the CC had not analysed the necessary efficiencies created by the exclusive supply arrangements[265] nor had the CC taken into account the 'enormous level of investments undertaken by Hanson'.[266]

131. Hanson considered that the CC was unable to impose its GGBS remedy due to the decision of the EC in the HeidelbergCement decision[267] (noted above) and asserted that the CC was 'not empowered under the Enterprise Act to impose a remedy in relation to GGBS'.[268]

132. In respect of proportionality, Hanson considered that this remedy would 'be highly intrusive and costly' and a 'divestiture of one or more grinders would clearly involve [✂] impairment losses'[269] especially as GGBS grinder represented significant sunk

[261] Hanson response to the Notice of possible remedies, paragraph 6.3.1.
[262] Hanson response to the Notice of possible remedies, paragraph 6.3.2.
[263] Hanson response to the Notice of possible remedies, paragraph 6.3.3.
[264] Hanson response to the Notice of possible remedies, paragraph 6.3.5.
[265] Hanson response to the Notice of possible remedies, paragraph 6.3.6.
[266] Hanson response to the Notice of possible remedies, paragraph 6.3.7.
[267] Hanson response to the Notice of possible remedies, paragraph 6.14.
[268] Hanson response to the Notice of possible remedies, paragraph 6.18.
[269] Hanson response to the Notice of possible remedies, paragraph 6.29.

costs.[270] It considered that the remedy 'would be disproportionate in the light of the investments made, and risks taken, by Civil & Marine (and Hanson)' and 'would impair and remove Hanson's ability to make any return on the investment it made in the Civil & Marine business in 2006'.[271] Hanson stated that 'without the grant of long exclusivity, Hanson would not have made these investments and/or taking the commitments/risks it did'.[272]

133. Regarding GGBS profitability, Hanson believed this should be considered in the context of the investment that had been made in the product and facilities. Its business was based on volumes [✂]. Hanson considered that the risks were so significant given the state of the steel market that its investment return ought properly to reflect the risks that had been taken.[273]

134. Hanson considered that there was still a need for exclusivity due to the very uncertain future of the steel industry.[274] It considered that the steel industry lacked stability which resulted in an [✂] supply of GBS.[275] It also considered that [✂] were the biggest issue for any potential purchaser.[276]

135. Regarding the GGBS contractual arrangements, [✂][277] The clauses on Hanson with respect to the supply agreement included the requirement [✂].[278]

136. Hanson believed that Tarmac clearly had an incentive to produce GBS rather than dispose of air-cooled residue as it was more profitable. [✂], therefore if two tonnes of

[270] Hanson response to the Notice of possible remedies, paragraph 6.32.
[271] Hanson response to the Notice of possible remedies, paragraph 6.31.
[272] Hanson response to the Notice of possible remedies, paragraph 6.34.
[273] Hanson response hearing summary, 23 July 2013, paragraph 8.
[274] Hanson response hearing summary, 2 July 2013, paragraph 45.
[275] Hanson response hearing summary, 2 July 2013, paragraph 44.
[276] Hanson response hearing summary, 2 July 2013, paragraph 50.
[277] Hanson response hearing summary, 23 July 2013, paragraph 21.
[278] Hanson response hearing summary, 23 July 2013, paragraph 22.

raw material only produced one tonne of GGBS, [✂][279] Hanson confirmed its understanding that, under its contract, there were no circumstances in which Tarmac would be able to supply GBS to a third party in the UK for the production of GGBS.[280]

137. Hanson believed that the PFA market had grown[281] and that customers had a range of options for example a customer could purchase imported GGBS, blend its own PFA or source PFA direction from a power station. Hanson stated that companies such as AI, Lafarge Tarmac and even some independents all imported GGBS now, and that small independent companies were also procuring PFA. As a result, Hanson's GGBS business had been significantly eroded in recent years. In respect of pricing, Hanson assessed the competitive threat against its product offering and priced accordingly.[282] Hanson noted that PFA was roughly two-thirds the price of GGBS. However, it stated that a tonne of PFA could not necessarily be substituted for a tonne of GGBS or a tonne of pure CEM meaning that the effective prices per tonne for GGBS and PFA were very similar when taking into account the cost to produce a cubic metre of RMX.[283] Hanson believed that the price of GGBS was in part driven by the cement price and therefore if the CC chose to levy a remedy for cement, that would therefore automatically become the remedy for GGBS.[284]

138. Hanson considered that there were numerous RCBs that the GGBS supply structure allowed[285] such as:

(a) the ability of Hanson to 'undertake the investment and make the commitment necessary to promote the benefits of GGBS'[286] to include GGBS 'as a cement

[279] Hanson response hearing summary, 23 July 2013, paragraph 23.
[280] Hanson response hearing summary, 23 July 2013, paragraph 26.
[281] Hanson response hearing summary, 23 July 2013, paragraph 9.
[282] Hanson response hearing summary, 23 July 2013, paragraph 10.
[283] Hanson response hearing summary, 23 July 2013, paragraph 11.
[284] Hanson response hearing summary, 23 July 2013, paragraph 20.
[285] Hanson response to the Notice of possible remedies, paragraph 6.38.
[286] Hanson response to the Notice of possible remedies, paragraph 6.39.1.

replacement with a lower environmental burden' which 'could not be guaranteed with a new entrant';[287]

(b) retaining a portfolio of plants [✂];[288]

(c) the benefits bestowed upon the steel industry from the guaranteed off-take of waste slag;[289] and

(d) Hanson's 'unique experience' and 'quality and reliability and security of supply' [✂].[290] Hanson considered that 'a break-up of GGBS operations would be likely to risk the adverse effects of higher prices as the efficiencies of scale and supply security were lost and buyers then relied on smaller and less efficient operators'.[291]

139. Hanson considered that there was an intricate link between where GBS and GGBS were produced resulting in a difficulty separating the logistical relationship between the steel producer, the GBS producer and the GGBS producer.[292] Any divestiture would need to take account on the trading relationship between Tata, Tarmac and Hanson and would need to make a distinction between selling a grinding plant and/or the granulator itself being sold. If a grinding facility was sold but the rest of the supply chain remained intact there would be an inherent risk.[293] Hanson explained that each plant had strengths and weaknesses for example the [✂].[294]

140. Hanson said that a clinker grinding plant could be modified to produce GGBS, but modifications would be necessary with respect to the drying process required for GGBS. While co-grinding (grinding cement from GBS at the same time to produce blended cement) to produce a higher quality output was possible, there were

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[287] Hanson response to the Notice of possible remedies, paragraph 6.39.3.
[288] Hanson response to the Notice of possible remedies, paragraph 6.39.2.
[289] Hanson response to the Notice of possible remedies, paragraph 6.39.4.
[290] Hanson response to the Notice of possible remedies, paragraph 6.39.5.
[291] Hanson response to the Notice of possible remedies, paragraph 6.40.
[292] Hanson response hearing summary, 2 July 2013, paragraph 48.
[293] Hanson response hearing summary, 23 July 2013, paragraph 30.
[294] Hanson response hearing summary 23 July 2013, paragraph 31.

commercial considerations that made this considerably less attractive. Another consideration was the requirements for the storage of clinker which were different.[295]

141. Hanson considered that the Lafarge Tarmac proposed remedy was incapable of being an effective one, since a weakened GGBS offering could only create even greater business opportunity for cement.[296]

Z1

142. Whilst Hanson disagreed with the CC's theory of harm based on vertical integration[297] it proposed a remedy that it considered had 'the advantage of dealing with all the perceived aims of the RMX divestment remedy (Remedy C2)'.[298] In essence, the proposed remedy imposed a 'requirement on those GB cement producers which are vertically integrated into RMX to conduct a tendering process (either by way of website invitation to tender, obtaining at least three quotations or by way of annual tender request) for the external supply of cement for RMX requirements'.[299]

143. Hanson suggested a number of safeguards be put in place such as a requirement to select 'the most economically advantageous tender',[300] 'a requirement to obtain a minimum number of quotes',[301] and 'a restriction on the delivery of information received from tendering suppliers within such process to eliminate transparency concerns by limiting the suppliers' delivery of such quotations to the relevant named procurement or RMX staff'.[302]

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[295] Hanson response hearing summary 23 July 2013, paragraph 34.
[296] Hanson response hearing summary 23 July 2013, paragraph 33.
[297] Hanson response to the Notice of possible remedies, paragraph 7.16.
[298] Hanson response to the Notice of possible remedies, paragraph 7.20.
[299] Hanson response to the Notice of possible remedies, paragraph 7.18.
[300] Hanson response to the Notice of possible remedies, paragraph 7.19.1.
[301] Hanson response to the Notice of possible remedies, paragraph.7.19.2
[302] Hanson response to the Notice of possible remedies, paragraph 7.19.3.

144. Hanson considered that this remedy would increase the size of the addressable market and facilitate expansion by producers outside the Top 3 GB cement producers.[303] It also considered it would reduce perceived transparency between the Top 3 cement producers,[304] eliminate the scope for cross-sales to be used to rebalance shares of sales,[305] and restrict the opportunity to use such sales for the purposes of retaliatory or punishment actions with regards to any deviation from perceived coordination that may have been detected.[306] In addition, Hanson considered that this remedy would retain the efficiencies associated with vertical integration and that it represented a more proportionate and effective solution than a divestiture remedy.[307]

Z3

145. Hanson considered that although hypothetically it might be easier physically to divest a stand-alone clinker grinding plant, such a plant would need to be externally supplied with clinker from overseas. Accordingly, a purchaser would therefore more than likely be an established cement producer rather than an independent.[308]

Mittal/HCM

146. The CC did not receive a response specific to either its Notice of possible remedies or provisional findings. However, Mittal/HCM attended a response hearing at the CC on 24 June 2013 where it provided comments on the Notice of possible remedies.

[303] Hanson response to the Notice of possible remedies, paragraph 7.20.1.
[304] Hanson response to the Notice of possible remedies, paragraph 7.20.2.
[305] Hanson response to the Notice of possible remedies, paragraph 7.20.3.
[306] Hanson response to the Notice of possible remedies, paragraph 7.20.4.
[307] Hanson response to the Notice of possible remedies, paragraph 7.21.
[308] Hanson response hearing summary 2 July 2013, paragraph 51.

C1

147. Mittal/HCM said that the CC should consider the relationship between geography and geology when it considered the divestiture of assets. It was concerned about the local/national picture.[309]

148. Mittal/HCM said that in relation to the acquisition of a divested cement plant, it would be important for any purchaser to have some form of downward vertical integration. In relation to the supply of aggregates, it would be possible to obtain aggregate supply although it would not be optimal as there could be issues of quality. Another factor that had to be considered was the need for concrete plants to be reasonably close to cement works so as to limit haulage costs.[310]

149. The divestiture of centrally located plants would be more beneficial. It would result in a central market with multiple competitors and would not result in the creation of local markets.[311]

150. It would be easier for a European player with existing supply chain capability—rather than a new entrant—to enter the UK market. [✂][312]

151. A purchaser of a central cement plant [✂] would be interested in rail links, longevity of asset in terms of limestone reserves plus any planning restrictions or opportunities.[313]

152. [✂][314]

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[309] Mittal/HCM response hearing summary, paragraph 17.
[310] Mittal/HCM response hearing summary, paragraph 18.
[311] Mittal/HCM response hearing summary, paragraph 19.
[312] Mittal/HCM response hearing summary, paragraph 20.
[313] Mittal/HCM response hearing summary, paragraph 21.
[314] Mittal/HCM response hearing summary, paragraph 22.

153. In respect of latent capacity (mothballed plants), Mittal/HCM expected cement volumes in the market to grow from approximately [✂] million tonnes per year in the UK. Latent capacity within an existing site would be less expensive to reinstate that an entire plant situated away from the centre of Great Britain. Mittal/HCM did not believe that latent capacity should form part of the remedy package. However, it said that it would be material if a major ordered to divest a central cement plant had other latent capacity proximate to it which could be brought back into operation.[315]

154. It would not be a good idea to divest part of a cement plant although Mittal/HCM considered that it would be possible to divest a grinding station to a player who could then import clinker and grind it.[316]

155. The profile of an acquiring company was very important, particularly if it could internalize 50 per cent of production internally. In addition, Mittal/HCM considered it necessary that at least 80 per cent of the aggregates required formed part of the package.[317]

156. Mittal/HCM did not have a strategy to acquire any divested assets but it did not feel it was reasonable for it to be excluded. Ultimately, the CC would take a view on which parties could acquire assets to be divested and from Mittal/HCM's perspective, it would depend on the overall package.[318]

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[315] Mittal/HCM response hearing summary, paragraph 23.
[316] Mittal/HCM response hearing summary, paragraph 24.
[317] Mittal/HCM response hearing summary, paragraph 25.
[318] Mittal/HCM response hearing summary, paragraph 26.

C2

157. Mittal/HCM considered that a new buyer in RMX would likely buy close to where its plants were located. Access to the market was key and areas with a higher-density population would be most attractive.[319]

158. Mittal/HCM considered that a significant number of RMX plants would have to be divested in order to generate cement buying power.[320]

159. The RMX market was a relatively easy market to enter, with low barriers to entry and where a significant number of small independents operated.[321]

160. Mittal/HCM expressed the view that divestiture of stand-alone RMX plants might not be an effective remedy in itself and that in any event, it might not be attractive to potential purchasers.[322]

C3

161. Mittal/HCM considered that there was no merit in this remedy; that competition in markets downstream from cement production was based on one competitor getting a better price than another, and if a buyer group was required, it would stifle downstream competition and would potentially increase the prices for the consumer.[323]

162. Mittal/HCM's view was that bigger players such as pre-casters would more likely than not purchase cement more cheaply than through a cement buying group.[324]

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[319] Mittal/HCM response hearing summary, paragraph 27.
[320] Mittal/HCM response hearing summary, paragraph 28.
[321] Mittal/HCM response hearing summary, paragraph 29.
[322] Mittal/HCM response hearing summary, paragraph 30.
[323] Mittal/HCM response hearing summary, paragraph 31.
[324] Mittal/HCM response hearing summary, paragraph 32.

163. Regarding smaller purchasers, a cement buying group would be problematic with issues such as credit ratings, different products, different contractual terms etc.[325]

C4

164. Mittal/HCM had not sent price announcement letters to its customers. It preferred to deal with customers face to face and approached customers individually to discuss terms of business. Mittal/HCM did not consider it was necessary to have to send price announcement letters to begin the price negotiation process.[326]

165. In the event that, for example, the aggregates levy increased (a cost which Mittal/HCM would pass through to its customers) Mittal/HCM considered it appropriate to send a blanket communication to its customers.[327]

166. Mittal/HCM did not agree that a spot price for cement on its website was a good idea. Its customers were happy dealing with it face to face.[328]

167. Mittal/HCM understood the issue around signalling. Whilst Mittal/HCM could see the customer benefit argument of receiving price increase letters, it considered the argument rather light. Mittal/HCM also said that professional buyers could track government indices for price information. Mittal/HCM's overall view was that it would not present any problem if generic price announcements were prohibited in relation to cement and GGBS and PFA.[329]

168. Mittal/HCM had received one price announcement letter [✂] since January 2013.[330]

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[325] Mittal/HCM response hearing summary, paragraph 33.
[326] Mittal/HCM response hearing summary, paragraph 34.
[327] Mittal/HCM response hearing summary, paragraph 35.
[328] Mittal/HCM response hearing summary, paragraph 36.
[329] Mittal/HCM response hearing summary, paragraph 37.
[330] Mittal/HCM response hearing summary, paragraph 38.

169. Mittal/HCM had a feel for the market price of cement through customer feedback although Mittal/HCM had not been shown anything on paper.[331]

C5

170. Mittal/HCM joined the Mineral Products Association (MPA) for a trial period of six months from 1 July 2013. Mittal/HCM understood its relative size in the market and felt it wanted a body to fight European legislation on its behalf and that the MPA would better represent its interests in respect of politicians and health and safety.[332]

171. MPA data was not a particular factor behind Mittal/HCM's decision to join the MPA given that Mittal/HCM could readily obtain market data from the Department for Business, Innovation and Skills.[333]

172. Mittal/HCM planned to join the Construction Products Association at the end of 2013.[334]

173. Mittal/HCM accepted that a time lag of three months in respect of MPA data was fine. Even data that was a year old would be useful to some degree.[335]

C6

174. Mittal/HCM had not made any use of carbon emissions data, which it did not consider of interest.[336]

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[331] Mittal/HCM response hearing summary, paragraph 39.
[332] Mittal/HCM response hearing summary, paragraph 40.
[333] Mittal/HCM response hearing summary, paragraph 41.
[334] Mittal/HCM response hearing summary, paragraph 42.
[335] Mittal/HCM response hearing summary, paragraph 43.
[336] Mittal/HCM response hearing summary, paragraph 44.

C7

175. Mittal/HCM did not find it difficult to source GGBS outside of Great Britain although it was no different in economic terms from purchasing GGBS within Great Britain. Ultimately, Mittal/HCM considered that it was preferable to use PFA which was more economical.[337]

176. Mittal/HCM could be interested in purchasing divested GGBS assets subject to cost which would have to equate to the same as PFA. Mittal/HCM would prefer to be in control of its cost base meaning that acquiring both GBS and GGBS activities would be more attractive.[338]

177. Mittal/HCM considered [✂].[339]

178. Economics of transport was a consideration.[340]

Z1

179. The cross-sales tendering remedy might result in another way of signaling.[341]

Z2

180. In respect of the information barriers remedy, Mittal/HCM did not understand how it would work in practice or how effective it would be.[342]

Z3

181. Mittal/HCM did not have anything to add on the grinding plant divestiture remedy.[343]

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[337] Mittal/HCM response hearing summary, paragraph 45.
[338] Mittal/HCM response hearing summary, paragraph 46.
[339] Mittal/HCM response hearing summary, paragraph 47.
[340] Mittal/HCM response hearing summary, paragraph 48.
[341] Mittal/HCM response hearing summary, paragraph 49.
[342] Mittal/HCM response hearing summary, paragraph 50.

Aggregate Industries

182. Aggregate Industries (AI) submitted a written response to the CC's Notice of possible remedies and also attended a response hearing on 18 June 2013. In its written response AI limited its comments to aspects of the remedies where it had sufficient market knowledge given its position as a cement importer and customer rather than a GB cement producer.[344]

C1

183. AI considered that [✂].[345]

184. [✂][346,347]

185. Unbundled divestments would be more attractive because of ease of integration and greater flexibility, although consideration would have to be given to how assets were bundled. In addition, bundled divestments could equate to a fairly large part of the GB cement production market which would be quite challenging for an incumbent purchaser and were more risky. A cement plant bundled with RMX plants was less attractive for those potential purchasers who already operated RMX plants—[✂].[348,349]

186. AI considered that importers may be less able to operate an acquired cement plant given the level of technical competence required. However, such expertise could be present within the parent companies of some importers.[350]

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[343] Mittal/HCM response hearing summary, paragraph 51.
[344] AI response to the Notice of possible remedies, paragraph 1.3.
[345] AI response hearing summary, paragraph 7.
[346] AI response hearing summary, paragraph 8.
[347] AI response hearing summary, paragraph 9.
[348] AI response hearing summary, paragraph 10.
[349] AI response to the Notice of possible remedies, paragraph 3.2.
[350] AI response hearing summary, paragraph 11.

187. Significant investment would be required for a potential purchaser to acquire divested cement production capacity within GB. This would have to be benchmarked against alternative investment opportunities elsewhere in the world and the GB market on the whole was currently less attractive than others.[351]

188. [✂] A centrally located plant could give access to a large geographic part of the market although good logistical support could improve the desirability of plants less centrally located. [✂][352]

189. There were some advantages and disadvantages in owning a single cement plant rather than two or more, and the importance of this largely depended on the strategic aspirations of the purchaser. [✂][353,354]

190. The CC would have to be satisfied that a purchaser of a divested cement plant(s) had the operational expertise to run the plant(s) effectively. AI cited HCM as an organization that could have valuable learning from its acquisitions.[355]

C2

191. AI noted that the CC had found no AEC in the RMX market[356] and that this remedy option was designed as a way to reduce the extent of the vertical integration between the Top 3 cement producers' cement and downstream operations.[357] AI considered that the RMX market was already very competitive and barriers to entry were low.[358]

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[351] AI response hearing summary, paragraph 12.
[352] AI response hearing summary, paragraph 13.
[353] AI response hearing summary, paragraph 14.
[354] AI response hearing summary, paragraph 15.
[355] AI response hearing summary, paragraph 16.
[356] AI response to the Notice of possible remedies, paragraph 3.1.
[357] AI response to the Notice of possible remedies, paragraph 3.2.
[358] AI response hearing summary, paragraph 18.

Furthermore, that the entry into the GB cement market by HCM and [✂] would [✂] be effective in increasing competition in this market.[359]

C3

192. AI considered that its concerns with this proposed remedy could be divided into two groups: (i) whether the remedy could in principle solve the AEC that the CC had identified; and (ii) the practicalities of implementing and monitoring the remedy. It also considered that the remedy could have unintended, adverse consequences on the effectiveness of competition in the cement and RMX markets.[360]

193. AI considered that the proposed remedy did little to increase the negotiating power of customers in the GBG on the basis that the number of cement suppliers remained unchanged.[361] It also considered that the remedy reduced the ability of cement suppliers to price discriminate which could lead to price increases for all cement purchasers.[362]

194. From a practical perspective, AI was concerned that this remedy was unworkable. Issues that needed to be addressed included: (i) how administrative costs would be split between the members; how the costs of any bad debt associated with the CBG would be split; (iii) how information received by the CBG on its members' likely requirements would be protected from anticompetitive disclosure; (iv) how the CBG could ensure it received the minimum volume guaranteed by cement suppliers; (v) how the CBG would design its tenders to avoid the risk of coordination in such an auction-type arrangement; and (vi) what the CBG would do if it ended up with excess

[359] AI response to the Notice of possible remedies, paragraph 3.2.
[360] AI response to the Notice of possible remedies, paragraph 4.1.
[361] AI response to the Notice of possible remedies, paragraph 4.4(a).
[362] AI response to the Notice of possible remedies, paragraph 4.4(b).

cement or insufficient quantities.[363] AI also considered that prices charged by cement suppliers to the CBG may need to be monitored by the CC.[364]

195. AI considered that cement was not a commodity in that different types of cement had different applications. Accordingly, a tender process was more efficient because customers could specify precisely what they wanted and what they intended to use it for. Three were also other criteria around consistency, availability and security of supply which were important factors for customers.[365]

196. [✂][366] This remedy option also had the potential to facilitate coordination by customers in the CGB by (i) aligning the cost of their principal input; and (ii) creating a forum for the discussion of key commercial decisions.[367]

C4

197. For the very limited volumes of cement that AI sold to third party customers, AI's policy was not to send price announcement letters.[368] Paragon, AI's cementitious materials division, had in the past provided price increase letters to its few external customers, but this practice stopped in 2012. Letters had tended to be tailored to individual customers.[369]

198. AI was a recipient of cement price increase letters. They were an indicator and a starting point for the negotiation process.[370] AI noted that the acquisition of cement was often a subcontract where an indication as to price was important to enable

[363] AI response to the Notice of possible remedies, paragraph 4.6.
[364] AI response to the Notice of possible remedies, paragraph 4.5.
[365] AI response hearing summary, paragraph 21.
[366] AI response to the Notice of possible remedies, paragraph 4.4(c).
[367] AI response to the Notice of possible remedies, paragraph 4.8.
[368] AI response to the Notice of possible remedies, paragraph 5.1.
[369] AI response hearing summary, paragraph 24.
[370] AI response hearing summary, paragraph 22.

contractors to bid on projects for which the cement was a sub-contracted input. It was therefore important that the practice was allowed to continue in some way.[371]

199. AI considered that the use of price announcement letters in general was an efficient way to communicate forecast increases in prices to customers. In turn, they enabled customers to plan ahead for increases in prices. Therefore, AI considered that price announcement letters gave rise to significant relevant customer benefits. Accordingly, AI was not convinced about the effectiveness and proportionality of this remedy and opposed the prohibition of price announcement letters.[372]

200. If the CC were to proceed to implement this remedy, AI considered that it would probably work most effectively if it operated on a prohibition basis which would reduce transparency and, in turn, opportunities for coordination.[373]

C5

201. AI was not a cement producer and therefore, had no clear, practical understanding of the current market data disclosure arrangements. As such, it could not comment on how the proposed remedy would affect behaviour in the market.[374] AI did not use MPA data for forecasting purposes as there were more relevant sources of information. Whilst the headline indicators were sometimes useful, it would not have a significant impact on AI if MPA data was unavailable.[375]

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[371] AI response hearing summary, paragraph 26.
[372] AI response to the Notice of possible remedies, paragraph 5.2.
[373] AI response hearing summary, paragraph 26.
[374] AI response to the Notice of possible remedies, paragraph 6.1.
[375] AI response hearing summary, paragraph 27.

C6

202. AI did not make use of the EU ETS verified CO2 data[376] and had no clear, practical understanding of it which rendered it unable to comment on how the proposed remedy would affect behaviour in the market.[377]

C7

203. In respect of the potential divestiture of GGBS and/or GBS plants, AI stated that it was not active the production of either GGBS or GBS in GB and on that basis, it did not consider itself well placed to comment on the effectiveness and/or proportionality of the possible divestiture remedies.[378] [✂][379]

204. In respect of the prohibition on exclusive GGBS and GBS arrangements, AI noted that there appeared to be a captive supply chain between GBS and GGBS where one could not be remedied without the other.[380] [✂][381]

205. AI imported GGBS from Holcim Germany.[382] [✂][383] AI had never encountered any difficulty obtaining GGBS from non-GB sources. AI noted that the volume of GGBS ultimately depended upon the demand for steel and currently, there was over-capacity.[384] AI had also purchased GGBS from Hanson Heidelberg [✂].[385]

206. AI had its own ash business which sourced PFA [✂].[386] Substitution had involved PFA rather than GGBS. AI explained that PFA had colour propensities [✂]. However, there were certain applications where AI customers specifically demanded

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[376] AI response hearing summary, paragraph 28.
[377] AI response to the Notice of possible remedies, paragraph 7.1.
[378] AI response to the Notice of possible remedies, paragraph 8.2.
[379] AI response hearing summary, paragraph 32.
[380] AI response hearing summary, paragraph 32.
[381] AI response to the Notice of possible remedies, paragraph 8.3.
[382] AI response hearing summary, paragraph 29.
[383] AI response hearing summary, paragraph 29.
[384] AI response hearing summary, paragraph 30.
[385] AI response hearing summary, paragraph 31.
[386] AI response hearing summary, paragraph 31.

GGBS and AI would seek to satisfy customer demand, hence why AI still sourced some GGBS.[387] [✂][388]

Z1

207. AI considered that a remedy requiring mandatory competitive tendering for the external supply of cement for RMX requirements was a potential way to address concerns arising from vertical integration. However, AI noted that it could result in greater price transparency in the market.[389]

Z2

208. Regarding the remedy that proposed information barriers between cement and RMX divisions, AI considered that it could potentially address concerns over the competitive effects of vertical integration on the cement market. However, AI believed it would not be effective in practice. It would be expensive to administer given the need for separate systems, individuals and parts of buildings and AI was concerned that ultimately those costs would be passed through to the customer.[390]

Z3

209. [✂][391]

CRH

210. The CC did not receive a response specific to either its Notice of possible remedies or provisional findings. However, CRH took part in a response hearing via telephone conference on 26 June 2013 where it provided comments on the Notice of possible remedies.

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[387] AI response hearing summary, paragraph 33.
[388] AI response hearing summary, paragraph 34.
[389] AI response hearing summary, paragraph 37.
[390] AI response hearing summary, paragraph 36.
[391] AI response hearing summary, paragraph 17.

C1

211. CRH noted that as HCM had only been active for a few months, it was not yet possible to assess its impact on the GB market. Thus far HCM appeared to be competing actively for business so up to this point its divestiture appeared to have had an effect on competition. CRH's view was that cement prices in GB were competitive [✂].[392]

212. If there were to be further divestitures of GB cement plants as a result of the CC's investigation, then CRH would be interested in looking at them, but it would need to evaluate whether or not the plant(s) would be able to provide the returns that CRH's board and shareholders would expect. In considering whether or not to bid for a plant, CRH would look at a number of factors including the plant's age, its efficiency (particularly in respect of energy costs), its location, proximity of mineral resources, transport links and compliance with environmental standards. The more modern and better located a given plant was, [✂], the more likely CRH would be interested in it.[393]

213. Were a cement plant to be divested, CRH considered that it would wish the package of assets to include some RMX plants, so that the plant's cement production would have an outlet. It was also important that the divested plant owners should have access to a ready supply of aggregates. Wherever possible, shared sites (ie an RMX plant owned by one company but located in another's aggregates quarry) should not be included for divestiture as such sites were more problematic for purchasers.[394]

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[392] CRH response hearing summary, paragraph 10.
[393] CRH response hearing summary, paragraph 11.
[394] CRH response hearing summary, paragraph 13.

C2

214. RMX was a market with low barriers to entry. In CRH's experience, whenever an RMX market became very profitable, there would be a flood of entrants and the price of RMX and the returns on it would decrease. [✂] Currently, CRH did not own any RMX operations in GB, though it did have a small precast concrete business.[395]

215. If the CC could increase the number of independent RMX producers by requiring the Top 3 vertically-integrated cement producers to sell some of their RMX plants to independents, then in principle this could benefit companies like CRH as they would have more customers to compete for. However, CRH was unsure as to who would be able to buy enough RMX plants to make this remedy viable.[396]

C3

216. CRH considered that the independent-minded nature of many independent RMX producers would make it difficult for them to work together. While it was possible to form buying groups for builders' merchants, because they were buying many different kinds of products, RMX producers were only buying cement and aggregates, so the dynamic was very different.[397]

217. Cement was traded in a different way from most other commodity products, so it would be difficult to devise a means of generating a spot price. Having a spot price might also enable price manipulation and lead to a distortion of competition. Therefore this remedy might create as many problems as it solved.[398]

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[395] CRH response hearing summary, paragraph 14.
[396] CRH response hearing summary, paragraph 15.
[397] CRH response hearing summary, paragraph 16.
[398] CRH response hearing summary, paragraph 17.

C4

218. Premier Cement did not currently send out price increase letters to its customers, so any proposed remedy in this respect would not affect it. It maintained regular contact with its customers by meeting them and keeping them informed about its proposed price increases and negotiating with them. It had never had any of its customers ask it to provide price increase letters.[399]

C5

219. CRH did not think that it was necessary to prohibit the publication of market data. The publication of data on a quarterly or six-monthly basis should enable interested parties to observe trends in the industry without raising any competition concerns.[400]

C6

220. CRH did not believe that the publication of ETS data by the European Commission had affected competition or pricing in the cement market. It would be very difficult to work out information about specific companies from this data, and CRH noted that there had been no significant change in the market since this data had been routinely published.[401]

C7

221. CRH's businesses were not affected by the current arrangements in GB for the production of GBS and GGBS. CRH was not involved with GBS or GGBS production elsewhere, [✂].[402]

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[399] CRH response hearing summary, paragraph 18.
[400] CRH response hearing summary, paragraph 19.
[401] CRH response hearing summary, paragraph 20.
[402] CRH response hearing summary, paragraph 21.

Z1

222. From its perspective as an importer, CRH would welcome a requirement for cement producers to tender when they needed to buy cement from other producers. However, this would cause it some concern as price would become the only consideration for customers and would displace quality of service and security of supply, which were very important issues for cement producers when sourcing cement from outside their own businesses.[403]

Z2

223. CRH did not agree that RMX suppliers which were vertically integrated with cement producers should be prevented from receiving information, especially relating to cement prices, from elsewhere in their own company. In CRH's case, it required its RMX business to make a profit, and they would not be able to do this effectively if they did not have all the information about their costs.[404]

Z3

224. As for divesting a grinding mill, the considerations for any purchasers would be similar to those which applied to cement plants (age, efficiency, location). CRH noted that the cost of electricity was higher in GB than in Spain and this, combined with the fact that GB was mainly a CEM I market, meant that for CRH it would be likely to be more cost-effective to grind clinker where electricity was cheaper and export the cement to GB.[405]

Titan UK

225. The CC did not receive a response specific to either its Notice of possible remedies or provisional findings. However, Titan took part in a response hearing via telephone

[403] CRH response hearing summary, paragraph 22.
[404] CRH response hearing summary, paragraph 23.
[405] CRH response hearing summary, paragraph 12.

conference on 4 July 2013 where it provided comments on the Notice of possible remedies.

C1

226. Titan believed that there was a danger of unintended consequences in the divestiture of cement plants as divestitures could lead to local hotspots of competition. It was concerned that any new entrant would find itself competing strongly with the former incumbent for market share in the surrounding area. This type of intense localized competition could negatively affect other market participants in the area, such as cement importers, which were challenged by the peculiarities inherent in the importing business.[406]

227. [✂][407]

228. While divestitures of cement plants might promote competition between cement producers, they could potentially weaken competition from cement importers which might struggle to compete in a region where a divestiture had occurred.[408]

229. [✂][409]

230. [✂][410]

C2

231. The divestiture of RMX plants could potentially have a positive effect on Titan's business depending on where the plants were located and depending on the number of plants divested. However, Titan suggested that cement producers which were

[406] Titan response hearing summary, paragraph 9.
[407] Titan response hearing summary, paragraph 10.
[408] Titan response hearing summary, paragraph 11.
[409] Titan response hearing summary, paragraph 12.
[410] Titan response hearing summary, paragraph 13.

required to divest RMX plants would probably compete for business from independent RMX operators in order to make up for the loss of production taken by their former RMX plants.[411]

232. [✂][412]

233. [✂][413]

234. The risk for a cement importer that acquired a ready-mix business was that, in doing so, it was effectively signalling to its current customers that it was now also a competitor. Therefore, any potential purchaser of RMX plants which also produced cement would have to evaluate the potential harm such integration might cause by alienating its existing customers. [✂][414]

C3

235. It would be difficult to assess the impact that cement buying groups might have as it was almost impossible to predict how such groups might behave once they were set up. Also, Titan considered that it would be difficult to justify limiting the sales options of cement producers by restricting them to only selling to buying groups or requiring them to sell a specific percentage of their production to such groups.[415]

C4

236. Titan understood the thinking behind the CC's proposals to require suppliers to send individualized letters to their customers and was content with such a remedy, but pointed out that there would need to be clear rules on what was permissible and what

[411] Titan response hearing summary, paragraph 14.
[412] Titan response hearing summary, paragraph 15.
[413] Titan response hearing summary, paragraph 16.
[414] Titan response hearing summary, paragraph 17.
[415] Titan response hearing summary, paragraph 18.

was not, and in any case suppliers still had to be able to communicate their pricing policy to their customers.[416]

C5

237. Titan was not a member of the Mineral Products Association (MPA). The only data that Titan saw was reproduced data about the size of the total UK market.[417]

238. Titan only used this data to provide general information in its internal presentations of the total consumption of countries such as the UK, France or Italy. Such data was of limited competitive use to Titan and did not help in terms of its sales.[418]

239. Titan did not submit any data to third parties in relation to its cement imports into GB. For this reason, Titan did not object to any remedy which might seek to delay the publication of data by the MPA.[419]

240. Titan did not make use of BIS data as it was not broken down company by company; rather it was a generic figure and only of interest in terms of gauging the level of consumption in the UK.[420]

C6

241. Titan did not regard carbon emission data to be of any commercial value as it was essentially historical. The data was only used in assessing how national plants allocated CO2 rights.[421]

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[416] Titan response hearing summary, paragraph 20.
[417] Titan response hearing summary, paragraph 21.
[418] Titan response hearing summary, paragraph 22.
[419] Titan response hearing summary, paragraph 23.
[420] Titan response hearing summary, paragraph 24.
[421] Titan response hearing summary, paragraph 25.

242. Titan said that there was some benefit in terms of the transparency of the EU Emissions Trading System scheme for competitors in that it gave them visibility of how rights had been allocated.[422]

C7

243. Titan was unable to comment on remedies relating to GGBS as it was not involved in this aspect of the market, either in GB or in any of the other countries where it operated.[423]

Z1

244. Titan did not consider that proposals to require the major cement producers to conduct an open tendering process when they needed to buy cement would make the overall cement market more competitive. In theory this proposal seemed fine but in practice it could alert other competitors to the fact that the producer concerned was struggling to supply its customers through its regular channels.[424]

Z3

245. Titan thought that the divestiture of a grinding station was not a particularly practical remedy. For instance, a producer could choose to close down small operations in order to move to a more efficient plant at a different location, but nevertheless retain the grinding station in the original location so as to supply clinker to it and retain market presence. Titan felt that forcing a producer to divest a grinding station would be an unwarranted interference with the GB producer's legitimate ability to structure its business in a cost-efficient way.[425]

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[422] Titan response hearing summary, paragraph 26.
[423] Titan response hearing summary, paragraph 19.
[424] Titan response hearing summary, paragraph 29.
[425] Titan response hearing summary, paragraph 28.

CPV (Dragon Alfa)

246. The CC did not receive a response specific to either its Notice of possible remedies or provisional findings. However, CPV (Dragon Alfa) took part in a response hearing via telephone conference on 9 July 2013 where it provided comments on the Notice of possible remedies.

C1

247. CPV's view was that if there were more cement producers in the GB market then there would be more competition.[426]

248. The creation of HCM as a result of the CC's remedies in the Anglo-Lafarge JV had led to lower prices in the northern part of Dragon Alfa's market, particularly in the area surrounding HCM's rail terminal in Reading.[427]

249. [✂][428]

250. CPV did not have a view on whether or not it would be necessary to include some RMX plants as part of the divestment of a cement plant or plants remedy.[429]

C2

251. Asked what the effect might be on competition, or on CPV as an importer, if Hanson or Cemex or Lafarge Tarmac were required to divest a number of their concrete plants, DA did not think having more RMX plants outside of the ownership of the main cement producers would particularly benefit DA, as it tended not to supply the

[426] CPV response hearing summary, paragraph 10.
[427] CPV response hearing summary, paragraph 11.
[428] CPV response hearing summary, paragraph 12.
[429] CPV response hearing summary, paragraph 13.

large type of RMX plants operated by the cement producers, although it might benefit other participants in the market.[430]

252. DA considered it unlikely that it would gain business if a mid-tier producer (Brett Group or Breedon Aggregates) owned more RMX plants but lacked cement production capacity. [✂][431]

253. [✂] operating RMX plants would not fit within [✂] simple business model of buying and distributing bulk cement.[432]

C3

254. DA's customers were small, independent operators which larger producers found unattractive to serve. The service that DA offered to its customers was as important as its prices. This included offering timed deliveries which were attractive to small operators. Large buying groups were all about low prices and this would not be attractive to DA.[433]

255. As a remedy, the creation of a cement buying group or groups could have the unintended consequence of being anticompetitive. In the past it had been asked to pay to join buying groups before it could gain access to the members of the group. DA was not interested in participating in buying groups of this type. Its experience of buying groups was that they had precluded potential customers from considering DA as a supplier and that this was a common situation.[434]

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[430] CPV response hearing summary, paragraph 14.
[431] CPV response hearing summary, paragraph 15.
[432] CPV response hearing summary, paragraph 16.
[433] CPV response hearing summary, paragraph 17.
[434] CPV response hearing summary, paragraph 18.

C4

256. The sending of generalized price announcement letters (PALs) had been a long-standing practice in the cement industry and the letters seemed to be sent on a very regular basis.[435]

257. PALs provided an indication of what the cement producers wanted to achieve, although the increases proposed did not realistically reflect what actually happened in the market. PALs provided DA with an idea of what it should be doing with its own prices. DA had used generalized PALs it had received in negotiations with its own customers.[436]

258. DA had tended to personalize its PALs rather than send generalized ones. It had actually abandoned any form of price increase letter for nearly three years. It now looked at each of its customers separately and made individual proposals to them. This had helped DA secure long-term relationships with its customers and reflected the current challenging state of the market rather than the situation before the downturn.[437]

C5

259. DA did not use Mineral Products Association (MPA) data in the running of its business. It did find the data interesting and did use the MPA's statistics in order to compare its business performance with the market. DA did not know how accurate the MPA data was but it seemed to suggest DA was in a reasonably good position in the market.[438]

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[435] CPV response hearing summary, paragraph 19.
[436] CPV response hearing summary, paragraph 20.
[437] CPV response hearing summary, paragraph 21.
[438] CPV response hearing summary, paragraph 22.

260. DA used the regional breakdown of cement sales volumes data. This was because it was based in the South-West which was a small market and so it was easy to see how well DA was performing against that data.[439]

261. DA tended to look at the data on a quarterly basis. Therefore, a three-month publication time lag would have no impact on it. Rather than rely on MPA data to plan its business, DA tended to have an ear to the ground.[440]

C6

262. DA did not use EU ETS data. It did not believe that the ETS currently had any material effect on its business but considered that it might do in future through requirements for construction projects to meet carbon targets.[441]

C7

263. DA's view was that the fact that supplies of granulated blast furnace slag (GBS) and ground granulated blast furnace slag (GGBS) were controlled by a limited number of parties was unlikely to be beneficial to the overall market and that there were likely to be competition issues arising from this. DA did not supply pulverized fly/fuel ash (PFA) or GGBS to customers. Its RMX customers and concrete producers supplied and blended their own PFA or GGBS.[442]

264. CPV noted that its cement blended particularly well with PFA. Whilst the price of GGBS could affect the number of users of PFA, there were also technical reasons why customers might choose to use PFA instead of GGBS.[443]

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[439] CPV response hearing summary, paragraph 23.
[440] CPV response hearing summary, paragraph 24.
[441] CPV response hearing summary, paragraph 25.
[442] CPV response hearing summary, paragraph 26.
[443] CPV response hearing summary, paragraph 27.

265. DA could not comment on whether the CC should intervene at both the upstream (GBS) and downstream (GGBS) level.[444]

266. [✂][445]

Z1

267. Regarding the proposed remedy of requiring major cement producers to enter into a tendering process when they wanted to purchase cement from other parties (cross-sales), DA said it had had very little involvement with cement producers and had only done a small amount of business with Aggregate Industries. DA did not consider that this remedy would significantly affect its business.[446]

Z3

268. As for the proposal of divesting a grinding station, DA did not know the difference between the cost of importing clinker and the cost of importing cement and could offer no comment.[447]

Breedon Aggregates

269. The CC did not receive a response specific to either its Notice of possible remedies or provisional findings. However, Breedon Aggregates attended a response hearing at the CC on 8 July 2013 where it provided comments on the Notice of possible remedies.

C1

270. A divestiture of a cement plant by one of the Top 3 would have to increase competition to some degree. However, as there were already four cement producers and a

[444] CPV response hearing summary, paragraph 28.
[445] CPV response hearing summary, paragraph 29.
[446] CPV response hearing summary, paragraph 30.
[447] CPV response hearing summary, paragraph 31.

number of importers active in the GB market, Breedon Aggregates was unsure whether the introduction of a fifth producer would make a significant difference to the degree of competition. It might be that the problems with competition were caused by reasons other than the number of participants in the market.[448]

271. In respect of the differences between HCM and Tarmac, Breedon Aggregates said that Tarmac had been virtually 100 per cent vertically integrated, so it had only a small requirement to sell cement externally. HCM was less vertically integrated, so it would need to sell more cement into the market and would therefore be a more active competitor than Tarmac.[449]

272. Breedon Aggregates considered that the following matters were important when considering whether to buy a cement plant:

(a) the plant would need to be connected to the rail network so it could reach as many customers as possible;

(b) access to in-house concrete production so that there was a guaranteed purchaser for some (say around 10 to 15 per cent) of the plant's output; and

(c) the plant should be reasonably sized so that economies of scale could be obtained, and it should have access to sufficient mineral reserves to ensure its long-term operation.[450]

273. Breedon Aggregates was not a cement producer and was unfamiliar with the respective merits of the various cement plants in Great Britain. [✂][451]

274. As noted above, a purchaser without any ready-mix concrete (RMX) capability would perhaps need to acquire some RMX plants. Building an RMX business from scratch

[448] Breedon Aggregates response hearing summary, paragraph 6.
[449] Breedon Aggregates response hearing summary, paragraph 7.
[450] Breedon Aggregates response hearing summary, paragraph 8.
[451] Breedon Aggregates response hearing summary, paragraph 9.

could take some time. A purchaser which already had an RMX business of its own would find that this would be much less of an issue. It should be relatively straight-forward, especially for an existing RMX producer, to acquire more plants and increase the scale of its business to accommodate production from an acquired cement plant. The biggest risk would be the losses which the RMX business would likely sustain for the first couple of years. If a purchaser acquired a stand-alone cement plant, it would be easy for it to acquire RMX plants independently as the barriers to entry in the RMX market were low. An RMX plant could be acquired for £200,000. Breedon Aggregates noted that the margins on concrete were low and therefore it would be risky for a purchaser to take a significant number of RMX plants together with a cement plant.[452]

275. Breedon Aggregates would be interested in acquiring a cement plant, particularly if the plant did not have future risks attached to it such as access to mineral reserves and emissions issues. Breedon Aggregates already had its own aggregates and RMX businesses so would not need a divestment to include RMX plants. Breedon Aggregates would be unlikely to consider building a new plant or acquiring a site with planning permission for a plant as it would be difficult for it to justify the costs involved.[453]

C2

276. Breedon Aggregates considered that limiting the amount of cement that producers could sell to their own RMX business, or the RMX operations of the other top 3 producers, to say 10 per cent would likely have the consequence of making cement producers compete harder for external customers. Cement producers would also likely scale back their RMX capability. It could also lead to a more profitable RMX

[452] Breedon Aggregates response hearing summary, paragraph 10.
[453] Breedon Aggregates response hearing summary, paragraph 11.

sector as it might be that the price of RMX was currently suppressed because the major cement players took profit upstream in their cement businesses which made it difficult for independent RMX firms to be profitable. It could also lead to the creation of more, and larger, independent RMX producers, however, the consequences were difficult to predict.[454]

277. Large contractors who needed security of supply would need to be confident of the technical back-up behind their RMX supplier, and they would probably be inclined to go to an RMX supplier with multiple plants in order to lessen risk.[455]

278. Careful consideration would need to be given to what would be the correct VI ratio for cement to RMX plants for a cement producer. For example, Lafarge Tarmac was already relatively less vertically integrated than other major producers. It might be necessary for different ratios to apply to different producers, and in particular Breedon Aggregates noted that it would be unfair for HCM suddenly to have to comply with a VI ratio of 10 per cent as it had just acquired its RMX business.[456]

279. RMX production required a lot of overhead and was a 'high volume, low margin business'. RMX divestitures would not be attractive to BA unless they were situated near to its aggregates facilities. Even in a key market within the M25, Breedon Aggregates would not consider buying RMX plants unless it could supply them. [✂][457]

[454] Breedon Aggregates response hearing summary, paragraph 12.
[455] Breedon Aggregates response hearing summary, paragraph 13.
[456] Breedon Aggregates response hearing summary, paragraph 14.
[457] Breedon Aggregates response hearing summary, paragraph 15.

280. Requiring the divestiture of RMX plants could lead to a reduction in capacity if the purchasers which acquired them discovered that it was a challenging business and did not work hard at keeping their RMX businesses going.[458]

C3

281. The cement buying group (CBG) remedy was unattractive to Breedon Aggregates. It was happy with how it currently purchased cement and felt it did not need the leverage that might follow from joining a CBG. Such groups might be beneficial for smaller cement purchasers not only in terms of lowering prices but also getting over credit risk issues. Having said that, Breedon Aggregates also stated that small independent purchases might not be paying significantly more for cement than bigger ones. Breedon Aggregates considered that a CBG could provide different specifications of cement as required.[459]

282. There was currently no cement spot price, partly because the price of cement varied regionally. If a spot price was published, it would likely result in those paying more than the spot price to renegotiate. Breedon Aggregates considered that a spot price would ultimately simply be a 'common average price' and would be of little value as Breedon Aggregates' experience of the construction materials business had been that prices were usually individually negotiated on a deal-by-deal basis.[460]

C4

283. A move away from cement producers sending generalized price announcement letters (PALs) (ie showing increases in terms of £ per tonne) in place of personalized ones (showing specific price figures) would be logical. Generalized PALs signalled intent and could be seen as a way of producers signalling to each other. If person-

[458] Breedon Aggregates response hearing summary, paragraph 16.
[459] Breedon Aggregates response hearing summary, paragraph 17.
[460] Breedon Aggregates response hearing summary, paragraph 18.

alized letters contained prices specific to a particular customer, both buyer and seller would want that letter to remain confidential, and this would, in turn, reduce price transparency. Breedon Aggregates also considered that cement suppliers would be more likely to insert a lower number in a personalized letter and that there would be less scope for negotiation over prices.[461]

284. Breedon Aggregates said that it could not see the customer benefit in receiving generalized PALs. Breedon Aggregates purchased all its cement from Lafarge, Cemex and Hanson but all prices were ultimately negotiated one to one. Breedon Aggregates would prefer to receive a personalized letter from a particular cement supplier when it was a natural point of the relationship to discuss price rather than receive a generalized PAL along with every other purchaser of cement.[462]

285. Breedon Aggregates said that in this respect ground granulated blast furnace slag (GGBS) should be treated the same way as cement.[463]

C5

286. Breedon Aggregates used Mineral Products Association (MPA) data as an indication of what the market was doing both regionally and nationally. Breedon Aggregates did not receive any detailed cement data as it was not a cement producer. However, it did receive national cement headline data.[464]

287. A lag in the publication of cement data would not present Breedon Aggregates with any problems. Cement suppliers would always try to find out, by whatever means,

[461] Breedon Aggregates response hearing summary, paragraph 19.
[462] Breedon Aggregates response hearing summary, paragraph 20.
[463] Breedon Aggregates response hearing summary, paragraph 21.
[464] Breedon Aggregates response hearing summary, paragraph 22.

what their market share was as it was important to them but a three-month delay in the publication of MPA data would make this more difficult.[465]

C6

288. Breedon Aggregates did not look at EU Emissions Trading System data and had no concerns about its publication.[466]

C7

289. In respect of granulated blast furnace slag (GBS) divestitures, Breedon Aggregates considered that it would be better to divest all three GBS production facilities to one firm in order to limit the risk of a company acquiring one GBS plant and the local steel works then closing down, which would result in the GBS plant having no supply of slag. For this reason, divestment of a single GBS plant might be unattractive to purchasers.[467]

290. The GGBS facilities could be divested to any of the existing cement producers (other than Hanson) but divestment to HCM as a new entrant might encourage more competition. If GGBS production was divested to a party independent of cement producers, then this independent would be likely to compete vigorously against cement producers.[468]

291. Breedon Aggregates currently purchased GGBS from Hanson. Breedon Aggregates would be interested in acquiring GGBS capacity subject to price and the long-term security of supplies from the steel industry.[469]

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[465] Breedon Aggregates response hearing summary, paragraph 23.
[466] Breedon Aggregates response hearing summary, paragraph 24.
[467] Breedon Aggregates response hearing summary, paragraph 25.
[468] Breedon Aggregates response hearing summary, paragraph 26.
[469] Breedon Aggregates response hearing summary, paragraph 27.

Z1

292. Breedon Aggregates did not consider that cross-selling of cement between the producers was contributing to any lessening of competition, so it did not regard a remedy requiring the majors to tender for these supplies to be necessary. Breedon Aggregates also did not consider it likely that any such remedy would be effective.[470]

Z2

293. Breedon Aggregates did not consider that any remedy restricting the flow of information about cement prices within the cement producers' internal organizations would be effective.[471]

Z3

294. Breedon Aggregates would not be interested in acquiring a stand-alone grinding station as it would have to import clinker. However, Breedon Aggregates could see this remedy being attractive to an independent with access to clinker.[472]

Brett Group

295. The CC did not receive a response specific to either its Notice of possible remedies or provisional findings. However, Brett Group attended a response hearing on 1 July 2013 where it provided comments on the Notice of possible remedies.

C1

296. Brett Group supported a decoupling of cement from both RMX and other integrated manufacturing operations. There was little value in the creation of another cementer with some integrated RMX. It would be preferable to divest a stand-alone cement

[470] Breedon Aggregates response hearing summary, paragraph 28.
[471] Breedon Aggregates response hearing summary, paragraph 29.
[472] Breedon Aggregates response hearing summary, paragraph 30.

plant or a cement plant with a low level of integrated capacity as this would create a cement producer with an interest in selling beyond its own operations.[473]

297. Up to now, out of the four incumbent cement producers only Lafarge had really shown a consistent interest over a sustained period in supplying Brett Group. This was because Lafarge produced more cement than it could sell through its own RMX operations.[474]

298. By itself Brett Group did not have the financial resources to acquire a divested cement plant. It might consider doing so as part of a joint venture, but it would need to ensure it had the right expertise to manage a cement-producing operation and the plant's location would need to align with Brett Group's other construction materials interests.[475]

299. As Brett Group was not familiar with the location, dynamics, reserves or cost bases of the various Great Britain cement plants, it was unable to assess which was the most attractive divestment. It noted that planning consent had been granted for a cement plant in the Medway in Kent. [✂][476]

300. Brett Group hoped that any divested cement plants would be acquired by companies it considered 'credible' as cement plants were large operations and customers needed them to be operated reliably, so any company running one would need a good track record. [✂][477]

301. The two most interesting dynamics were *(a)* the number of players; and *(b)* their willingness and interest in supplying Brett Group. The current number of cement

[473] Brett Group response hearing summary, paragraph 6.
[474] Brett Group response hearing summary, paragraph 7.
[475] Brett Group response hearing summary, paragraph 8.
[476] Brett Group response hearing summary, paragraph 9.
[477] Brett Group response hearing summary, paragraph 10.

producers could address the AEC. The fact that they were so vertically integrated meant that they were generally less interested in supplying Brett Group. [✂][478]

302. Brett Group was concerned to read in the provisional findings that Lafarge Tarmac was the prime divestiture candidate [✂] current supply arrangements with Lafarge Tarmac. Requiring Lafarge Tarmac to divest cement production capacity could mean that it would be more interested in supplying its own RMX business and less interested in supplying companies like Brett Group. The concept of three or four barely interested cementers worried Brett Group. [✂][479]

C2

303. The more cement a cementer had to sell on the open market, the better [✂]. As cementers became more vertically integrated, they were less interested in supplying independents. [✂] A RMX divestiture would have the effect of incentivizing Cemex and Hanson to be more interested in supplying independents.[480]

304. Brett Group would be interested in acquiring a number of divested RMX plants subject to having the necessary management capacity and the location of the plants being divested in relation to its aggregates facilities and the addressable market. [✂] In this way, if Brett Group could purchase cement competitively, it could add value to [✂] its [✂] aggregates.[481]

C3

305. Brett Group's understanding was that this remedy was intended to result in increased buyer power in the cement market. However, it took a long-term perspective about

[478] Brett Group response hearing summary, paragraph 11.
[479] Brett Group response hearing summary, paragraph 12.
[480] Brett Group response hearing summary, paragraph 13.
[481] Brett Group response hearing summary, paragraph 14.

building knowledge, relationships, contracts and long-term strategy in order to leverage the best cement prices for itself. [✂][482]

306. [✂] It wanted control over the type of cement it purchased which was driven by a range of criteria including customer specifications. It needed discretion over who it dealt with. Overall, Brett Group was not in favour of this remedy.[483]

C4

307. Brett Group explained that generalized cement price increase announcement letters assisted it when negotiating contract prices with its customers, where some supply agreements lasted in excess of 12 months. These letters enabled Brett Group to revert to its customers and negotiate price increases.[484]

308. As a purchaser of cement, Brett Group did not put much credence behind the proposed price increases in cementers price announcement letters, and it negotiated directly (face to face) with cementers.[485]

309. Brett Group did not recognize the problems identified by the CC in connection with sending generalized cement price announcement letters. It found them helpful for the professional procurement manager and it expected to be written to by suppliers with regard to prices going forward. It would not present any problems if suppliers wrote to Brett Group in more personal terms.[486]

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[482] Brett Group response hearing summary, paragraph 15.
[483] Brett Group response hearing summary, paragraph 16.
[484] Brett Group response hearing summary, paragraph 17.
[485] Brett Group response hearing summary, paragraph 18.
[486] Brett Group response hearing summary, paragraph 19.

C5

310. Brett Group made use of cement data and considered it an important part of its knowledge from a procurement perspective [✂]. Whether cement volumes were up or down were important signals and it could get this from Mineral Products Association (MPA)/Department for Business, Innovation and Skills data. However, it was unable to assess which firms had lost volume from the data. Nevertheless, it could determine this anecdotally.[487]

311. Brett Group gained competitive leverage from the data when added to other market intelligence including various market studies which it used to review the market and kept its ear to the ground regarding market developments.[488]

312. If MPA data was available after a lag of three months, that would not fundamentally affect the value derived from the data although there was a point where it became historic. The sooner it could obtain the data, the greater the advantage.[489]

C6

313. Brett Group did not make use of the EU Emissions Trading System data and was unfamiliar with it.[490]

C7

314. Brett Group imported ground granulated blast furnace slag (GGBS) for its own consumption. The fact that there was a monopoly in the domestic supply of GGBS in

[487] Brett Group response hearing summary, paragraph 20.
[488] Brett Group response hearing summary, paragraph 21.
[489] Brett Group response hearing summary, paragraph 22.
[490] Brett Group response hearing summary, paragraph 23.

Great Britain was a reason for importing GGBS [✂]. Having the terminal allowed Brett Group to import GGBS. [✂][491]

315. GGBS was very well known as a cement replacement in Great Britain. Brett Group had been buying GGBS since the 1980s. It preferred GGBS over pulverized fly/fuel ash (PFA) as: *(a)* PFA supply into the South-East could be limited, and *(b)* it worked better in its RMX plants as PFA had different handling characteristics. In addition, GGBS concrete was well known and accepted by customers in the South-East, outside of London.[492]

316. Brett Group would prefer to deal with a number of competing suppliers of GGBS within Great Britain. It considered that the domestic monopoly in GGBS allowed its supplier to sell GGBS at a price which, while below that of CEM I, tracked the CEM I price in order to ensure that GGBS sales volumes were maintained.[493]

Z1

317. Brett Group did not see any merit in the third party competitive tender process remedy.[494]

Z2

318. Brett Group did not see how the information barriers remedy could be implemented practically. It would be preferable to reduce the number of RMX plants owned by cement producers.[495]

[491] Brett Group response hearing summary, paragraph 24.
[492] Brett Group response hearing summary, paragraph 25.
[493] Brett Group response hearing summary, paragraph 26.
[494] Brett Group response hearing summary, paragraph 27.
[495] Brett Group response hearing summary, paragraph 28.

Z3

319. [✂][496]

[A mid-tier aggregates and RMX producer]

320. [✂] said it had reviewed the CC's provisional findings and Notice of possible remedies. [✂] did not provide detailed comments on the provisional findings or Notice of possible remedies with the exception of the CC's proposed remedy C3, the creation of a cement buying group or groups.

C3

321. [✂] did not consider that the CC's proposed remedy C3 was justified and queried the basis for it. [✂] stated that the AEC that remedy C3 sought to address (a lack of countervailing buyer power on the party of cement purchasers) was not fully articulated in the provisional findings. It considered that the other remedies which required divestments and restrictions on supplier conduct (remedies C1, C2 and C4) plus publication restrictions (C5 and C6) would together address the AEC and correctly focus on the structure and behaviour of the suppliers.[497]

322. [✂] stated that remedy C3 was not reasonable, effective or proportionate.[498] From a practical perspective, [✂] considered that the implementation, monitoring and administration requirements of such a buying group or groups 'would be considerable and disproportionately burdensome'.[499] [✂] also commented that remedy C3 was unduly invasive and had the potential to distort the prevailing competitive conditions.[500] Furthermore, [✂] considered that buying groups raised potential

[496] Brett Group response hearing summary, paragraph 29.
[497] [✂] response to the CC's Notice of Possible Remedies, paragraph 2.1.
[498] [✂] response to the Notice of possible remedies, paragraph 2.2.
[499] [✂] response to the Notice of possible remedies, paragraph 2.5.
[500] [✂] response to the Notice of possible remedies, paragraph 2.6.

competition law issues and that 'compulsory membership would be highly invasive and interventionist'.[501]

F E Gilman

323. F E Gilman submitted a written response to the CC's provisional findings and Notice of possible remedies. The written response commented on the following proposed remedy options.

C1 & C2

324. Divestitures were essential. Cement producers must be separated from cement users. Divestitures would be much simpler for the cementitious side of the Top 3 cement producers, given the extent to which they were vertically integrated, rather than for their RMX and precise concrete sides.[502]

C7

325. Each of the Top 3 cement producers should divest itself of every one of its GB cement, slag and ash interests.[503]

Z3

326. In respect of the small number of cement, cement clinker grinding, slag and ash plants involved, each production plant should be acquired by a new player in a manner that ensures that any single cement/slag/ash player owned, controlled or managed not more than one plant location.[504]

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[501] [✂] response to the Notice of possible remedies, paragraph 2.9.
[502] F E Gilman's response to the Notice of possible remedies, paragraph 3.
[503] F E Gilman's response to the Notice of possible remedies, paragraph 4.
[504] F E Gilman's response to the Notice of possible remedies, paragraph 5.

[A small producer]

327. The CC did not receive a response specific to either its Notice of possible remedies or provisional findings. However, [✂] sent an email to the Admin Team attaching an earlier email to John Doyle, a former member of the CC, in November 2012 setting out concerns in relation to the Lafarge Tarmac joint venture divestments to HCM which [✂] considered still very relevant today.

[An independent RMX producer]

328. [✂] responded to the CC's provisional findings and Notice of possible remedies with reference to its trading experience following new entrants to the cement and GGBS markets which appeared to have increased competition and reduced the prices paid for materials by [✂]. However, [✂] did not provide any specific comments on the individual remedies.

329. In respect of CEM I, [✂] considered that HCM's presence in the market had reduced the purchase price. Prior to HCM entering the market, [✂] purchased CEM 1 from [a cement importer] at £[✂] per tonne. HCM quoted £[✂] and ultimately, [✂] secured a price of £[✂] with [a cement importer]. In addition, [a GB cement producer] and [a GB cement producer] separately cold called [✂] with quotes that were unusually competitive.[505]

330. In respect of GGBS, [✂] stated that Hanson had held a monopoly for the supply of GGBS in GB ever since it purchased Civil and Marine. In 2012, [✂] could purchase GGBS from Hanson at £[✂] per tonne ex works plus haulage at £[✂] per tonne giving a total of £[✂]. In May 2012, [✂] offered [✂] Spanish GGBS at £[✂] delivered. In June 2012, [✂] negotiated with [✂] for the supply of German GGBS at £[✂] per tonne delivered. In August 2012, a Hanson rep verbally offered GGBS ex

[505] Page 1 published [✂] response to the CC's Notice of Possible Remedies.

works at £[✂] per tonne (subject to manager approval) and apparently commented that previously higher rates reflected Hanson's position in the market at that time as the sole supplier of GGBS. Hanson ultimately quoted a delivered price of £[✂] per tonne fixed until the end of 2013.[506]

331. [✂] concluded that the reduction in the prices of both CEM I and GGBS when new suppliers entered the market showed that these markets had not been operating correctly and had resulted in higher prices. [✂] encouraged the CC to take action to improve competition in these markets.[507]

Department for Business, Innovation and Skills

332. Department for Business, Innovation and Skills (BIS) provided a response to the Notice of possible remedies which was restricted to remedy C5, restrictions on the disclosure of cement market data by the UK Government and by GB cement producers to private sector organizations. BIS did not comment on whether it agreed or disagreed with the AECs identified by the CC. BIS also attended a teleconference response hearing on 8 July 2013.

C5

333. The Construction Market Intelligence team, located in the Analysis Directorate of BIS, was responsible for publishing a range of statistics on building materials and components. This was done through a regular monthly publication titled *Monthly Statistics of Building Materials and Components*, which was made publicly available through its website.[508] Table 8 of that publication included statistics on monthly cement production and sales in GB plus figures for cementitious materials (GGBS and PFA), clinker and estimates of cement imports. The information was received

[506] Page 2 published [✂] response to the CC's Notice of Possible Remedies.
[507] Page 2 published [✂] response to the CC's Notice of Possible Remedies.
[508] BIS response to the Notice of possible remedies, paragraph 3.

from an accountancy firm, who collected data from cement producing firms on behalf of the Mineral Products Association (MPA). BH aggregated the data and then passed it to the MPA and BIS.[509]

334. Prior to 2007, the information published in Table 8 was collected by BIS' predecessor organization, the Department for Trade and Industry (DTI), from UK cement producers.[510] Data was previously published by DTI three months in arrears. In 2007, the British Cement Association (BCA) asked BH to collect the data from cement producers. The BCA subsequently decided to publish the data one month in arrears and DTI followed suit.[511]

335. The data was used primarily for market and economic information by government and industry bodies, including construction trade associations.[512] BIS investigations indicated that cement data was a good predictor of construction output.[513] Brick and cement deliveries appeared to be the most reliable predictors of construction output and therefore BIS did not wish to omit cement from its forecasting model.[514]

336. BIS considered that if the data were embargoed for longer than one month, no forecasting model would be able to use it.[515] Cement data published three months in arrears would be useless for forecasting purposes because cement production led output by about a month.[516] From a practical perspective, BIS considered it unproblematic to revert to publishing the data three months in arrears. However, there would be little point in publishing data with a greater time lag or in less detail as

[509] BIS response to the Notice of possible remedies, paragraph 4.
[510] BIS response to the Notice of possible remedies, paragraph 7.
[511] BIS response to the Notice of possible remedies, paragraph 8.
[512] BIS response to the Notice of possible remedies, paragraph 9.
[513] BIS response to the Notice of possible remedies, paragraph 10.
[514] BIS response hearing summary, paragraph 2.
[515] BIS response to the Notice of possible remedies, paragraph 11.
[516] BIS response hearing summary, paragraph 5.

its utility would be diminished.[517] BIS said that it could not use cement data that was six months old for forecasting construction market performance.[518]

337. If given access to data with an embargo, BIS stated that it would be treated as confidential data under the Code of Practice for Official Statistics whereby only named individuals would be allowed pre-publication access in exceptional and unusual circumstances and upon signing a strict non-disclosure agreement.[519]

338. BIS could not foresee any circumstances where disaggregated data needed to be provided to third parties accept for the purpose of aggregation as in the case of MPA's firm of accountant's arrangement with the MPA.[520]

339. If the CC recommended that this remedy be adopted, BIS would immediately cease publication of the next month's cement data and would wait three months before publishing it.[521]

Department of Energy & Climate Change

340. Department of Energy & Climate Change (DECC) submitted a response to the CC's Notice of possible remedies which focused on remedy option C6; recommendations to the UK Government/European Commission on the publication of GB cement producers' verified emissions data under the EU Emissions Trading System (EU ETS). DECC also attended a teleconference response hearing on 11 July 2013.

[517] BIS response to the Notice of possible remedies, paragraph 12.
[518] BIS response hearing summary, paragraph 2.
[519] BIS response to the Notice of possible remedies, paragraph 13.
[520] BIS response to the Notice of possible remedies, paragraph 14.
[521] BIS response hearing summary, paragraph 8.

C6

341. DECC stated that the annual EU ETS emissions data was useful to the cement sector and provided 'significant public policy benefits from the transparent publication of the data across the EU'. In particular, the data enabled viewers to track developments across Europe.[522] DECC considered that the CC had not set out a strong enough case for prohibiting the publication of the EU ETS emissions data and that the other remedies set out in the Notice of Possible Remedies, in particular those that directly addressed the ability to coordinate, were likely to be more effective than a ban on data publication.[523] DECC said that 'even if the publication of EU ETS data contributed to the creation of the AEC in the cement market provisionally identified by the CC, the benefits obtained from publishing the data outweighed any detrimental effects'.[524]

342. DECC explained that EU ETS emission figures were made publicly available by the European Commission on the first working day after the 31 March deadline for reporting annual EU ETS emissions. Making the data available to all as soon as possible prevented those with the ability to make accurate estimates of the emissions data from having an unfair advantage in the carbon market. In addition, some Member States could not restrict access to the data due to freedom of information legislation. Therefore, a coordinated release of the emissions data was implemented.[525]

343. DECC was concerned that recommendations such as aggregating data could set a precedent for other industry sectors and this could potentially thwart the ability of the public from assessing how the EU ETS was delivering emission reductions at

[522] DECC response hearing summary, paragraph 16.
[523] DECC response to the Notice of possible remedies, paragraph 2.
[524] DECC response hearing summary, paragraph 2.
[525] DECC response to the Notice of possible remedies, paragraph 3.

installation level which had been published since 2007.[526] In any case, DECC stated that it was not clear that the EU ETS data was the only source of information in the UK that cement producers could use to make inferences about production volumes and market shares.[527]

344. Aside from the public policy concerns, DECC considered that there would be some legal practicability issues involved if the remedy was implemented to include amendments to EU legislation.[528] The impact of implementing this particular remedy would require a qualified majority of Member States to amend the Registries Regulation and the agreement of the European Parliament and the Council of the EU in response to a proposal from the European Commission in respect of the ETS Directive.[529] Information requests for this data under the Environmental Information Regulations (which implemented the EU Directive on public access to environmental information[530]) meant that there was a statutory duty on public authorities to make environmental information such as emissions data available on request.[531]

345. DECC considered that a delay in the publication of the data would not be as problematic as a total prohibition[532] although any delay on publication would have to be the same across the EU which would involve practical difficulties.[533] DECC also considered that a recommendation by the CC for a delay in the publication of cement

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[526] DECC response to the Notice of possible remedies, paragraph 4.
[527] DECC response to the Notice of possible remedies, paragraph 5.
[528] Article 15A of the amended ETS Directive states that: *'Member States and the Commission shall ensure that all decisions and reports relating to quantity and allocation of allowances and to the monitoring, reporting and verification of emissions are immediately disclosed in an orderly manner ensuring non-discriminatory access. Information covered by professional secrecy may not be disclosed to any other person or authority except by virtue of the applicable laws, regulations or administrative provisions'*. In addition, the Registries Regulation 2013 which states that by virtue of Article 109 the Central Administrator shall make available information referred to in annex XIV to members of the public via the EU Transaction Log which is the EU wide database through which all Registry transactions take place. Article 1(e) of annex XIV specifies that the EU Transaction Log shall provide to the public, *'the verified emissions figure, along with its corrections for the installation related to the operator holding account for year x shall be displayed from the 1 April onwards of year (x81)'*.
[529] DECC response to the Notice of possible remedies, paragraph 9.
[530] (2003/4/EC).
[531] DECC response to the CC's Notice of Possible Remedies, paragraph.
[532] DECC response hearing summary, paragraph 5.
[533] DECC hearing response summary, paragraph 6.

data might well lead to other industry sectors involved in EU ETS to argue for similar treatment.[534]

OFT

346. The nature and proportionality of the proposed remedies in the cement market ought to be viewed in the light of the OFT's 2011 market study into aggregates and also the:

(a) £180 million detriment[535] to buyers over five years identified by the CC in its provisional findings (which has subsequently been revised);

(b) fact that conditions seem to exist in the market which could result in outright collusion and therefore, arguably, a higher level of detriment unless remedial action is taken; and

(c) fact that new entry to the market by means other than acquisition of divested plant is virtually impossible due to planning constraints and high start up costs.

347. There is strong justification for the proposed divestiture remedies. While the divestiture remedies should go a long way to remedying the AEC the CC has identified, divestments alone will not be enough. Behavioural remedies are also required in order to minimize the risk of collusion.

C1

348. The CC should consider the minimum plant sizes required for a sustainable cement plant operation and whether divestiture would cause any loss of economies of scale the benefits of which were previously passed on to customers in the form of lower prices (although the CC's investigation would suggest that it is unlikely that such benefits were being passed on).

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[534] DECC hearing response summary, paragraph 11.

[535] Further work on customer detriment has been carried out since the publication of the CC's Provisional Findings. Revised customer detriment estimates are set out at paragraph 32 of the CC's Provisional Decision on Remedies.

349. Divestiture alone will not remedy the AEC. Tacit collusion might be possible with a larger number of competitors as it is among three.

350. Divestiture would be more effective if the businesses to be sold off were able to operate almost immediately after sale as stand-alone businesses with their own set of customers and orders to fulfil. The OFT agreed with the other points about the cement divestiture.

351. The extent to which latent production capacity should be required to be divested ought to depend in part on where this production capacity is.

C2

352. The divestiture of RMX plant capacity would probably have to be at such a level so as to increase the size of the addressable market such that there would be a real increase in overall competition for the supply of cement through encouraging more suppliers to compete for the business and make better use of their plants. This should inform the Target VI ratio.

C3

353. Whilst CBGs could increase buyer power, divestments are likely to have the same effect. There were competition law considerations with this proposed remedy for example conditions of joining that may require members to buy a particular quantity of cement via the CBG and restrictions on members purchasing cement elsewhere. There were also administration issues. It was noted that CBGs had not emerged naturally. Nevertheless, CBGs might be worth investigating further.

C4

354. The OFT expected customers to be told in advance about price changes (rises or reductions) or change in pricing policy. This was necessary for them to be able to plan ahead in their purchase and use of cement, and to be able to make well-informed decisions on whether to terminate the contract and switch supplier.

355. The definition of 'price announcement' should be wide and encompass notifications about changes in either or both actual prices and pricing structure. A prohibition of forms and content of communications rather than a template was also preferred.

356. In respect of monitoring compliance, it would be too resource intensive for the OFT to carrying out frequent checks of cement suppliers or to impose a requirement that all price announcements were copied to the OFT. A better alternative would be to rely on complaints about the practice or whistleblowers.

C5

357. If the data published were older, there was less risk of it being used to lead prices and dampen competition. However, the OFT offered no view on what the time lag should be.

C6

358. The OFT could not provide a view on the merits of this remedy as it had insufficient information. It acknowledged that the CC had consulted the team in the European Commission handling the Article 101 enquiries into the cement sector. The OFT considered that there would probably need to be a strong case for treating UK data differently to other EU counties' data.

C7

359. There were risks if the CC required the three GBS facilities to be under separate ownership. The sale of two or three to one entity might ensure a better chance of continuity of supply if operations ceased temporarily or permanently at some of the steel works. If all three plants were sold to one operator, it would result in 'a total monopoly merely being transferred from one enterprise to another without the prospect of opening up the market to competition'.

360. In respect of GGBS, the OFT considered that 'there might be more scope to require Hanson to sell all or some of its five GGBS manufacturing plants to independent operators' which could increase the visibility of GBS prices in the supply chain and possibly expose the GGBS sector to some competition from overseas.

The Directorate-General for Climate Action

361. Directorate-General for Climate Action (DG Clima) did not submit a response to the CC's Notice of possible remedies. However, it did attend a meeting with members of the CC in Brussels on 25 June 2013. The focus of the discussion was remedy option C6; recommendations to the UK Government/European Commission on the publication of GB cement producers' verified emissions data under the EU ETS.

C6

362. DG Clima explained that transparency was a feature that was widely present in environmental legislation due to the policy benefits of transparency and that the publication of verified emissions data was prescribed by legislation.[536,537]

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[536] Paragraph 2 published note of meeting.
[537] http://ec.europa.eu/clima/policies/ets/documentation_en.htm); its genesis dates back to the Aarhus Convention on access to information, public participation in decision-making and access to justice in environmental matters (signed 25 June 1998 and

363. DG Clima explained that the rationale behind the publication of the EU ETS data included:

(a) the policy benefits of transparency; enabling the public and interested third parties (such as NGOs, financial analysts and those active in the carbon markets, for example [✂]) to see the effectiveness of the EU ETS in reaching is policy objectives (and, in the case of analysts, contributing to the efficient running of the carbon markets); and

(b) the aim of facilitating compliance in reducing carbon emissions.[538]

364. The relevant data was published by the European Commission on the next working day after it was provided to the European Commission by installations on 31 March each year. The data was accessible by each of the 28 Member States plus the three countries belonging to the European Economic Area European Free Trade Association.[539] Installations submitting data to the European Commission had one month from this 31 March to surrender their relevant allowances equivalent to their emissions. By publishing the data within one working day of receiving it, no company should be able to gain an advantage when trading allowances in advance of submission of allowances to the EU.[540]

365. There were detailed rules stipulating how the data should be recorded and verified. The public could request verified emissions data (to include installation level data) from national authorities (The Environment Agency in the case of GB) and also from the European Commission.[541]

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implemented in the EU and member states through Directive 2003/4). It further confirmed that the European Court of Justice (Case *524/09 Ville de Lyon v Caisse des dépôts et consignations* http://curia.europa.eu/juris/liste.jsf?language=en&num=C-524/09) which held that data classified as 'environmental information', such as reports of emissions, had to be published, but certain exemptions applied to 'trading data' relating to emission allowances.

[538] Paragraph 3 published note of meeting.

[539] Paragraph 4 published note of meeting.

[540] Paragraph 6 published note of meeting.

[541] Paragraph 5 published note of meeting.

366. DG Clima considered that remedy C6 was incapable of being implemented because:

(a) a delay in publication by the European Commission would not prevent the information being obtained from elsewhere (as had been the case when there was a six week delay in publication prior to 2006). A publication delay would also be considered disproportionate on the basis that only 10 of the 10,000 CO2 emitting installations across the EU were GB cement plants yet the remedy would affect all 10,000 installations;

(b) the application of the equal treatment principles would prevent GB cement producers being excluded from the ambit of the legislation;

(c) there was significant value in the data which in particular enabled benchmarking; and

(d) aggregating cement emissions data with emissions data from other industries would not be desirable as it would not provide useful information on the environmental impact of each industry in isolation.[542]

Tata Steel UK

367. Tata Steel submitted a response to the CC's Notice of possible remedies which focused on remedy C7, structural measures to address the AEC in relation to GGBS/GBS production in GB. Tata Steel UK also attended a response hearing at the CC on 18 July 2013.

C7

368. [✂][543]

[542] Paragraph 7 published note of meeting.
[543] Paragraph 2 published Tata Steel response to the Notice of possible remedies under the heading '(i) Provisional Findings in the GBS and GGBS markets'.

369. Tata Steel UK contracted with Lafarge Tarmac for the removal, processing and sale of blast furnace slag, steel slag and other slags. The processing of these slags were [✂].[544]

370. Tata Steel UK considered that the exclusive nature of its contracts with Lafarge Tarmac was a necessary and essential feature given that:

(a) large-scale investment was necessary meaning that an GBS processor required security of supply of slag over time in order to justify and recover investment;

(b) the process of treating the slag necessitated that slag cooling facilities were within close proximity to the blast furnaces (both facilities at Scunthorpe and Port Talbot were on site);

(c) [✂];

(d) [✂];

(a) [✂]; and[545]

(e) [✂], if the CC were to conclude [✂], Tata Steel UK suggested that an owner must operate multiple sites. Tata Steel UK also proposed criteria that the CC should consider in respect of the suitability of a purchaser of GBS plants:

(i) any new owner be independent of the steel industry;

(ii) it should have appropriate expertise and knowledge;

(iii) it should have the financial investment in the assets and continued capacity expenditure; and

(iv) ability to demonstrate a long-term commitment to the divested entity.[546]

371. The contracts [✂][547] which ran until 2029.[548]

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[544] Paragraph 3 published Tata Steel response to the Notice of possible remedies under the heading '(i) Provisional Findings the GBS and GGBS markets'.
[545] Paragraph 4 Tata Steel response to the Notice of possible remedies under the heading '(i) Provisional Findings in the GBS and GGBS markets'.
[546] Tata Steel response to the Notice of possible remedies under the heading '(e) What criteria should be applied to the consideration of purchaser suitability for: (i) GBS plants'.

372. [✂][549]

373. [✂][550]

374. In terms of timescale, Tata Steel UK considered that if divestments were required at either GBS or GGBS level, that these take place at the earliest possible opportunity or failing that, within the CC's standard six months.[551]

375. [✂][552,553]

Sahaviriya Steel Industries UK

376. Sahaviriya Steel Industries UK (SSI) submitted a written response and attended a telephone response hearing on 21 August 2013. SSI's comments were limited to remedy C7.

C7

377. SSI explained that the volume of slag produced was dependent on the volume of iron produced. Therefore, the exact slag production figures will vary. As a rule of thumb, for each tonne or iron made, approximately 200 to 300 kg (or 20 to 30 per cent) of slag was produced.[554]

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[547] Tata Steel response hearing summary, paragraph 35.
[548] Tata Steel response hearing summary, paragraph 29.
[549] Paragraph 2 under the heading 'a) Is it necessary to intervene at both the upstream and downstream levels in order to achieve an effective remedy to this AED?'
[550] Paragraph 1 under the heading 'd) If we chose to require divestitures at both upstream and downstream levels, should the same operator be permitted to purchase both a GBS and GGBs plant?'
[551] Paragraph 1 under the heading '(i) What timescale should be allowed for the implementation of any divestiture the CC may require?'
[552] Paragraph 2 under the heading '(ii) What arrangements should be put in place for holding separate the operations to be divested from those that will be retained and for monitoring any such provisions?'
[553] Paragraph 1 under the heading 'g) Under what circumstances should the CC appoint a divestiture trustee?'
[554] SSI response to the Notice of possible remedies, paragraph 3.

378. SSI noted that there was no reference to Hanson's mothballed grinding plant located at Redcar.[555]

379. SSI noted that the market had for some time been tightly controlled through very long-term contracts and specialization by single companies at various stages of the supply chain. SSI stated that it 'would therefore welcome the arrival of further outlets and processors and thus more competition at each stage of the supply chain'.[556]

380. Regarding the exclusive supply arrangements between Lafarge Tarmac and Hanson, SSI did not know what the exact arrangements were other than what had been disclosed during the CC's inquiry. [✂][557,558] SSI considered that more demand would be created for GGBS if there were a freer market with more players in it. SSI considered that very few businesses had the kind of security derived from the agreement between Lafarge Tarmac and Hanson.[559]

381. SSI considered that ownership of the plants itself did not restrict completion; it was the exclusive supply contracts that did. It believed that ownership of the GBS plants sat best with the owners of the blast furnaces. However, separating ownership of the processing plants from the buyers of the raw materials would assist in increasing competition.[560]

382. SSI viewed the granulator as being very much an integral part of the overall blast furnace operation and therefore considered it inappropriate to be owned by a third party. [✂][561] SSI considered that ownership of GBS plants was not important from a remedy or competition perspective. From an operational perspective, SSI wanted to

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[555] SSI response to the Notice of possible remedies, paragraph 3.
[556] SSI response to the Notice of possible remedies, paragraph 5.
[557] SSI response hearing summary, paragraph 35.
[558] SSI response to the Notice of possible remedies, paragraph A.
[559] SSI response hearing summary, paragraph 36.
[560] SSI response to the Notice of possible remedies, paragraph B.
[561] SSI response to the Notice of possible remedies, paragraph 5.

own the granulation plant itself. It considered that an effective remedy would come in the form of opening up the market. It took the view that if it could only sell its slag to one entity, that entity had the upper hand in the negotiation.[562]

383. SSI considered that there needed to be several GGBS plants and suggested as many as the number of owners of GBS plants. It also thought it important that mothballed GGBS plants were included in the divestiture process and new owners of them were encouraged to compete.[563] SSI considered that separation of production at the upstream and downstream levels would enhance competition.[564]

384. In respect of GBS plant ownership, SSI considered that no third party (ie a non-blast furnace operator) would be suitable as an owner. In respect of GGBS plant ownership, SSI considered that GGBS operator should be independent of the GBS operators and the cement producers. It was concerned that if the plant were merely shuffled around amongst the existing players, there was a strong likelihood that the AEC would continue.[565]

385. SSI considered that the divestiture process should be swift and on that basis, trusteeship should be unnecessary.[566]

International Small Business Alliance

386. The CC did not receive a response specific to either its Notice of possible remedies or provisional findings. However, Seamus May sent an email to the CC on 14 June 2013 attaching the following documents:

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[562] SSI response hearing summary, paragraph 38.
[563] SSI response to the Notice of possible remedies, paragraph C.
[564] SSI response to the Notice of possible remedies, paragraph D.
[565] SSI response to the Notice of possible remedies, paragraph E.
[566] SSI response to the Notice of possible remedies, paragraph F.

(a) International Small Business Alliance (ISBA) Draft Report for the OFT on the Structures and Behaviours of the UK Cement, Concrete and Aggregates Sector (prepared for the British Aggregates Association);

(b) BAA report Undisclosed Prices;

(c) ISBA comments on the Anglo/Lafarge mergers; and

(d) ZEW paper Concrete Shoes for Competition—the effect of the German Cement Cartel on Market Price.

387. ISBA welcomed the CC's provisional findings and agreed that there were 'very significant structural and behavioural problems'.[567]

388. In respect of the proposed remedies, ISBA considered that 'further analysis is required in relation to both foreclosure and margin squeeze effects, arising from the degree of vertical integration enjoyed by the [Majors]. Effective remedies require that the underlying analysis is thorough and it does seem that this may not fully be the case in regard to the concrete products market'.[568]

389. With regard to RMX, ISBA considered that Majors typically had a second plant within range or had reciprocal cross-supply arrangements in place with other Majors and 'in reality, the majority of independents only have access to the bread and butter RMX market, eg housing and aggregates'. ISBA also stated that 'the potential margin squeeze and threats to continuing cement supplies have been a very significant deterrent to new market entrants or to expansion by existing concrete producers' and that 'margin squeeze over the long term tends to eliminate independent RMX producers'.[569]

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[567] Page 1 published ISBA response to the CC's Notice of Possible Remedies.
[568] Page 1 published ISBA response to the CC's Notice of Possible Remedies.
[569] Page 2 published ISBA response to the CC's Notice of Possible Remedies.

390. With regard to cement, ISBA considered that 'the ring of cement import terminals around the UK that are controlled by Major cement producers, either with cement production capacity in the UK or not, are an elaborate attempt to create an illusion of competition when in reality, a quota system operates from country to country so as to give then effect of the free movement of cement across transnational borders'.[570]

MPA

391. The MPA provided a written response to the Notice of possible remedies confined to remedy C5. It also attended a teleconference response hearing on 17 July 2013.

C5

392. The remedy was a disproportionate way of addressing the AEC and was inconsistent with past EU/UK authority decisional practice.[571]

393. The MPA did not believe that, in relation to dissemination of identical market data from the same source, a different remedy should be implemented for private sector organisations such as the MPA, as opposed to Government departments and public sector bodies such as BIS.[572] In particular, restricting access to market data except via a Government source will stifle market analysis and innovation.[573]

394. In the absence of evidence demonstrating any clear nexus between the use of the MPA data and the coordination concerns raised by the CC, prohibiting cement producers from submitting sales and volume data to the MPA is disproportionate and unjustified.[574]

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[570] Page 3 published ISBA response to the CC's Notice of Possible Remedies.
[571] MPA response to the Notice of possible remedies, paragraph 1.2.
[572] MPA response to the Notice of possible remedies, paragraph 1.3.
[573] MPA response to the Notice of possible remedies, paragraph 1.4.
[574] MPA response to the Notice of possible remedies, paragraph 4.3.

395. The MPA would be prepared to consider a longer time lag provided it struck a reasonable balance between competition considerations and legitimate benefits that all users derived from publication of the data.[575]

Independent Buying Consortium

396. Independent Buying Consortium (IBC) did not submit a written response to the CC's provisional findings or Notice of possible remedies. However, it did attend a telephone conference response hearing on 12 July 2013 where it gave its views on remedy C3 (the creation of a cement buying group or groups).

C3

397. IBC said that the effectiveness of this remedy would depend to some extent on the level of the supply chain where the cement buying group or groups operated.[576] IBC was effectively an interface between its approved suppliers of construction materials and its 157 independent builders' merchant members. Members did not have to pay a membership fee to join this third party buying group[577] nor were they compelled to purchase materials exclusively through IBC.[578]

398. Cement accounted for approximately 8 to 10 per cent of IBC's overall turnover.[579] IBC said that it had not experienced any difficulty dealing with cement producers in GB.[580]

399. It considered that the construction products market in GB behaved differently to others elsewhere in the EU in that GB manufacturers negotiated with and sold

[575] MPA response hearing summary, paragraph 18.
[576] IBC response hearing summary, paragraph 14.
[577] IBC response hearing summary, paragraph 1.
[578] IBC response hearing summary, paragraph 19.
[579] IBC response hearing summary, paragraph 8.
[580] IBC response hearing summary, paragraph 18.

products directly to the end users.[581] It also said that some independent RMX producers gained a competitive advantage from individually negotiating cement prices.[582]

[581] IBC response hearing summary, paragraph 15.
[582] IBC response hearing summary, paragraph 13.

Supporting analysis to cement plant divestiture remedy

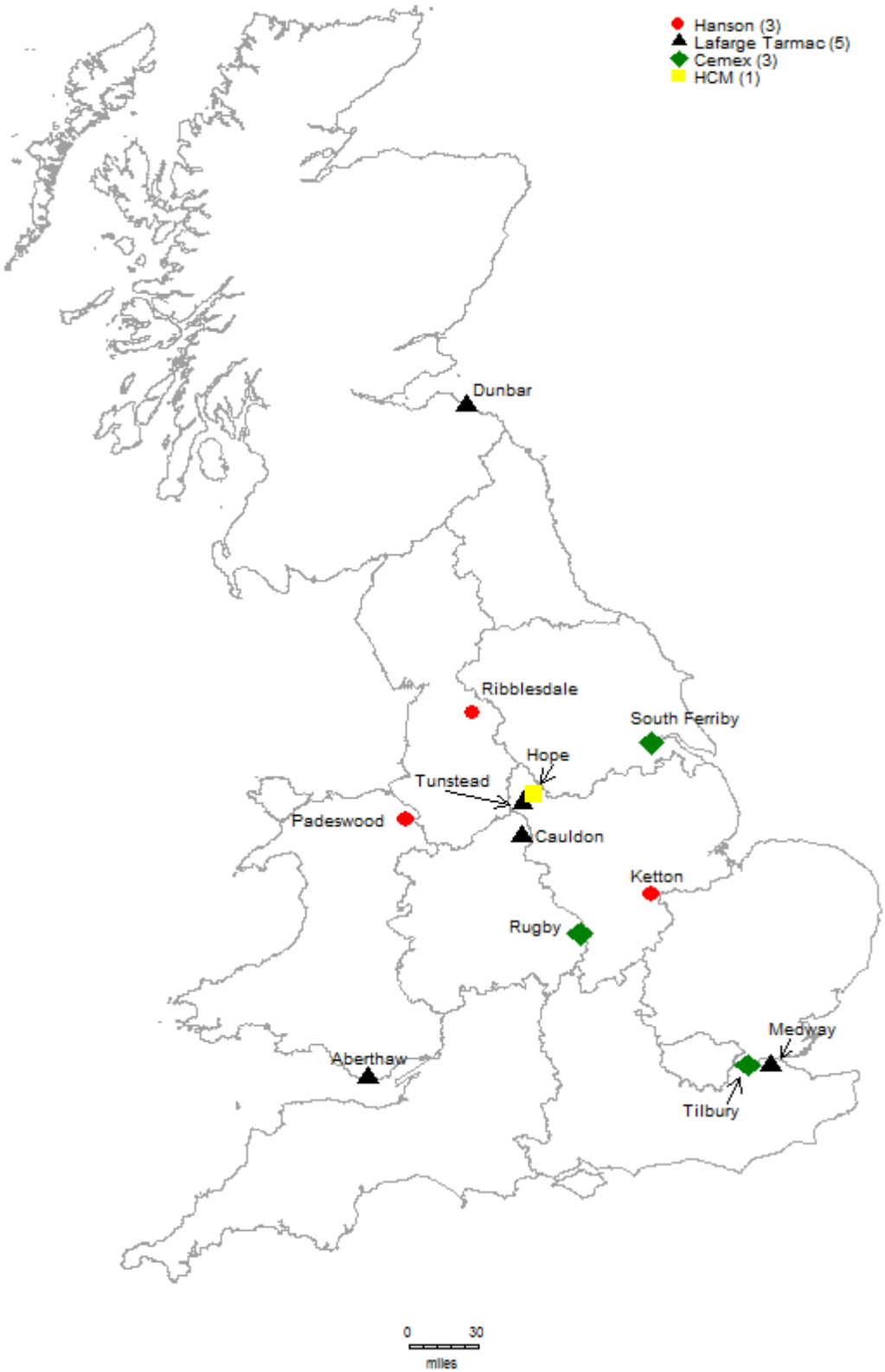
Details of cement plants in GB

Introduction

1. This annex provides background information on the cement facilities of the GB cement producers. Figure 1 shows a map of all ten cement plants in GB.

FIGURE 1

Locations of cement plants in GB



Source: Top 3 cement producers (FY11 transactions data).
Note: 'Medway' represents a site where Lafarge Tarmac has planning permission to construct a new 1.4 Mt cement plant and is therefore not counted as an active cement plant. 'Tilbury' is a stand-alone grinding station, which is owned by Cemex.

2. There are ten cement plants in GB which produce and grind clinker into cement, nine of which are owned and operated by the Top 3 cement producers:[1]

(a) Lafarge Tarmac has four cement plants: (i) the Aberthaw plant in South Glamorgan, Wales; (ii) the Cauldon plant in Stoke-on-Trent in Staffordshire in the West Midlands; (iii) the Dunbar plant in East Lothian, Scotland; and (iv) the Tunstead plant in Buxton, Derbyshire in the East Midlands.

(b) Hanson has three cement plants: (i) the Ketton plant in Stamford, Lincolnshire; (ii) the Padeswood plant in Mold, Flintshire in Wales; and (iii) the Ribblesdale plant in Clitheroe, Lancashire.

(c) Cemex has two cement plants: (i) the Rugby plant in Rugby, Warwickshire, in the West Midlands; and (ii) the South Ferriby plant in Barton-upon-Humber in Lincolnshire.

(d) HCM, the fourth and smallest GB cement producer, has one cement plant: the Hope plant in Hope, Derbyshire, in the West Midlands.

3. Two of the Top 3 cement producers also have additional clinker grinding capacity that is not co-located at any of their cement plants:[2]

(a) Lafarge Tarmac has a grinding station at Barnstone in Nottingham and a moth-balled grinding station at Westbury in Wiltshire.

(b) Cemex has a stand-alone grinding station located in Tilbury, Essex.

4. In relation to mothballed capacity, ie clinker and cement production capacity that has been mothballed:[3]

(a) Hanson has a mothballed kiln at its Ketton plant, and mothballed grinding mills at each of its three cement plants;

(b) Cemex has a mothballed kiln at its South Ferriby plant; and

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[1] Appendix A of the Remedies Notice.
[2] ibid.
[3] ibid.

(c) as mentioned above, Lafarge Tarmac has a mothballed grinding station at Westbury.

5. Only Lafarge Tarmac has any permitted capacity, ie production capacity which has received planning permission, where it has:[4]

(a) received planning permission to construct a second kiln at its Tunstead plant; and

(b) been granted an option by Lafarge SA to construct a new cement plant on Lafarge SA's freehold greenfield site in Medway, Kent.

6. In relation to cement import terminals:

(a) Lafarge Tarmac owns one import terminal in the South-East;[5]

(b) Cemex operates two active import terminals (Southampton and Dagenham) which are used as storage depots for cement manufactured at its Rugby plant, as well as a mothballed import terminal at Newport. [✂][6]

(c) Hanson operates two import terminals in England.[7]

7. In Figures 2 to 4 we show a map for each of the Top 3 cement producers, showing the locations of their rail-linked and non-rail-linked depots, their import terminals, as well as other sites, eg blending and packing facilities (based on each of the Top 3 cement producers' 2011 transactions data).

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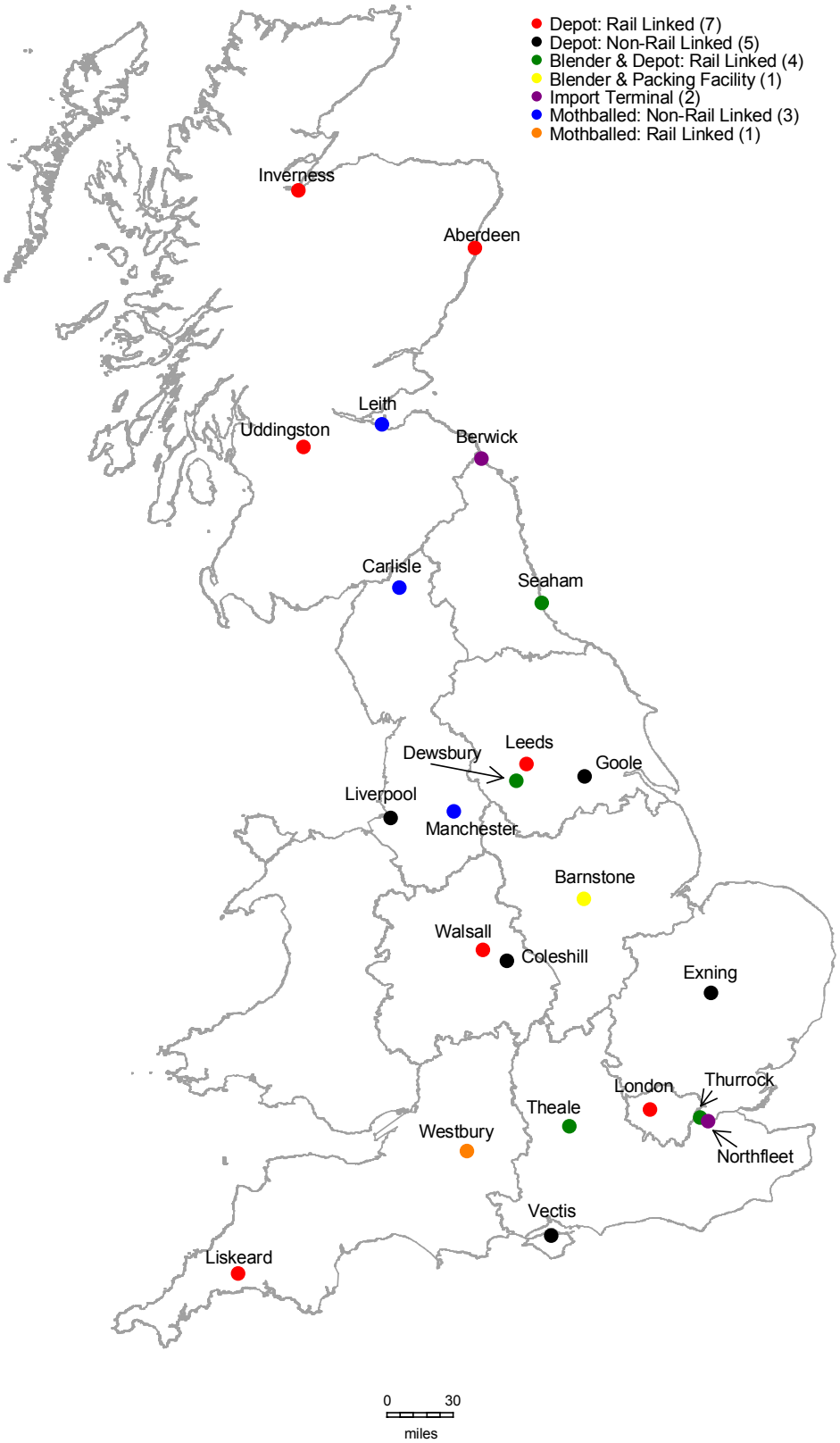
[4] ibid.
[5] Table 3.11 of the provisional findings.
[6] Appendix 3.1, paragraph 33, of the provisional findings.
[7] Paragraph 3.30 of the provisional findings.

FIGURE 2

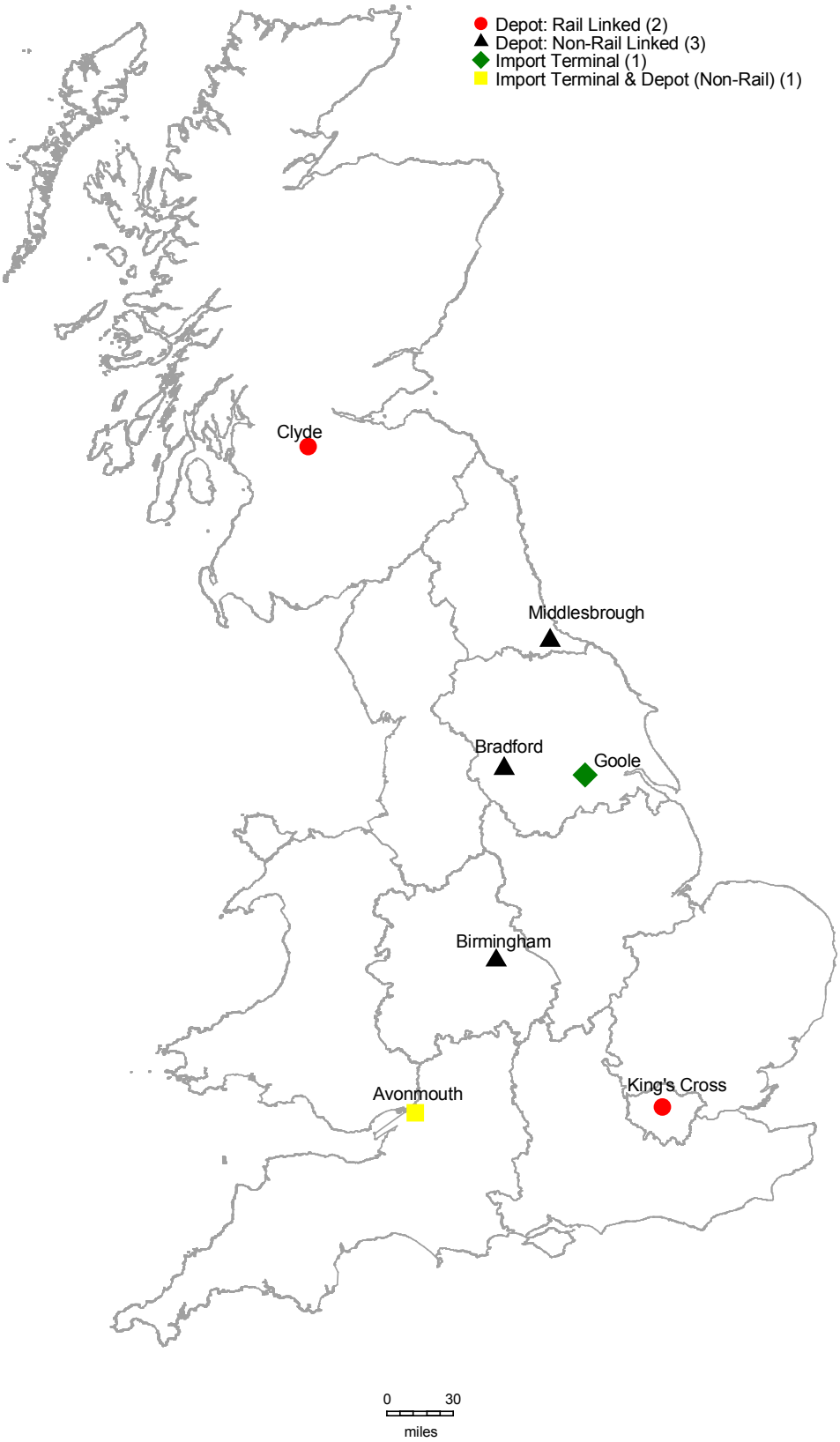
Lafarge Tarmac: cement site locations (non-clinker production)



Source: Lafarge and Tarmac (FY11 transactions data).
Note: Some depots also serve as import terminals. Depots Theale (in West Berkshire), Walsall (in the West Midlands) and Dewsbury (in West Yorkshire) have all been divested to HCM.

FIGURE 3

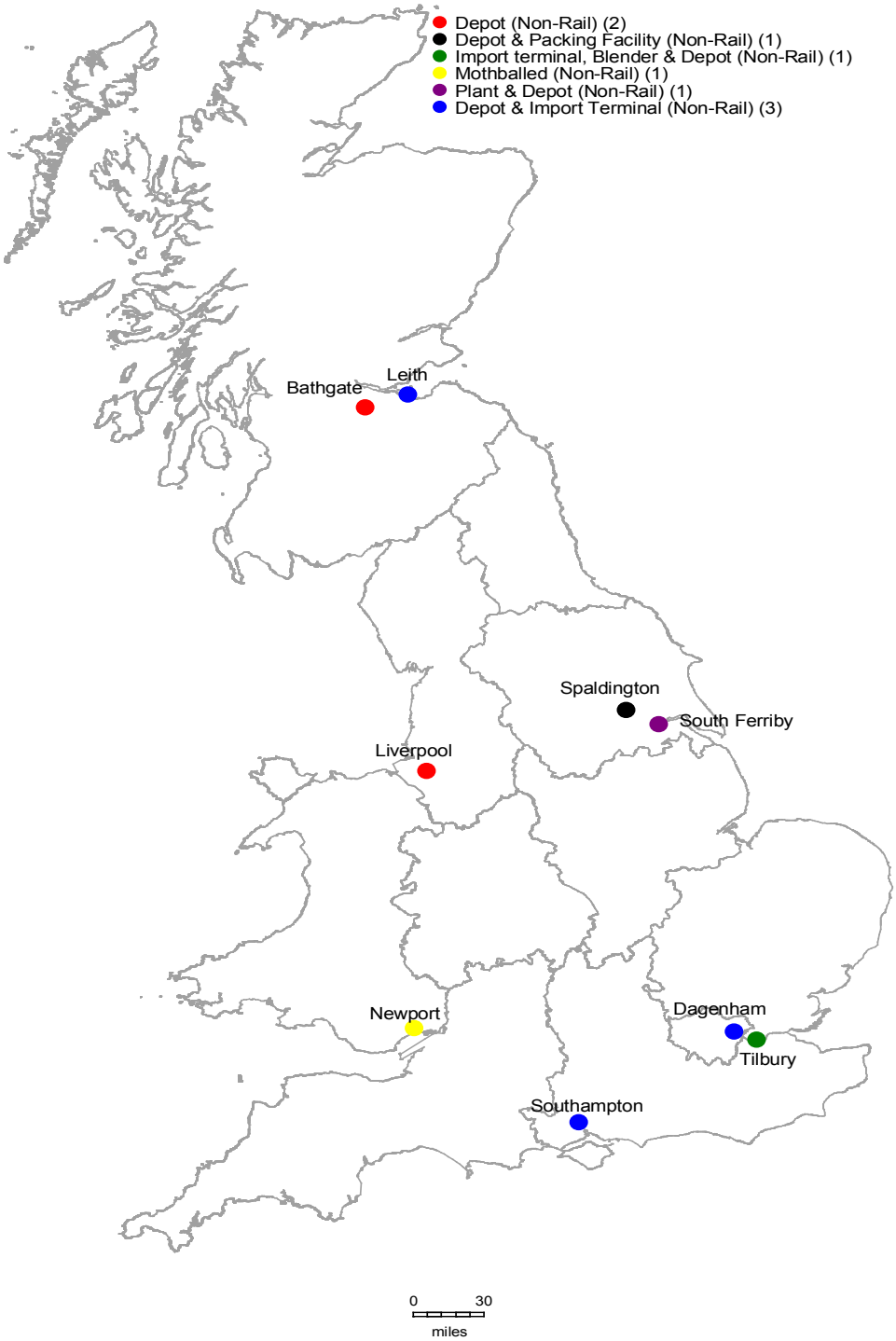
Hanson: cement site locations (non-clinker production)



Source: Hanson (FY11 transactions data).
Note: Some depots also serve as import terminals.

FIGURE 4

Cemex: cement site locations (non-clinker production)



Source: Cemex (FY11 transactions data).
Note: Some depots also serve as import terminals.

Production and capacity information

Introduction

1. This annex provides production and dispatch volumes and clinker capacity utilization for each of the Top 3 cement producers' cement plants in GB.

2. In relation to capacity utilization, we focused on clinker production capacity utilization. However, a plant's cement production capacity is determined not only by its clinker production capacity, but also by its clinker grinding and cement blending capacities.

3. Table 1 illustrates how clinker production capacity utilization might vary from cement production capacity based on Lafarge Tarmac's four cement plants.

TABLE 1 **Lafarge Tarmac: differences between clinker production capacity* and cement production capacity**

per cent

	Average†	*2012*	*2013 (H1)*
Grey cement capacity utilization by plant			
Aberthaw plant	[✂]	[✂]	[✂]
Cauldon plant	[✂]	[✂]	[✂]
Dunbar plant	[✂]	[✂]	[✂]
Tunstead plant	[✂]	[✂]	[✂]
*Clinker capacity utilization by plant**			
Aberthaw plant	[✂]	[✂]	[✂]
Cauldon plant	[✂]	[✂]	[✂]
Dunbar plant	[✂]	[✂]	[✂]
Tunstead plant	[✂]	[✂]	[✂]

Source: Lafarge Tarmac.

*This calculation of clinker production capacity is also set out in Tables 2 and 3 of this annex.
†Average utilization percentages were based on FY07 to FY11, with the exception of the Tunstead plant, which was for FY08 to FY11.

Lafarge Tarmac

4. Tables 2 and 3 below sets out for each of Lafarge Tarmac's cement plants, its clinker capacity, clinker and cement production volumes, cement volumes dispatched from the plant, kiln utilization and excess capacity, and the percentage of cement accounted for by clinker.

TABLE 2 **Lafarge Tarmac: production and capacity data (Cauldon plant and Tunstead plant), FY10 to FY12**

	Cauldon plant			*Tunstead plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*
*Total clinker capacity (kt)**						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker produced (kt)						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Cement produced (kt)						
Bulk cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Bagged cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Cement dispatched (kt)						
Bulk cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Bagged cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker capacity utilization (%)						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker excess capacity (%)						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker as % of cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Lafarge Tarmac.

*Where a cement plant has two kilns, total clinker capacity represents the sum of the maximum clinker production capacity of both kilns regardless of whether a kiln was active or mothballed during the period considered. Where a cement plant has only one kiln, Kiln 1 denotes the single active kiln, and Kiln 2 is not applicable.
Note: N/A = not applicable.

TABLE 3 **Lafarge Tarmac: production and capacity data (Aberthaw plant and Dunbar plant), FY10 to FY12**

	Aberthaw plant			*Dunbar plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*
*Total clinker capacity (kt)**						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker produced (kt)						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Cement produced (kt)						
Bulk cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Bagged cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Cement dispatched (kt)						
Bulk cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Bagged cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker capacity utilization (%)						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker excess capacity (%)						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker as % of cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Lafarge Tarmac.

*Where a cement plant has two kilns, total clinker capacity represents the sum of the maximum clinker production capacity of both kilns regardless of whether a kiln was active or mothballed during the period considered. Where a cement plant has only one kiln, Kiln 1 denotes the single active kiln, and Kiln 2 is not applicable.
Note: N/A = not applicable.

Hanson

5. Table 4 sets out for each of Hanson's cement plants its clinker capacity, clinker and cement production volumes, cement volumes dispatched from the plant, kiln utilization and excess capacity, and the percentage of cement accounted for by clinker.

TABLE 4 **Hanson: production and capacity data, FY10 to FY12**

	*Ketton plant**			*Padeswood plant*			*Ribblesdale plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*	*2010*	*2011*	*2012*
Total clinker capacity (kt)†									
Kiln 1‡	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2‡	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker produced (kt)									
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Cement produced (kt)									
Bulk cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Bagged cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Cement dispatched (kt)									
Bulk cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Bagged cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker capacity utilization (%)									
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker excess capacity (%)									
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker as % of cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Hanson.

*Kiln 2 (as labelled by us) at the Ketton plant was mothballed for the whole year during the period under consideration, ie FY10 to FY12 (both years inclusive).
†Where a cement plant has two kilns, total clinker capacity represents the sum of the maximum clinker production capacity of both kilns regardless of whether a kiln was active or mothballed during the period considered. Where a cement plant has only one kiln, Kiln 1 denotes the single active kiln, and Kiln 2 is not applicable.
‡Hanson told us that each kiln's clinker production capacity was based on the 'hypothetical maximum capacity' based on its ultimate parent company, HeidelbergCement AG's, calculations, ie kiln clinker output (tonnes per day) x a 'Reliability Coefficient' x 365 days (less any planned maintenance). [✂]
Notes:
1. N/A = not applicable.
2. Where cells are shaded in grey, these show when the kiln was mothballed for the whole year.

Cemex

6. Table 5 sets out for each of Cemex's cement plants its clinker capacity, clinker and cement production volumes, cement volumes dispatched from the plant, kiln utilization and excess capacity, and the percentage of cement accounted for by clinker.

TABLE 5 **Cemex: production and capacity data, FY10 to FY12**

	Rugby plant			*South Ferriby plant**			*Tilbury grinding station*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*	*2010*	*2011*	*2012*
Total clinker capacity (kt)†									
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker produced (kt)									
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Cement produced (kt)									
Bulk cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Bagged cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Cement dispatched (kt)									
Bulk cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Bagged cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker capacity utilization (%)									
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker excess capacity (%)									
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker as % of cement	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Cemex.

*At the South Ferriby plant, Kiln 1 (as labelled by us) was mothballed for the whole year in FY10 and FY11. In FY12, Kiln 1 was brought back into operation during FY12 on [✂]. Kiln 2 (as labelled by us) was mothballed from [✂].
†Where a cement plant has two kilns, total clinker capacity represents the sum of the maximum clinker production capacity of both kilns regardless of whether a kiln was active or mothballed during the period considered. Where a cement plant has only one kiln, Kiln 1 denotes the single active kiln, and Kiln 2 is not applicable.
Notes:
1. N/A = not applicable.
2. Where cells are shaded in grey, these show when the kiln was mothballed for the whole year. Where cells are shaded in turquoise, these show when the kiln was mothballed for only part of the year.

Treatment of latent capacity

Introduction

1. This annex sets out our assessment of how we should treat, or take into account, latent capacity in the context of this remedy. It sets out:

   (a) the views of parties on latent capacity in the context of our remedy; and

   (b) our assessment and conclusions on how mothballed and permitted capacity should be treated.

2. We identified two types of latent capacity: *(a)* production capacity that has already been built but remains inactive (mothballed capacity); and *(b)* proposals for the construction of additional cement production capacity that has already received planning permission (permitted capacity).

3. We considered that latent capacity may be a relevant consideration for our remedy for the following reasons:

   (a) The total size of latent capacity available in GB is significant and comprises both mothballed and permitted capacity. Therefore, bringing latent capacity into operation would be likely to have a significant impact on the structure of the GB cement markets in the medium to long term.

   (b) All latent capacity is currently only available to the firms within the coordinating group, where Hanson and Cemex each owns a mothballed kiln, and Lafarge Tarmac has planning permissions to construct a second kiln at its Tunstead plant (with capacity to produce 1 Mt of cement), and to construct a new cement plant at Medway, Kent (with capacity to produce 1.4 Mt of cement).[1]

[1] CC's Remedies Notice, Appendix A.

(c) In our Remedies Notice, we said that latent capacity might enable a Top 3 cement producer to replace any production capacity forgone through a cement plant divestiture remedy in order to try and re-establish its market position.[2]

Views of parties on latent capacity

4. We asked parties whether we should focus our divestiture remedy only on current production capacity, or whether latent capacity should also be considered and, if so, what weight we should place on it.

5. Aggregate Industries told us that [✂].[3]

6. Cemex told us that it needed to retain a certain amount of latent capacity in order to cope with any potential upturn in the market, and therefore the CC should not focus a divestiture solely on latent capacity. It added that although it was not technically difficult to bring mothballed capacity online at a cement plant such as South Ferriby, it would be very expensive.[4]

7. Breedon Aggregates told us that it would be unlikely to consider building a new cement plant or acquiring a site with planning permission for a plant as it would be difficult for it to justify the costs involved.[5]

8. MI told us that latent capacity within an existing site would be less expensive to reinstate than an entire plant situated away from the centre of GB. It also told us that whilst latent capacity should not form part of the remedy package, it would be

[2] Remedies Notice, paragraph 27.
[3] Summary of response hearing with Aggregate Industries, paragraph 9.
[4] Summary of response hearing with Cemex, paragraph 24.
[5] Summary of response hearing with Breedon Aggregates, paragraph 11.

material if a Major that was ordered to divest a central cement plant had other latent capacity proximate to it which could be brought back into operation.[6]

9. Brett Group told us that it considered latent capacity to be only one step away from being current capacity and therefore it was necessary to consider latent capacity when assessing the balance of market supply and demand.[7] It added that the planning permission for a new cement plant in the Medway, Kent, [✂].[8]

10. The OFT told us that the extent to which any latent capacity should be divested ought to depend in part on its location, eg if a whole cement plant, or almost a whole plant, had been mothballed, it might still be a viable candidate for divestiture if it was situated in the right location, or had assured contracts that could be supplied once the mothballed capacity had been reactivated.

Our assessment and conclusions on treatment of latent capacity

11. As part of our assessment, we asked each of the Top 3 cement producers to provide details about their plans for their respective latent capacity, including the likely timescales and costs to bring them into production.

12. Hanson told us that it had [✂]. In relation to the timescale and costs to bring its mothballed kiln into production:

    (a) Hanson estimated that it would take at [✂], and that this included the time to install and commission the new equipment, as well as the time to re-employ and train staff. It added that the mothballed kiln had been mothballed [✂], and therefore [✂].

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[6] Summary of response hearing with MI and HCM, paragraph 23.
[7] Summary of response hearing with Brett Group, paragraph 30.
[8] ibid, paragraph 9.

(b) In terms of the total cost to reactivate the mothballed kiln, Hanson estimated this to be at least £[✂] including any contingency.

13. Hanson told us that without some form of latent capacity (ie a mothballed kiln in its case), its ability to compete in the market and expand would be significantly reduced.[9] It also argued that it would be difficult to assess the latent capacity of its competitors, given that the lead time for reactivating a mothballed kiln depended on how long it had been out of service, eg the engineering requirements were particularly demanding where capacity had been mothballed for five or six years, [✂].[10]

14. Cemex told us that it had no plans or existing planning permission to expand capacity at its existing cement operations' sites. In relation to the timescale and cost to reactivate the mothballed kiln at its South Ferriby plant:

(a) Cemex estimated that it would take around [✂] months to start clinker production and that most of this related to sourcing parts to the site.

(b) The total repair costs required to reactivate the mothballed kiln was estimated at just over £[✂], with over half (£[✂]) relating to estimated maintenance overhaul costs.

15. Lafarge Tarmac told us [✂].

16. In relation to Lafarge Tarmac's permitted capacity to construct a new cement plant on a greenfield site at Medway,[11] it told us that [✂].[12]

17. In relation to the likely timescale and cost to construct Lafarge Tarmac's permitted capacity at its Tunstead plant: [✂].

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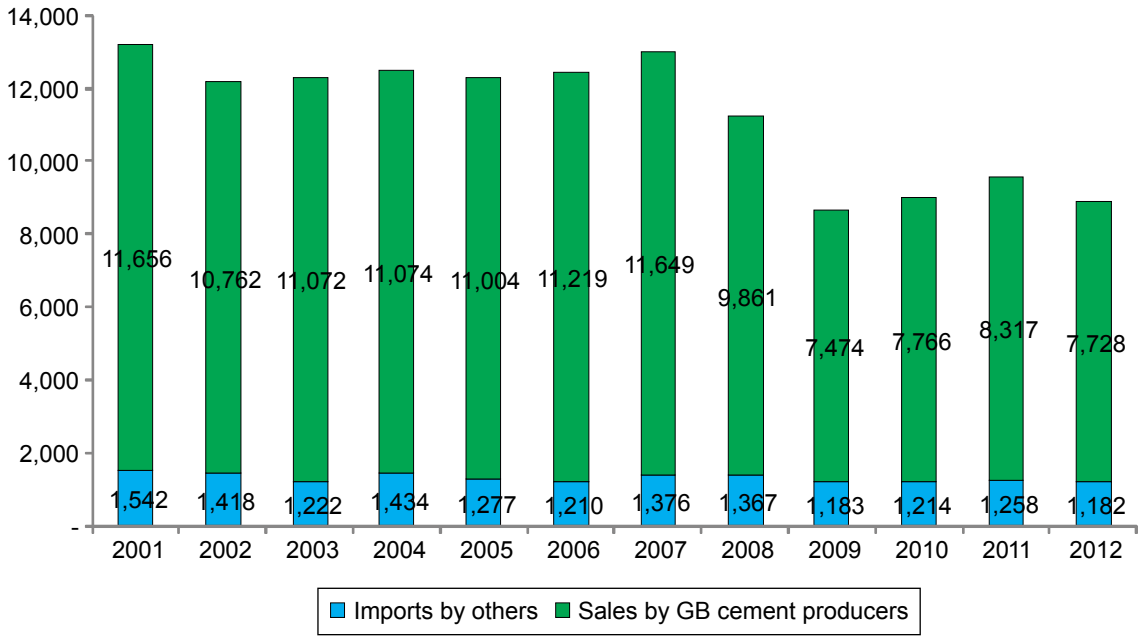
[9] Summary of first response hearing with Hanson, paragraph 21.
[10] ibid, paragraph 22.
[11] Summary of response hearing with Lafarge Tarmac, paragraph 22.
[12] ibid, paragraph 22.

18. Based on the views of parties, including the information provided by the Top 3 cement producers, we considered that given current market demand in GB of 8.9 Mt, of which 1.2 Mt (around 13 per cent) was accounted for by importers without a GB cement plant, when taken against total GB cement production capacity that is currently active, it would be unlikely that any latent capacity would be brought into production in the current market climate. In Figure 1, we show the annual demand (in Mt) for cement in GB between 2001 and 2012.

FIGURE 1

GB cement sales volumes (including all imports) (in kt)



Source: MPA.
Note: Imports by the GB cement producers form part of 'sales by GB cement producers'.

19. In relation to market outlook:

(a) MI told us that it expected cement volumes in the market to grow from around [✂] Mt a year in the UK.[13]

(b) Hanson told us that it expected cement volumes to grow at a rate of some 3 to 4 per cent a year for the next few years.[14]

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[13] Summary of response hearing with MI and HCM, paragraph 23.
[14] Remedies Notice response from Hanson, paragraph 3.7.

(c) Lafarge Tarmac told us that it could not see the market significantly improving over the next two years, and that production was higher in 2007.[15]

20. On the basis that cement demand is derived from the demand for products that use cement in its production, eg RMX and other concrete products, BDS had forecast that concrete demand would fall by 12 per cent in 2012 and stay flat during 2013, but increase by 5 and 6 per cent in 2014 and 2015 respectively, with growth in demand increasing largely on the back of major construction projects.[16]

21. In our view, given that current active GB cement production capacity is 9.3 Mt compared with current GB demand of 8.9 Mt, we considered that there was too much uncertainty in relation to market outlook to ascertain whether there would be a requirement for any latent capacity for the foreseeable future, eg the next five years.

22. However, in relation to permitted capacity, given the forward-looking nature of our assessment of remedies, we considered whether there was any merit in a remedy involving both the divestiture of a cement plant and a requirement for Lafarge Tarmac to relinquish its option to construct a new cement plant at the Medway. Whilst we considered that there may be long-term value to Lafarge Tarmac in holding the option, especially given its location in the South-East, given the current market climate and the considerable uncertainty in relation to when a significant upturn might be expected, we considered it highly unlikely that a cement plant at the Medway would be brought into production in the foreseeable future. Therefore, when determining which cement plants should be selected for divestiture, we did not take permitted capacity into account.

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[15] Summary of response hearing with Lafarge Tarmac, paragraph 22.
[16] BDS report, *Estimated market shares of ready mixed concrete companies in Great Britain (2011)*, July 2012.

23. On this basis, we focused on active capacity when determining which cement plants should be selected for possible divestiture, but given its potential significance (not-withstanding their low likelihood of being brought into production), we took moth-balled and permitted capacity into account only to examine their potential impact on market structure in the medium to long term.

Distribution capabilities

Introduction

1. This annex sets out:

   (a) details of the rail distribution capabilities of the Top 3 cement producers' rail-linked cement plants (where applicable);

   (b) the volumes transported from each of the Top 3 cement producers' cement plants to rail-linked (where applicable) and non-rail-linked depots; and

   (c) the estimated capital cost required to give a rail connection to those cement plants that are not rail-linked.

Details of rail-linked cement plants

2. In relation to the rail distribution capabilities of the Top 3 cement producers' cement plants:

   (a) Lafarge Tarmac told us that its Dunbar and Tunstead plants each had an established rail-link connection.

   (b) Hanson told us that its Ketton and Ribblesdale plants each had a completed rail-link connection.

   (c) Cemex told us that none of its two cement plants were rail-linked and did not operate any rail-linked depots.

3. Maps showing the locations of the depots of the Top 3 cement producers are set out in Annex A, Figures 2 to 4.

Volumes transported to depots (rail-linked and non-rail-linked)

4. We looked at the significance of cement volumes being transported through rail-linked and non-rail-linked depots.

5. Table 1 shows the annual FY12 volumes of cement that were transported by each of Lafarge Tarmac's cement plants to its depots (both rail-linked and non-rail-linked) in GB. Other than the rail-linked depots listed below, Lafarge Tarmac also appears to own a rail-linked depot at Willesden (north-west London).

TABLE 1 **Lafarge Tarmac: FY12 cement volumes* from dispatching cement plant to depots**

kt

	Aberthaw plant	*Cauldon plant*	*Dunbar plant*	*Tunstead plant*
Rail-linked depots				
Aberdeen	[✂]	[✂]	[✂]	[✂]
Carlisle	[✂]	[✂]	[✂]	[✂]
Dewsbury	[✂]	[✂]	[✂]	[✂]
Inverness	[✂]	[✂]	[✂]	[✂]
Liskeard*	[✂]	[✂]	[✂]	[✂]
ScotAsh	[✂]	[✂]	[✂]	[✂]
Seaham	[✂]	[✂]	[✂]	[✂]
Theale*	[✂]	[✂]	[✂]	[✂]
Thurrock*	[✂]	[✂]	[✂]	[✂]
Uddingston	[✂]	[✂]	[✂]	[✂]
Westbury*	[✂]	[✂]	[✂]	[✂]
Walsall	[✂]	[✂]	[✂]	[✂]
Leeds	[✂]	[✂]	[✂]	[✂]
Northenden (Manchester)	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]
Non-rail-linked depots				
Berwick Docks†	[✂]	[✂]	[✂]	[✂]
Coleshill	[✂]	[✂]	[✂]	[✂]
Exning	[✂]	[✂]	[✂]	[✂]
Liskeard*	[✂]	[✂]	[✂]	[✂]
Colnbrook†	[✂]	[✂]	[✂]	[✂]
Tolworth†	[✂]	[✂]	[✂]	[✂]
Steetley†	[✂]	[✂]	[✂]	[✂]
Theale*	[✂]	[✂]	[✂]	[✂]
Thurrock*	[✂]	[✂]	[✂]	[✂]
Vectis	[✂]	[✂]	[✂]	[✂]
Westbury*	[✂]	[✂]	[✂]	[✂]
Liverpool‡	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]
Depots				
Number of rail-linked depots used	[✂]	[✂]	[✂]	[✂]
Number of non-rail-linked depots used	[✂]	[✂]	[✂]	[✂]
Total cement dispatched (kt)	[✂]	[✂]	[✂]	[✂]
% dispatched to rail-linked depot	[✂]	[✂]	[✂]	[✂]
% dispatched to non-rail-linked depot	[✂]	[✂]	[✂]	[✂]

Source: Lafarge Tarmac.

*The Liskeard, Theale, Thurrock and Westbury depots are both rail-linked depots and used as non-rail-linked depots (ie receives deliveries by road transport) by the Aberthaw plant. The Westbury depot is also used by the Cauldon plant.
†[✂]
‡Lafarge Tarmac told us that it believed the Liverpool depot was on a site that was under redevelopment into residential properties.
Note: N/A = not applicable.

6. Based on Table 1 above, Lafarge Tarmac's Dunbar plant transported [✂] per cent (or [✂] kt) of its total dispatched volumes through its six rail-linked depots, compared with [✂] per cent (or [✂] kt) for the Tunstead plant through its three rail-linked depots. We noted that each rail-linked depot was only supplied by one cement plant.

Only [✂] and [✂] per cent of their respective volumes were transported through their non-rail-linked depots. We also noted that the Liskeard, Theale, Thurrock and Westbury depots are rail-linked depots, but also used as non-rail-linked depots (ie receives deliveries by road transport) by the Aberthaw plant.

7. In relation to Lafarge Tarmac's cement plants without a rail connection, its Aberthaw and Cauldon plants respectively transported [✂] and [✂] per cent of their total dispatched volumes through their depots. The Aberthaw plant used [✂] depots during FY12, whilst the Cauldon plant used [✂]. The key depot which handled the most volumes for the Aberthaw plant was the Westbury depot, and for the Cauldon plant, the Coleshill depot. However, we noted that both the Aberthaw and Cauldon plants shared the use of the Vectis depot and the Westbury depot. Whilst the Aberthaw plant transported more volumes through both of these depots than the Cauldon plant, the Cauldon plant still transported [✂] kt through the Westbury depot (compared with [✂] kt for the Aberthaw plant).

8. Lafarge Tarmac told us that its depot operations were predominantly focused on serving external customers, and that around 80 per cent of daily weekday bulk cement road dispatches to customers from depots were made between 6 am and 12 noon, and that this six-hour time slot represented the 'peak period' of operation for a depot or dispatch location. During this peak period, it told us that the number of loading point and vehicle loading times were likely to be the main operational constraints on depot throughput, where typically a 30-tonne cement tanker could take 15 to 20 minutes to load. It told us that in a wider operating context, there may also be restrictions on a depot's operating hours.

9. Table 2 below shows the annual FY12 volumes of cement that were transported by each of Hanson's cement plants to its depots (both rail-linked and non-rail-linked) in GB.

TABLE 2 **Hanson: FY12 cement volumes from dispatching cement plant to depots**

kt

	Ketton plant	*Padeswood plant*	*Ribblesdale plant*
Rail-linked depots			
King's Cross Powder Terminal*	[✂]	[✂]	[✂]
Clyde Powder Terminal	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]
Non-rail-linked depots			
Avonmouth Powder Terminal†	[✂]	[✂]	[✂]
Avonmouth Trailer Park	[✂]	[✂]	[✂]
Bradford Depot	[✂]	[✂]	[✂]
Clyde Trailer Park	[✂]	[✂]	[✂]
Middlesbrough Depot	[✂]	[✂]	[✂]
Purfleet GGBS production	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]
Depots			
Number of rail-linked depots used	[✂]	[✂]	[✂]
Number of non-rail-linked depots used	[✂]	[✂]	[✂]
Total cement dispatched (kt)	[✂]	[✂]	[✂]
% dispatched to rail-linked depot	[✂]	[✂]	[✂]
% dispatched to non-rail-linked depot	[✂]	[✂]	[✂]

Source: Hanson.

*[✂]
†Hanson told us that it was currently constructing a new rail-linked depot at Avonmouth (currently a non-rail-linked depot), with an annual capacity of around [✂] kt and storage capacity of around [✂] kt. It added that similar to its King's Cross depot, it would have a loading capacity of two trucks per lane, with two lanes, and that the maximum train size was 1.4 kt, but was currently 1.1 kt.
Note: N/A = not applicable.

10. Based on Table 2 above, Hanson operates two rail-linked depots, where:

(a) its Ketton plant uses [✂] (which handled [✂] per cent of total cement volumes dispatched from the plant during FY12); and

(b) its Ribblesdale plant uses [✂] (which handled [✂] per cent of total cement volumes dispatched from the plant during FY12).

11. As shown in Table 2 above, all three of its cement plants use two non-rail-linked depots each. Only Hanson's[✂]. Volumes handled by non-rail-linked depots were insignificant for Hanson's rail-linked plants, at [✂] and [✂] per cent for the Ketton and Ribblesdale plants respectively. However, this figure was [✂] per cent for the Padeswood plant, which does not have a rail connection.

12. Table 3 shows the annual FY12 volumes of cement that were transported by each of Cemex's cement plants to its depots (non-rail-linked) in GB.

TABLE 3 **Cemex: FY12 cement volumes from dispatching cement plant to depots***

kt

	Rugby plant	*South Ferriby plant*
Non-rail-linked depots		
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
[✂]	[✂]	[✂]
	[✂]	[✂]
Depots		
Number of rail-linked depots used	[✂]	[✂]
Number of non-rail-linked depots used	[✂]	[✂]
Total cement dispatched (kt)	[✂]	[✂]
% dispatched to rail-linked depot	[✂]	[✂]
% dispatched to non-rail-linked depot	[✂]	[✂]

Source: Cemex.

*Cemex does not have any rail-connected cement plants and does not operate any rail-linked depots.
Note: N/A = not applicable.

13. Based on Table 3 above, whilst both the Rugby and South Ferriby plants do not have a rail connection, the South Ferriby plant transported [✂] per cent of its cement volumes to its depots compared with [✂] per cent for the Rugby plant. However, the Rugby plant used [✂] compared with [✂] for the South Ferriby plant. We also noted that none of these depots were supplied by more than one cement plant during FY12.

Details of the investment required to provide a rail connection

14. We asked each of the Top 3 cement producers to estimate the capital cost that would be required to provide a rail-link connection to each of its cement plants that were not rail-linked.

Lafarge Tarmac

15. Lafarge Tarmac has two cement plants without a rail-link connection, namely the Aberthaw and Cauldon plants.

16. In relation to its Aberthaw plant, Lafarge Tarmac told us that it had not undertaken a detailed feasibility study into the possibility of a day-to-day and outbound cement rail link from this plant. However, it told us that a rail line already ran on to the site, and that this was currently being used to supply cement by rail to a local power station project, using road tankers to blow cement into the rail wagons. [✂] It added that the potential supply capability would depend on:

(a) securing rail paths with Network Rail; and

(b) the availability of sufficient cement rail wagons to transport bulk cement to the required depots and destinations.

17. In relation to its Cauldon plant, Lafarge Tarmac told us that it had conducted a high-level feasibility study back [✂] into constructing a rail-link facility at the plant. It added that one possible option was to use the recently restored heritage railway line (Moorland and City railway) that connected nearby Cauldon Low with the mainline rail network at Stoke. It estimated that the indicative cost of this option would be around £[✂] million to build a rail spur from the heritage line into the site, as well as enabling rail loading capabilities at the plant, and take around two to three years to complete. However, under this option, it told us that due to restrictions on freight access to the heritage line, outbound cement volumes would be limited to around 100 kt a year, and that this would provide the Cauldon plant with only very limited rail-connected capacity.

18. Whilst this feasibility study estimated that the cost of creating a branch line into the Cauldon plant [✂], another option was to deliver the cement from the Cauldon plant by road to the railhead, which would incur a lower capital cost figure of around £[✂] million. [✂] estimated an investment payback period of [✂], and [✂].

19. However, we also noted that this was not the only option available to the Cauldon plant to have a rail connection, and [✂] using a loading facility located on Tarmac's site, that would enable around [✂] of cement volumes to be transported by rail from the Cauldon plant to East Anglia and Birmingham. This proposal was estimated to cost around [✂].

Hanson

20. Hanson told us that its Padeswood plant [✂].

Cemex

21. Cemex told us that none of its cement plants were rail-linked and it did not own any rail-linked depots.

22. In relation to its Rugby plant, Cemex told us that it had on several occasions evaluated the cost of building a rail distribution capability into its plant, but concluded each time that it would be uneconomic to do so since the returns did not justify the significant investment that would be required. It estimated that the capital cost would be at least £[✂] million, but added that this did not include the additional capital costs that would be required to procure the necessary network of rail-linked depots to allow for the onward distribution of cement. It told us that whilst there was a rail spur from the nearby West Coast Main Line near the Rugby plant, it was situated on the other side of the new Rugby Western Relief Road and a disused quarry, which meant that cement would have to be transported over a considerable distance to a new rail loading facility. It added that there were other obstacles including the current condition of the siding (next to which a new rail loading facility would have to be built) given its disuse; 'significant obstacles' in relation to obtaining planning permission, eg the close proximity of the site in question to residential areas; and obtaining the requisite consent from Network Rail.

23. In relation to its South Ferriby plant, Cemex told us that since the nearest railway line was around 6 miles away (as the crow flies), it never conducted an investigation into 'rail enabling' its plant. It also told us that given the small overall capacity of the plant, it would be 'distinctly unattractive' to rail-link the South Ferriby plant, as the volumes produced were likely to be insufficient to cover the significant capital outlay and risk to provide an investor with any kind of return. However, based on its previous projects, it estimated that the capital cost alone would be at least £[✂] million (excluding the cost of procuring any rail-linked depots and land on which to install a new line). It added that it anticipated 'significant obstacles' in relation to obtaining planning permission and the requisite consent from Network Rail.

24. We concluded that it would be essential for any divestiture of a rail-linked cement plant to be accompanied by divestiture of the rail-linked depots on its rail network, in order to enable a rail-linked cement plant to make effective use of its rail connection.

Cement customer catchment areas

Introduction

1. This annex sets out our assessment of:

   (a) the customer catchment areas of each GB cement plant owned by Lafarge Tarmac and Hanson, where we consider each cement plant's geographic reach and the density of demand covered within each catchment area; and

   (b) the overlap of customer catchment areas (and the significance of such overlaps in terms of a GB cement producer's total volumes) between the different GB cement producers.

2. In our provisional findings, we found that the geographic areas over which cement could be transported were quite large, eg up to 100 miles, and that each of the four GB cement producers sold cement in each GB region.[1] A cement plant divestiture will be more effective if the cement plant which is divested has the ability to serve a wide customer base and compete on a wide geographic area. Therefore, in order to assist our assessment of the effectiveness of divesting particular cement plants, we have undertaken an analysis of their customer catchment areas.

3. Our catchment area analysis is based on the maximum distance over which 50, 80 and 90 per cent of each cement plant's sales are delivered to the customers in GB. A customer catchment area includes both the first leg of a journey (from a cement plant to a depot, either by rail or road) and the second leg (from a depot to the customer), where deliveries are made from a cement plant direct to the customer or from a depot. This analysis is based on total delivered sales of cement volumes (both internal and external sales) made in 2011.

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[1] Provisional findings, paragraph 7.21.

4. We based our assessment on 2011 transactions data (which was the latest transactions data available to us) for the four GB cement producers as they were prior to the formation of Lafarge Tarmac and HCM, which both commenced trading from 7 January 2013. However, for the purposes of our analysis, we have presented our results based on the current market structure, ie where Lafarge Tarmac owns the Tunstead plant but not the Hope plant. We therefore note that the results of our analysis may be affected by the fact that during 2011, the Tunstead plant was operated as a stand-alone cement plant under Tarmac's ownership.

5. Whilst we aimed to look at customer catchment areas for all of the Top 3 cement producers, we have not been able to perform this analysis for Cemex due to a lack of the relevant and necessary data.

6. The focus of much of the analysis contained in this annex will be on two cement plants owned by Lafarge Tarmac at the centre of our proposed cement plant divestiture remedy, namely the Cauldon and Tunstead plants.

7. This annex is structured as follows: first, we present maps which show the locations of Lafarge Tarmac's cement plants followed by some descriptive analysis of cement sales made by each cement plant in GB. We then describe the data and methodology of our catchment area analysis and present the results. Hanson's catchment area analysis is set out in Supplement 1 to this annex.

Our assessment of customer catchment areas

Lafarge Tarmac

Locations of cement plants and sites

8. Figures 1 and 2 present maps showing the locations of Lafarge Tarmac's cement plants, depots and (if any) stand-alone grinding stations and import terminals in GB.

9. Based on Figure 1, which shows the locations of Lafarge Tarmac's four cement plants, Lafarge Tarmac has one plant located in Scotland (Dunbar), one plant located in Wales (Aberthaw) and two cement plants located in the Midlands (Cauldon and Tunstead). From these four cement plants, Tunstead is the only plant to have a rail connection.

10. Based on Figure 2, which shows the locations of Lafarge Tarmac's other cement sites, the map shows a wide geographic coverage of cement sites located across GB. Based on 2011 transaction data, Lafarge Tarmac owned 16 cement depots, of which 11 were rail-liked. With the divestiture of depots located in Walsall, Theale and Dewsbury to HCM (MI), Lafarge Tarmac currently own 13 cement depots of which eight are currently rail-linked.

Descriptive analysis of sales

11. Table 1 shows the proportion of cement sales that leave three of the four cement plants by rail and by road. For the Aberthaw and Cauldon plants, 100 per cent of their cement sales volumes are made by road. For the Dunbar plant, roughly 50 per cent of its cement sales volumes are made by rail and by road.

TABLE 1 **Proportion of sales (in tonnes) that leave the plant by rail and road to supply the shipping facility**

		per cent
Cement plant	*Rail*	*Road*
Aberthaw	-	100.00
Cauldon	-	100.00
Dunbar	[✂]	[✂]

Source: CC calculations based on 2011 transactions data provided by Lafarge.

Note: This summary of data is not available for the Tunstead plant as Tarmac did not provide this information in its transactions data.

12. Table 2 shows the list of depots to which Lafarge Tarmac transports cement by rail from the Dunbar plant. In 2011, the Uddingston depot received the largest volumes of cement from the Dunbar plant at [✂] tonnes, followed by the Seaham depot with

[✂] tonnes and the Inverness and Aberdeen depots with [✂] and [✂] tonnes respectively.

TABLE 2 **List of depots where cement is transported by rail**

Cement plant	*Depot*	*Volume* (*tonnes*)
Dunbar	Aberdeen	[✂]
	Inverness	[✂]
	Seaham Depot	[✂]
	Uddingston	[✂]

Source: CC calculations based on 2011 transactions data provided by Lafarge.

Note: This summary of data is not available for the Tunstead plant as Tarmac did not provide this information in its transactions data.

13. Table 3 shows the split of cement sales by type at each cement plant. The Tunstead and Cauldon plants have the [✂] volume of bulk cement sales compared with the Aberthaw and Dunbar plants. The Cauldon plant has the [✂] volume of bagged cement sales in 2011 and the Tunstead plant has the [✂] volume of bagged cement sales compared to the Aberthaw and Dunbar plants. By cement type, the Cauldon and Tunstead plants have the [✂] volume of [✂] cement sales in 2011, but the Aberthaw and Dunbar plants have the [✂] volume of [✂] sales in 2011.

TABLE 3 **Split sales from cement plants between bulk vs bagged and between different types of cement**

Cement plant	*Total bulk cement*	*Total bagged cement*	*CEM I*	*CEM II*	*Bulk other*	*CEM I and other cement*	*Bagged + Limebond* (*tonnes*)
Aberthaw	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Cauldon	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Dunbar	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Tunstead	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: CC calculations based on 2011 transactions data provided by Lafarge Tarmac.

Note: The volumes presented in this table may not match the figures available in the 2011 transactions data as we dropped 1 per cent of the outliers based on price. For Lafarge, a total of 333 observations were dropped from the 2011 transactions data. For Tarmac, a total of 49 observations were dropped from the 2011 transactions data. We note that Lafarge Tarmac was not able to confirm the accuracy of our calculations because of our exclusion of these outliers, though we note that this should not affect the results materially given only 1 per cent of the data was dropped.

14. Based on Table 4, which shows the proportion of cement sales that go through each depot depending on the source of supply from the cement plant:

(a) Cement depots located in Aberdeen, Inverness, Seaham and Uddingston have 100 per cent of their cement supplied from the Dunbar plant.

(b) In the Midlands, the Cauldon plant supplies 100 per cent of the cement sold through the Exning and Coleshill depots, and roughly [✂] and [✂] per cent of the cement volumes sold through the Thurrock and Vectis depots respectively.

(c) The Aberthaw plant supplies 100 per cent of the sales volumes sold through depots located at Liskeard and Theale and roughly less than [✂] per cent of the cement sales volumes through the Thurrock and Vectis depots.

TABLE 4 **Proportion of cement sales through each depot by source**

per cent

Cement depot	*Source of cement (plant)*	*Volume concentration*
Aberdeen	Dunbar	[✂]
Inverness	Dunbar	[✂]
Seaham Depot	Dunbar	[✂]
Uddingston	Dunbar	[✂]
Exning	Cauldon	[✂]
Coleshill	Cauldon	[✂]
Thurrock Blender	Aberthaw	[✂]
Thurrock Blender	Cauldon	[✂]
Liskeard	Aberthaw	[✂]
Vectis	Aberthaw	[✂]
Vectis	Cauldon	[✂]
Theale Depot	Aberthaw	[✂]

Source: CC calculations based on 2011 transactions data provided by Lafarge.

15. Table 4 above excludes the analysis of the supply of cement from the Tunstead plant to the shipping facilities located in London, Walsall, Leeds and Liverpool. All of these cement sites were formerly owned by Tarmac prior to its JV with Lafarge. We have assumed that prior to this JV, 100 per cent of the cement sold through these depots was supplied from the Tunstead plant.

16. Table 5 shows the total number of external sales customers that have purchased cement from each plant. This table shows that the Cauldon plant made cement sales to [✂] customers, followed by the Tunstead plant which made cement sales to [✂] customers in 2011. The Aberthaw and Dunbar plants made cement sales to [✂] and [✂] customers respectively in 2011.

TABLE 5 **Total numbers of customers at each cement plant in 2011 (external sales)**

Cement plant	*External sales*
Aberthaw	[✂]
Cauldon	[✂]
Dunbar	[✂]
Tunstead	[✂]

Source: CC calculations based on 2011 transactions data provided by Lafarge Tarmac.

Note: For the Tunstead plant, the variable used to identify the total number of customers is called 'payer_id' in the transactions data submitted by Tarmac.

17. Tables 6 to 9 present the volume concentrations for the top 20 customers at each cement plant. These tables show the array of customers that have purchased cement that was produced at each plant.

18. Table 6 presents the volume concentration for the top 20 customers at the Aberthaw plant based on all internal and external sales. Table 6 shows that [✂] accounts for roughly [✂] per cent of the total cement sales volumes at the Aberthaw plant. Of the Majors, [✂] accounts for [✂] per cent of the total sales volumes, followed by [✂] ([✂] per cent), [✂] ([✂] per cent) and [✂] ([✂] per cent).

TABLE 6 **Volume concentrations of top 20 customers at the Aberthaw plant, all sales**

Customer name	*Volume concentration %*
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]

Source: CC calculations based on 2011 transactions data provided by Lafarge Tarmac.

19. Table 7 presents the volume concentration for the top 20 customers at the Cauldon plant based on all internal and external sales. This table shows that [✂].

TABLE 7 **Volume concentrations of top 20 customers at the Cauldon plant, all sales**

Customer name	*Volume concentration %*
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]

Source: CC calculations based on 2011 transactions data provided by Lafarge Tarmac.

20. Table 8 presents the volume concentration for the top 20 customers at the Dunbar plant based on all internal and external sales. This table shows that [✂].

TABLE 8 **Volume concentrations of top 20 customers at the Dunbar plant, all sales**

Customer name	*Volume concentration %*
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]

Source: CC calculations based on 2011 transactions data provided by Lafarge Tarmac.

21. Table 9 presents the volume concentration for the top 20 customers at the Tunstead plant. This table shows that TQM BL&C is the top customer, accounting for roughly [✂] per cent of total sales volumes. Cemex is the only other Major to feature in the top 20 list of customers, accounting for roughly [✂] per cent of total sales volumes.

TABLE 9 **Top 20 customers by volume concentration at the Tunstead plant, all sales**

Customer name	*Volume concentration %*
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]
[✂]	[✂]

Source: CC calculations based on 2011 transactions data provided by Lafarge Tarmac.

Note: For the Tunstead plant, the variable used to identify the total number of customers is called 'payer_id' in the transactions data submitted by Tarmac.

22. From our analysis of the top 20 customers at each cement plant with particular focus on the Cauldon and Tunstead plants, we find that the Cauldon plant serves a wide mixture of customers, namely the Majors, [✂] and [✂], as well as other mid-tier and independent firms. At the Tunstead plant, our analysis shows that the majority of its sales have been made to [✂] and [✂], accounting for [✂] per cent of total sales volumes in 2011.

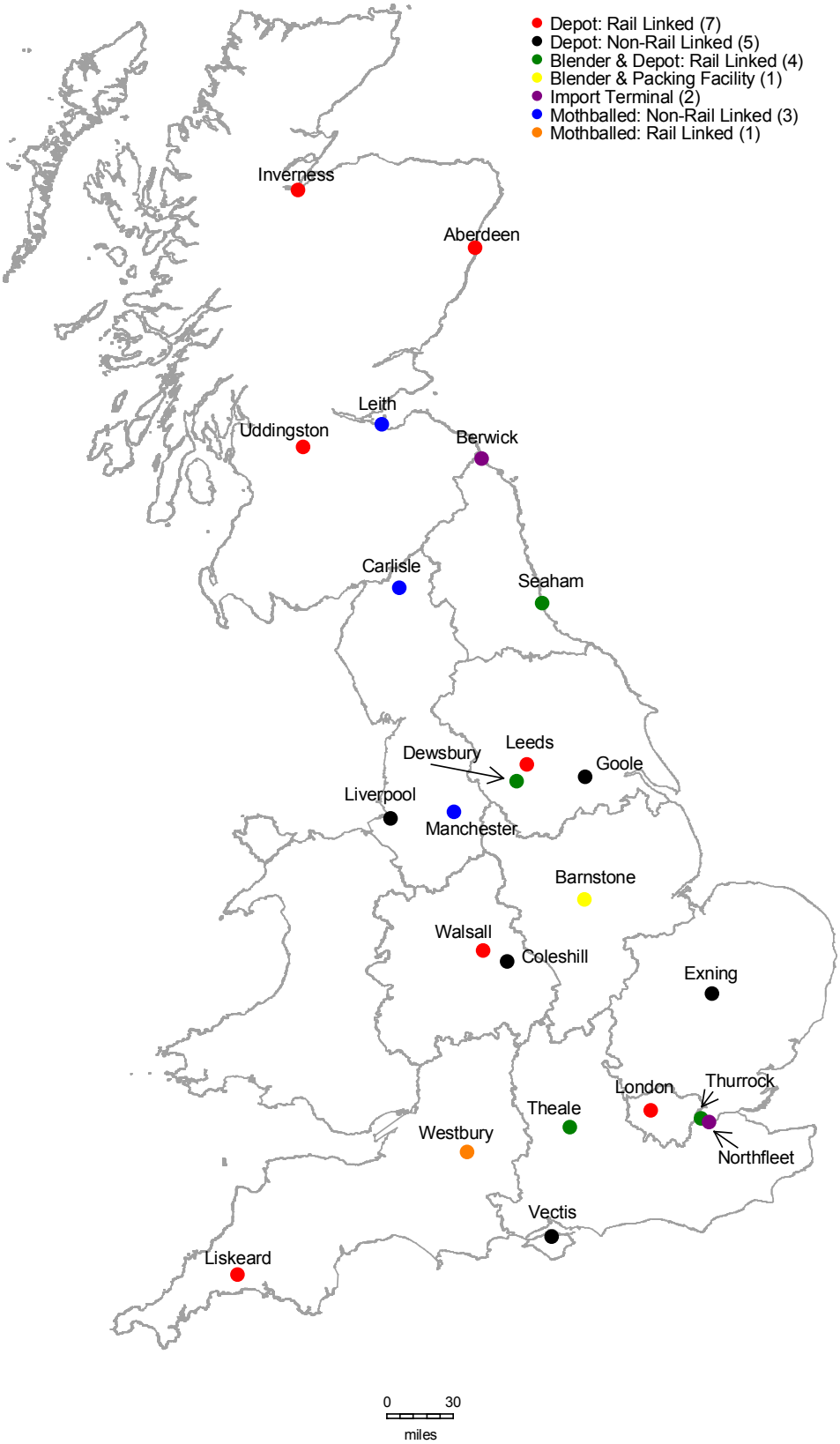
FIGURE 1

Lafarge Tarmac: cement plant locations

Source: Lafarge Tarmac (2011 transactions data)
Note: The Dunbar and Tunstead plants are the only rail-linked cement plants.

FIGURE 2

Lafarge Tarmac: cement site locations (2011)



Source: Lafarge Tarmac (2011 transactions data).
Note: The depots at Theale (in West Berkshire), Walsall (in the West Midlands) and Dewsbury (in West Yorkshire) have all been divested to HCM.

Customer catchment area analysis

23. We undertook our customer catchment area analysis in order to understand the distances over which cement is delivered and the geographic coverage of a cement plant in relation to its customers. We first describe the methodology and data used in this analysis before presenting our findings.

24. Our customer catchment area analysis examines the maximum distance over which 50, 80 and 90 per cent of each cement plant's sales volumes are delivered. We used transactions data for 2011 provided by Lafarge and Tarmac on total delivered sales of cement volumes (bulk and bagged) that were delivered to internal and external customers.

25. We use the radial (straight line) distances centred on each cement plant and calculate within which 50, 80 and 90 per cent of each cement plant's total sales volumes were delivered to customers. Our data comprises all active cement plants and depots (rail and non-rail-linked) that have delivered cement to all customers. To compute the customer catchment areas and delivery distances, we have only included delivered sales to customers and excluded collected sales.

Customer catchment area analysis results

Road and rail catchment areas

26. Table 10 and Figures 3 and 4 present our customer catchment area results. These results include both the first leg of a journey from the cement plant to a depot (either by rail or road), and the second leg from the depot to the customer, where deliveries are made from a cement plant or a depot direct to the customer. Cement deliveries from a depot are all made by road.

TABLE 10 **Customer catchment area distances from cement plant to customers**

			miles
Cement plant	*50*	*80*	*90*
Aberthaw	[✂]	[✂]	[✂]
Dunbar	[✂]	[✂]	[✂]
Cauldon	[✂]	[✂]	[✂]
Tunstead	[✂]	[✂]	[✂]

Source: CC calculations based on 2011 transactions data provided by Lafarge Tarmac.

Note: Catchment area distances are in radial miles.

27. From Table 10 above, the 50 per cent catchment area distances for the Cauldon and Tunstead plants are similar; from the Cauldon plant, the catchment area is roughly [✂] miles less than the catchment area distance from the Tunstead plant. The 80 per cent catchment area distances from both plants differ by roughly [30–40] miles. From the Cauldon plant, the 50 and 80 per cent catchment area distances are around [50–60] and [100–110] miles to the customer respectively. For the Tunstead plant, these catchment area distances are respectively around [50–60] and [130–140] miles. The larger 80 per cent catchment area for the Tunstead plant compared to the Cauldon plant is likely to be explained at least in part by the fact that the Tunstead plant is a rail-linked plant where cement can be delivered further to the customer.

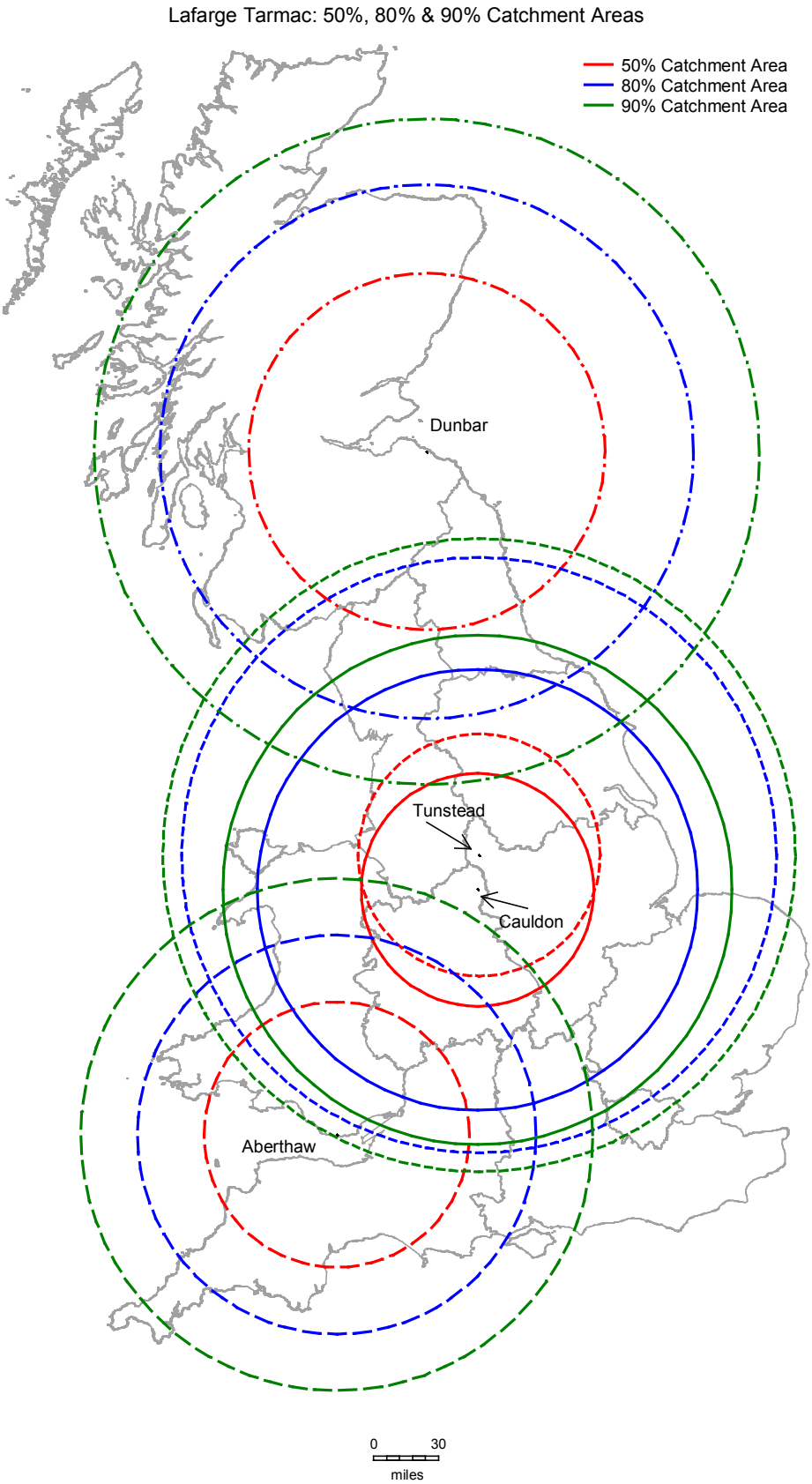
28. The geographic coverage of the catchment area distances from Table 10 can be viewed for all cement plants in Figure 3, and for the Cauldon and Tunstead plants only in Figure 4. Figure 4 shows that even though the Cauldon plant is not a rail-linked plant, cement can be transported to customers at a similar distance from the plant in relation to the Tunstead plant (which is partially rail-linked) based on the 50 per cent catchment area. However, the 80 per cent catchment area for the Tunstead plant encapsulates the 80 and 90 per cent catchment areas from the Cauldon plant. We note, however, that our analysis of customer catchment areas was based on 2011 data, during which Lafarge was operating both the Cauldon and Hope plants, both of which are located within the same region. Lafarge had told us

that it was its strategy to use the Cauldon plant mainly for local sales, and use the Hope plant for more distant sales. Therefore, the fact that the Cauldon plant's 80 per cent and 90 per cent catchment areas tended to be smaller than the Tunstead plant may also be explained by Lafarge's strategy in relation to the Cauldon and Hope plants, and therefore does not necessarily mean that the Cauldon plant would not be able to compete for customers located further away than it used to serve in 2011.

29. For the Aberthaw plant, Figure 3 shows that the geographic coverage of the customer catchment areas covers most of the South-West and parts of the central regions of GB. The 50 and 80 per cent catchment area distances are [50–60] and [90–100] miles respectively.

FIGURE 3

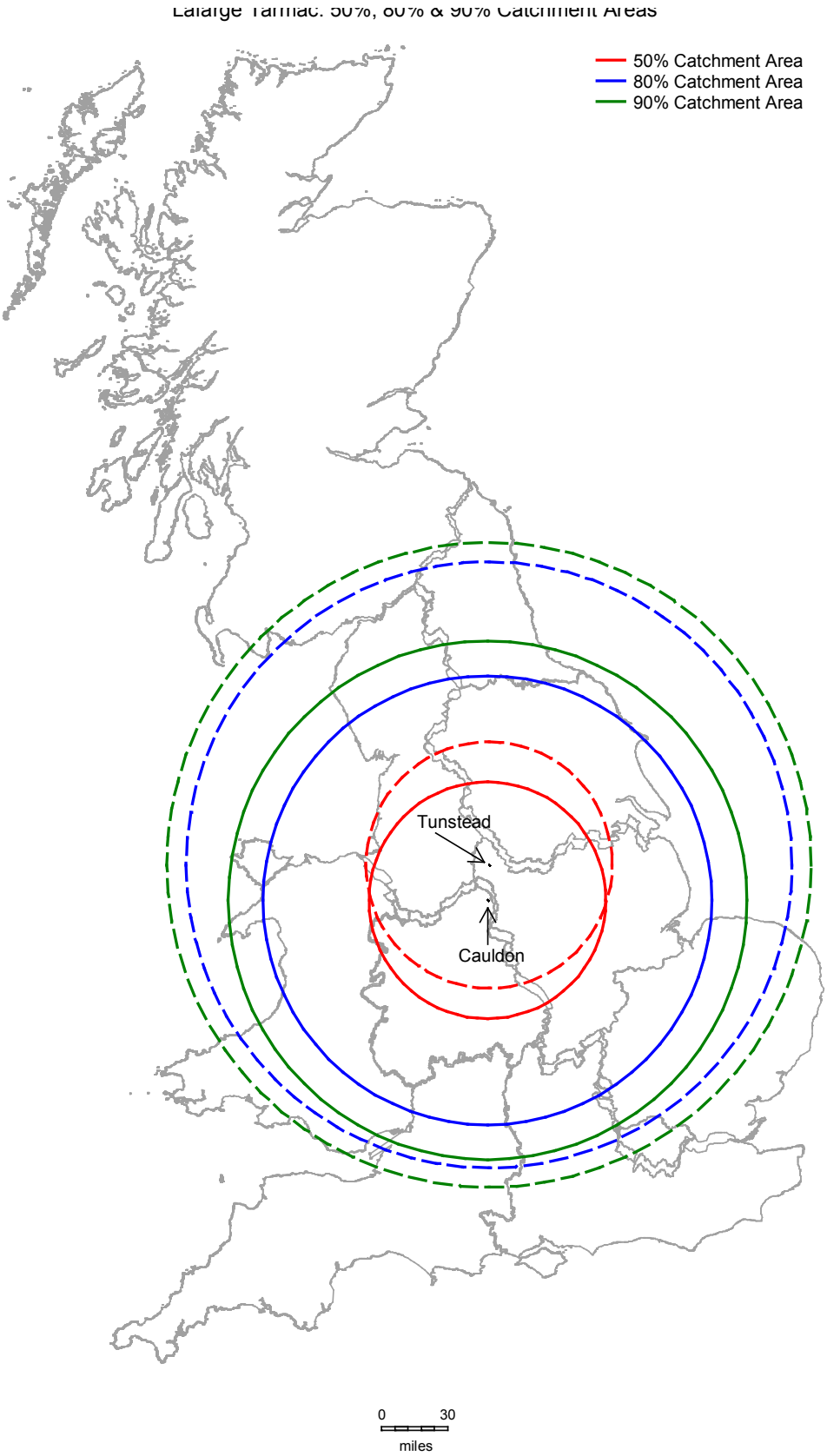
Lafarge Tarmac: 50, 80 and 90 per cent catchment areas



Source: Lafarge Tarmac (2011 transactions data).
Note: Catchment areas are based on radial distances. Table 10 provides the catchment area distances.

FIGURE 4

Lafarge Tarmac: 50, 80 and 90 per cent catchment areas



Source: Lafarge Tarmac (2011 transactions data)
Note: Catchment areas are based on radial distances. Table 10 provides the catchment area distances.

30. Based on Figure 3 above, the geographic coverage from the catchment area distances for the Dunbar plant shows larger coverage over the north of GB compared with the three plants located in southern GB. This is explained by the Dunbar plant being the only plant to deliver cement by rail and by road to its shipping facilities and therefore the cement can be delivered further. Table 10 shows that the 50 and 80 per cent catchment area distances are [80–90] and [120–130] miles respectively from the plant to the customer.

Rail catchment area results

31. Table 11 presents the rail catchment area distances from the cement plant to the shipping facilities. Currently, we are only able to present the results for the Dunbar plant. We are not able to present these results for the Tunstead plant as the method of delivery from the plant to the shipping facility was not provided by Tarmac (prior to the formation of Lafarge Tarmac) in its transactions data.

32. Table 11 shows that the Dunbar plant delivers cement by rail to depots located in Aberdeen, Inverness, Seaham and Uddingston. It also presents the rail catchment area distances to these depots from the Dunbar plant. Our results show the 50 and 80 per cent catchment area distances from the Dunbar plant to the depots are roughly [80–90] and [90–100] miles respectively.

TABLE 11 **Rail catchment areas from cement plant to shipping facility**

			miles
Cement plant	*50*	*80*	*90*
Dunbar	[✂]	[✂]	[✂]

Source: CC calculations based on 2011 transactions data provided by Lafarge Tarmac.

Note: These calculations are not available for the Tunstead plant as Tarmac did not provide this information in its transactions data.

TABLE 12 **Catchment area distances around depots which receive cement by rail**

			miles
Depot	*50*	*80*	*90*
Aberdeen	[✂]	[✂]	[✂]
Inverness	[✂]	[✂]	[✂]
Seaham Depot	[✂]	[✂]	[✂]
Uddingston	[✂]	[✂]	[✂]

Source: CC calculations based on 2011 transactions data provided by Lafarge Tarmac.

Note: These calculations are not available for the Tunstead plant as Tarmac did not provide this information in its transactions data.

33. Table 12 presents the catchment area distances around depots that receive their cement shipment from the plant by rail. The results show that the Aberdeen and Uddingston depots have smaller 50 and 80 per cent catchment area distances compared with the Inverness and Seaham depots.

Catchment area results around depots

34. Table 13 presents the catchment area distances around the cement depots owned by Lafarge Tarmac (based on 2011 transactions data). This table also shows the cement plants which supplied each depot.

TABLE 13 **Catchment area distances around depots**

				miles
			All sales	
Cement plant	*Depots*	*50*	*80*	*90*
Aberthaw	Thurrock Blender	[✂]	[✂]	[✂]
	Barnstone Cem	[✂]	[✂]	[✂]
	Liskeard	[✂]	[✂]	[✂]
	Vectis	[✂]	[✂]	[✂]
	Theale Depot	[✂]	[✂]	[✂]
Cauldon	Exning	[✂]	[✂]	[✂]
	Coleshill	[✂]	[✂]	[✂]
	Thurrock Blender	[✂]	[✂]	[✂]
	Barnstone Cem	[✂]	[✂]	[✂]
	Vectis	[✂]	[✂]	[✂]
Dunbar	Aberdeen	[✂]	[✂]	[✂]
	Inverness	[✂]	[✂]	[✂]
	Seaham Depot	[✂]	[✂]	[✂]
	Uddingston	[✂]	[✂]	[✂]
Tunstead	Leeds	[✂]	[✂]	[✂]
	Liverpool	[✂]	[✂]	[✂]
	London	[✂]	[✂]	[✂]
	Walsall	[✂]	[✂]	[✂]

Source: CC calculations based on 2011 transactions data provided by Lafarge Tarmac.

35. Table 13 shows that the Vectis depot has the smallest catchment area distances to the customer as the Vectis depot is located in the Isle of Wight. The Barnstone depot is not a cement depot but a blender and packing facility. The catchment area distances for this shipping facility are the largest based on all sales. Based on 2011 transactions data, the Cauldon plant supplied five depots and the Tunstead plant supplied four depots. All depots that have been supplied by these two plants are located around the central and southern regions of GB.

Conclusions

36. This annex has presented our customer catchment area analysis of Lafarge Tarmac's cement plants, with particular focus on the Cauldon and Tunstead plants located in the Midlands based on 2011 transactions data.

37. Our main findings show that:

(a) The Cauldon plant had a higher volume of bagged cement sales in 2011 compared with the Tunstead plant, whilst the Tunstead plant had a higher volume of bulk cement sales compared to the Cauldon plant.

(b) The Cauldon plant had a high yield of customer sales, supplying [✂] customers compared with only [✂] customers for the Tunstead plant during 2011.

(c) The Cauldon plant had a wide mix of customers based on our analysis of the top 20 customers in 2011 by volume concentration compared with the Tunstead plant.

(d) Based on 80 per cent catchment area distances, the Cauldon plant, which is not a rail-linked plant, had a lower catchment area than the Tunstead plant, which is partially rail-linked. However, the fact that the Cauldon plant had not served customers located further away may have been a result of Lafarge's strategy in relation to its Cauldon and Hope plants in 2011.

Customer catchment area analysis: Hanson

1. Our catchment area analysis based on Hanson's transaction data for 2011 is presented below.[1]

2. Hanson's customer catchment area analysis is based on the straight line (radial) distance from the cement plant to the shipping facility for the first leg of the journey and road miles from the shipping facility to the customer for the second leg of the journey. The first leg of this journey was estimated by the CC because this distance was not provided.

3. Hanson has three active cement plants in GB in 2011 at Ketton, Padeswood and Ribblesdale. The Ketton and Ribblesdale plants are rail-linked plants.

4. Table 1 shows the proportion of cement sales that leave each plant by rail and by road to supply their shipping facilities:
   (a) For the Ketton plant, [✂] per cent of its total sales volumes leave by rail and [✂] per cent of its total sales volumes leave by road.
   (b) For the Ribblesdale plant, [✂] per cent of its total sales volumes leave the plant by rail and [✂] per cent of its total sales volumes leave the plant by road.
   (c) For the Padeswood plant, [✂] per cent of its total sales volumes are made by road.

5. It should be noted that the results in Table 1 differ from the results presented in Table 1 above for Lafarge Tarmac's plants as Hanson make the majority of its cement sales directly from its plants.

[1] We have dropped 1 per cent of the outliers based on price. A total of 199 observations were dropped from the 2011 transactions data.

TABLE 1 **Proportion of sales (in tonnes) which leave the plant by rail and road to supply the shipping facilities**

	per cent	
Cement plant	*Rail*	*Road*
Ketton	[✂]	[✂]
Padeswood	[✂]	[✂]
Ribblesdale	[✂]	[✂]

Source: CC calculations based on 2011 transactions data provided by Hanson.

6. Table 2 sets out the catchment area distances from the cement plant to its customers. It shows that the Padeswood plant has the [✂] catchment area distances followed by the Ketton and Ribblesdale plants. These customer catchment areas can be viewed in Figure 1.

TABLE 2 **Catchment area distances from cement plant to customer**

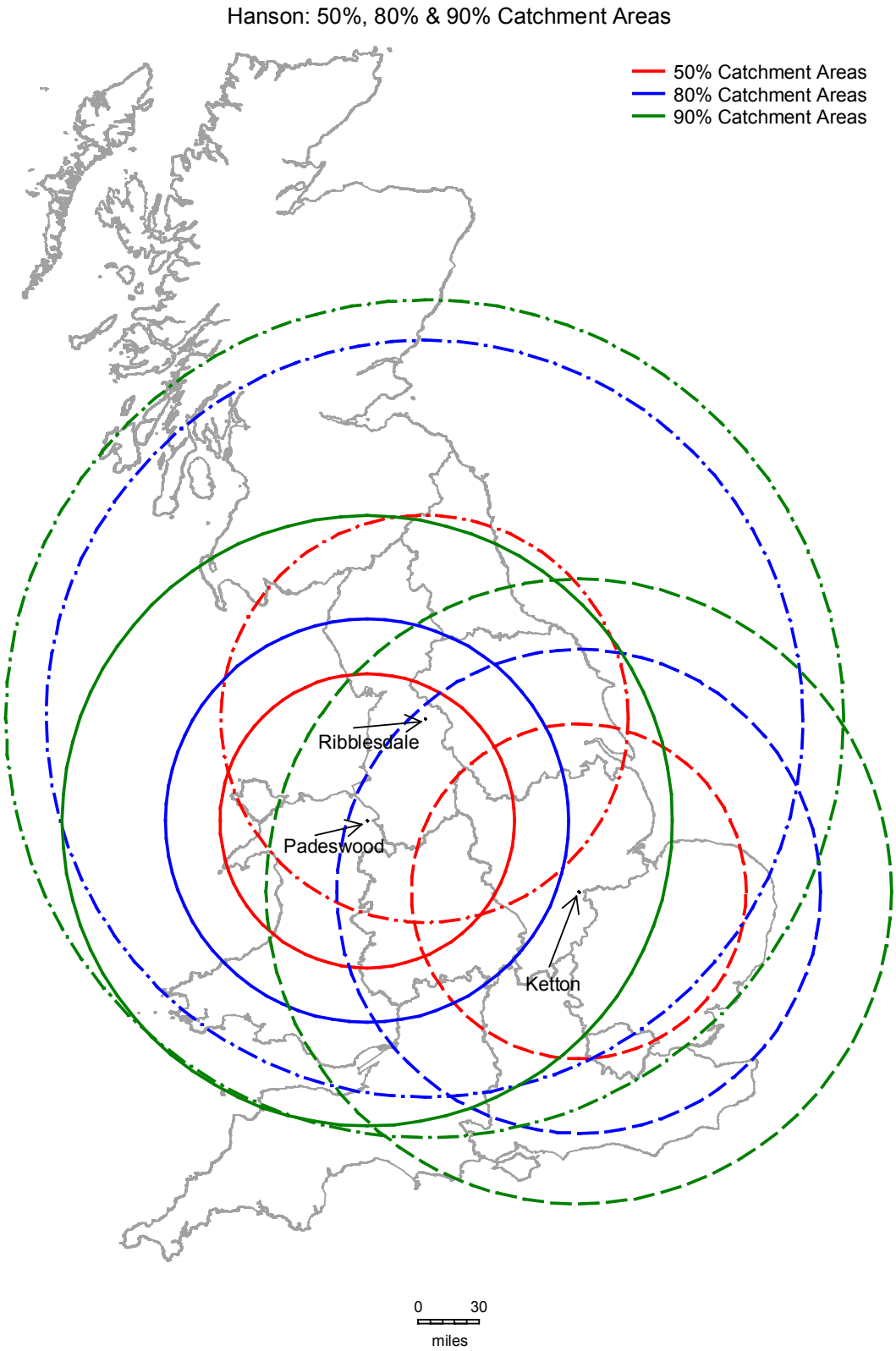
			miles
Cement plant	*50*	*80*	*90*
Ketton	[✂]	[✂]	[✂]
Padeswood	[✂]	[✂]	[✂]
Ribblesdale	[✂]	[✂]	[✂]

Source: CC calculations based on 2011 transactions data provided by Hanson.

Note: Catchment area distances are a combination of radial miles on the first leg of the journey from the cement plant to the shipping facility and road miles on the second leg of the journey from the shipping facility to the customer.

FIGURE 1

Hanson: 50, 80 and 90 per cent catchment areas



Source: Hanson (2011 transactions data).
Note: Catchment area distances are a combination of radial and road miles from the cement plant to the customer. Table 2 provides the catchment area distances.

Availability and procurement of raw materials

Introduction

1. This annex sets out, for the Top 3 cement producers, details of each of their cement plants' supply arrangements concerning their top five raw material requirements (by tonnage consumed in FY12).

Our assessment

2. For each of their top five raw materials (by cement plant), we looked at whether these raw materials were supplied internally or by third parties; their long-term availability, and where availability was potentially an issue, whether suitable alternatives could be cost-effectively sourced; and the implications of divestiture on existing raw material supply arrangements.

Lafarge Tarmac

3. Table 1 shows the top five raw materials consumed (by tonnage) by each of Lafarge Tarmac's four cement plants during FY12.

TABLE 1 **Lafarge Tarmac: availability and procurement of raw materials (top 5 by consumption in FY12)**

Raw material	*Internal or external supply*	*Name of supplier*	*FY12 con-sumption (kt)*	*Current/ permitted availability**	*Future availability†*	*Use of raw material*	*Implication of divestiture*	*Availability of cost-effective alternative*
Aberthaw plant								
Limestone	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]#
Limestone	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]#
Air-cooled slag	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Celtic ash	[✂]		[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Limestone (20mm)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Cauldon plant								
Limestone	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]~
Shale	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
PFA	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Gypsum	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Sand	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Dunbar plant								
Limestone	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	★
PFA	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Sand	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Shale	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Gypsum	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Tunstead plant								
Limestone	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	♦
Slurry	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Marl	[✂]	[✂]	[✂]	[✂]§	[✂]§	[✂]	[✂]	[✂]
Sand	[✂]	[✂]	[✂]	[✂]	[✂]¶	[✂]	[✂]	[✂]
Gypsum	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Lafarge Tarmac.

Notes:
*Current permitted availability, where it is expressed in years, is based on current rates of production and/or existing suppliers.
†Future availability based on ability to increase raw material availability, eg through planning permissions.
‡Sourced externally during FY12, but now internal, ie part of Lafarge Tarmac from January 2013.
§[✂]
¶Feasibility study into a second kiln at the Tunstead plant verified sand supply availability for at least double the existing kiln demand.
#[✂]
~Lafarge Tarmac told us that it was likely that a significant part of the reserves at the Cauldon Low Quarry, which was located adjacent to the Cauldon Quarry, could be used for cement production at the Cauldon plant, subject to obtaining the required planning permissions.
★Lafarge Tarmac told us that there was only one quarry linked to the Dunbar plant that could be generically labelled as the 'Dunbar Quarry', and that it was also known as the 'North East Quarry', as this was the section of the quarry that was currently being worked. It added that the north-west sector had been worked and was now undergoing restoration.
♦Lafarge Tarmac told us that there were many decades of proven and probable limestone reserves at the Tunstead Quarry to which it would reasonably expect to gain access going forwards such that it should not be necessary to bring in limestone from any other source for the economic life of the current cement plant.

4. Based on Table 1 above, the most consumed raw material by each of Lafarge Tarmac's cement plants is limestone, which is, in all cases, supplied internally by its respective quarries. In relation to the production of clinker, the top two raw materials (by tonnage consumed), including limestone, are internally supplied. For the Aberthaw plant, these raw materials relate to limestone from two different quarries;

for both the Cauldon and Dunbar plants, they relate to limestone and shale; and for the Tunstead plant, they relate to limestone and slurry.

5. Whilst PFA does not appear in Table 1 above for the Tunstead plant, the PFA that is used at each of Lafarge Tarmac's other three plants are sourced from three different JVs, namely CelticAsh, ProAsh and ScotAsh.

6. We also noticed that the supply of sand varied from being externally supplied to the Cauldon and Dunbar plants to being internally supplied to the Tunstead plant.

7. In relation to the availability of limestone, Table 1 above shows that:

   (a) The Aberthaw plant currently has [✂] years of reserves remaining at the Aberthaw Quarry with the ability to extend this by [✂] years. It also has around [✂] years of limestone reserves at its Pant Quarry (based on current consumption rates), but planning permission at the Pant Quarry expires on [✂]. Lafarge Tarmac told us that its Ruthin and Garwa Quarries (currently mothballed) used to supply limestone to the Aberthaw plant, and could be used again to supply limestone once reserves at the Pant Quarry became exhausted. It also told us that the Aberthaw Quarry could continue to supply the balance of limestone required for the raw mix.

   (b) The Cauldon plant sources both its limestone and shale from the Cauldon Quarry. In relation to its permitted limestone reserves, there are currently nine years remaining, which could be extended by a further [✂] years through obtaining planning permission. In relation to its shale reserves, the Cauldon Quarry has [✂] years of permitted reserves, which could be extended by [✂] years through obtaining planning permission. Lafarge Tarmac told us that [✂]. However, in addition to the Cauldon Quarry, Lafarge Tarmac told us that it was likely that a significant part of the reserves at the Cauldon Low Quarry (located adjacent to

the Cauldon Quarry) could be used to supply limestone to the Cauldon plant subject to obtaining the required planning permissions.

(c) The Dunbar plant has around [✂] years of permitted limestone reserves, the second highest behind the Tunstead plant in terms of permitted limestone reserves.

(d) The Tunstead plant currently has just over [✂] of permitted limestone reserves which, based on its current consumption of limestone and slurry, give rise to, by far, the highest permitted reserves among Lafarge Tarmac's four cement plants.

Hanson

8. Table 2 shows the top five raw materials consumed (by tonnage) by each of Hanson's three cement plants during FY12.

TABLE 2 **Hanson: availability and procurement of raw materials (top 5 by consumption in FY12)**

Raw material	*Internal or external supply*	*Name of supplier*	*FY12 con-sumption (kt)*	*Current/ permitted availability**	*Future availability†*	*Use of raw material*	*Implication of divestiture*	*Availability of cost-effective alternative*
Ketton plant								
Limestone	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clay	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Limestone (MAC)‡	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Gypsum	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]¶
Gypsum (recycled)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Padeswood plant								
Limestone	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
PFA	[✂]	[✂]	[✂]	[✂]§	[✂]	[✂]	[✂]	[✂]#
Sand	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Gypsum	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]¶
Limestone (MAC‡)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Ribblesdale plant								
Limestone	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Limestone (MAC)‡	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
PFA	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]#
Gypsum	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]¶
Sandstone	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Hanson.

*Current permitted availability, where it is expressed in years, is based on current rates of production and/or existing suppliers.
†Future availability based on ability to increase raw material availability, eg through planning permissions.
‡Minor additional constituent.
§[✂]
¶The availability of imports is not known.
#[✂]
Note: N/A = not applicable.

9. Table 2 above shows that limestone is the key raw material with the highest consumption in terms of tonnage for each of Hanson's plants. Limestone is internally supplied to each cement plant by different quarries.

10. In relation to permitted reserves of limestone:

(a) The Ketton plant currently has [✂] years of permitted reserves, which could be extended by a further [✂] years through planning permission.

(b) The Padeswood plant has [✂] years of permitted reserves, which could be extended by a further [✂] years.

(c) The Ribblesdale plant has [✂] years of permitted reserves, which could be extended by a further [✂] years.

Cemex

11. Table 3 shows the top five raw materials consumed (by tonnage) by each of Cemex's two cement plants and Tilbury grinding station during FY12.

TABLE 3 **Cemex: availability and procurement of raw materials (top 5 by consumption in FY12)**

Raw material	*Internal or external supply*	*Name of supplier*	*FY12 consumption (kt)*	*Current/ permitted availability*	*Future availability*	*Use of raw material*	*Implication of divestiture*	*Availability of cost-effective alternative*
Rugby plant								
Chalk (limestone)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clay	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Wet sand	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
PFA	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Limestone	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
South Ferriby plant								
Chalk (limestone)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clay	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Wet sand	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Gypsum	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
PFA	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Tilbury grinding station								
Clinker	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
PFA	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Gypsum	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Chalk filler	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Limestone	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Cemex.

*Current permitted availability, where it is expressed in years, is based on current rates of production and/or existing suppliers.
†Future availability based on ability to increase raw material availability, eg through planning permissions.

12. Table 3 above shows that the top two raw materials for both of Cemex's cement plants (ie excluding the Tilbury grinding station) are [✂], both of which are [✂]. We note that the third key raw material, sand, is externally supplied to both plants. Each plant sources its [✂].

13. In relation to the availability of limestone (chalk) and clay:

(a) The Rugby plant sources its limestone (chalk) from [✂], which has [✂] years of permitted reserves which could be extended by a further [✂]. It also sources its clay from its [✂], which has [✂] years of permitted reserves, but [✂].

(b) The South Ferriby plant sources both its limestone (chalk) and clay from [✂], which has permitted reserves of [✂] and [✂] years respectively, but [✂].

Production efficiencies

Introduction

1. This annex sets out a comparison of production efficiency (including costs) and kiln reliability for each of the Top 3 cement producers' GB cement plants.

Our assessment of production efficiency

2. We requested, for each of the Top 3 cement producers' cement plants, annual raw material and power costs for the production of clinker, as well as annual power consumption figures (in kWh per clinker tonne) up to the point at which clinker was produced over the period FY10 to FY12.

3. Lafarge Tarmac told us that it was concerned that this would not correctly capture the relevant energy costs incurred throughout the cement production process, since [✂] per cent of its cement operations' power consumption was used after clinker was manufactured. It also argued that this measure of power consumption would prejudice it in our calculations given its strategy of producing blended cements which reduced power consumption for each tonne of cement produced.

4. In response to Lafarge Tarmac's concern above, our reasons for focusing on clinker production costs were largely based on our need for unit cost data that would be most comparable across all cement plants. As pointed out by Lafarge Tarmac, its strategy of producing blended cement could distort the comparability of its unit costs with those of other producers. Furthermore, we considered Lafarge Tarmac's concern to be relevant if a unit cost figure was calculated based on clinker production costs and cement production volumes. However, we note that our calculation of unit costs was based on clinker production costs and clinker production volumes, and

therefore we did not consider that this would prejudice Lafarge Tarmac in our analysis.

5. Based on Tables 1 to 4 below, in relation to power consumption per tonne of clinker produced, we noted that there was a significant discrepancy between the power consumption per tonne of clinker produced submitted by Hanson and those submitted by Lafarge Tarmac and Cemex. Hanson noted that its figures were based on its plants' total power consumption, whilst the figures provided by Lafarge Tarmac and Cemex concerned power consumption relating only to the production of clinker. We have therefore excluded Hanson's figures from this assessment.

6. In relation to power consumption per tonne of clinker produced, for all of Lafarge Tarmac's and Cemex's cement plants, the [✂] plant was [✂], with a range of [✂] kWh per clinker tonne over the period FY10 to FY12. After the [✂] plant, the [✂] plant had a range of [✂] kWh per clinker tonne over the period, whilst the [✂] plant had a range of [✂], and the [✂] plant had a similar range of [✂]. The [✂] plant was next with a range of [✂], followed by the [✂] plant with a range of [✂] (see Tables 1 to 4 below). As mentioned above, we have not been able to ascertain the relative positioning of Hanson's plants in this regard. However, if we looked only at Hanson's figures, there was [✂] variation across Hanson's power consumption figures for its Ketton and Padeswood plants, where the range for the former was [✂] kWh per clinker tonne, and [✂] for the latter. In relation to Ribblesdale, its range was from [✂]. We noted the trends in Hanson's power consumption figures: whilst power consumption per clinker tonne increased relatively steadily year on year for the Ketton plant, it actually decreased [✂] for the Padeswood plant (from [✂] kWh per clinker tonne). For the Ribblesdale plant, power consumption per clinker tonne dropped in FY11 before increasing in FY12.

7. We also compared each of the Top 3 cement producers' variable costs of clinker production per tonne of clinker produced, in terms of raw material costs and power costs (see Tables 1 to 4 below). Based on these figures, it is unclear whether they were prepared based on a consistent definition, eg between FY10 and FY12, unit raw material costs ranged from £[✂] (Ketton plant) to £[✂] (Rugby plant), whilst unit power costs ranged from £[✂] (Rugby plant) to £[✂] (Padeswood plant). We also note that in relation to its power costs, Cemex told us that in line with its own standard definition, it [✂] relating to 'general services' (eg offices and workshops) (see footnote to Table 4 below). Given the scale of these discrepancies, in particular in relation to Cemex's figures, we have not been able to rely on the comparability of these figures across their different cement plants.

8. However, we considered that we could compare the unit variable costs (comprising raw material and power costs) of the cement plants for each producer:

   (a) Lafarge Tarmac. In FY12, out of Lafarge Tarmac's four cement plants, the Cauldon plant had the lowest unit variable costs at £[✂]. This was followed by the Tunstead plant at £[✂], the Dunbar plant at £[✂], and lastly the Aberthaw plant at £[✂].

   (b) Hanson. In FY12, out of Hanson's three cement plants, the Ketton plant had [✂] unit variable costs at £[✂], [✂] the Ribblesdale plant at £[✂] and then the Padeswood plant at £[✂].

   (c) Cemex. In FY12, out of Cemex's two cement plants, the South Ferriby plant [✂] compared with the Rugby plant at £[✂].

9. We set out below the figures we used for this assessment.

10. Tables 1 and 2 set out our calculations of unit clinker variable costs and power consumption per clinker tonne for each of Lafarge Tarmac's cement plants over the period from FY10 to FY12.

TABLE 1 **Lafarge Tarmac: production efficiency measures (Cauldon plant and Tunstead plant), FY10 to FY12**

	Cauldon plant			*Tunstead plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*
Clinker production variable costs (£'000)						
Raw materials	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Power*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Unit clinker production variable costs (£/t)						
Raw materials	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Power*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
*Power (kWh)/clinker tonne**	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Lafarge Tarmac.

*The power costs and consumption figures relate to the power (as measured in kWh) consumed up to the point that clinker is produced and therefore power consumption relating to grinding and blending activities are not included.

TABLE 2 **Lafarge Tarmac: production efficiency measures (Aberthaw plant and Dunbar plant), FY10 to FY12**

	Aberthaw plant			*Dunbar plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*
Clinker production variable costs (£'000)						
Raw materials	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Power*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Unit clinker production variable costs (£/t)						
Raw materials	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Power*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
*Power (kWh)/clinker tonne**	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Lafarge Tarmac.

*The power costs and consumption figures relate to the power (as measured in kWh) consumed up to the point that clinker is produced and therefore power consumption relating to grinding and blending activities are not included.

11. Table 3 sets out our calculations of unit clinker variable costs and power consumption per clinker tonne for each of Hanson's cement plants over the period from FY10 to FY12.

TABLE 3 **Hanson: production efficiency measures, FY10 to FY12**

	Ketton plant			*Padeswood plant*			*Ribblesdale plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*	*2010*	*2011*	*2012*
Clinker production variable costs (£'000)									
Raw materials	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Power*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Unit clinker production variable costs (£/t)									
Raw materials	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Power*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
*Power (kWh)/clinker tonne**	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Hanson.

*The power costs and consumption figures relate to the power (as measured in kWh) consumed up to the point that clinker is produced and therefore power consumption relating to grinding and blending activities are not included.
†Hanson noted that this was based on a plant's total power consumption.

12. Table 4 sets out our calculations of unit clinker variable costs and power consumption per clinker tonne for each of Cemex's cement plants over the period from FY10 to FY12.

TABLE 4 **Cemex: production efficiency measures, FY10 to FY12**

	Rugby plant			*South Ferriby plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*
Clinker production variable costs (£'000)						
Raw materials	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Power*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Unit clinker production variable costs (£/t)						
Raw materials	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Power*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
*Power (kWh)/clinker tonne**	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Cemex.

*The power costs and consumption figures relate to the power (as measured in kWh) consumed up to the point that clinker is produced and therefore power consumption relating to grinding and blending activities are not included. In line with its own standard definition, Cemex told us that it also [✂] relating to 'general services' (eg offices and workshops).
†In relation to its raw material costs to produce clinker, Cemex told us that it [✂], and for the avoidance of doubt, excluded fixed costs (ie maintenance costs).

Our assessment of kiln reliability

13. We requested, for each of the Top 3 cement producers' cement plants, the number of days a kiln was operated in each year, and the number of breakdown days, over the period FY10 to FY12. We note that when calculating 'downtime', two of the Top 3 cement producers, namely Hanson and Cemex, included outage days due to

planned maintenance works as part of its definition of a 'breakdown', and therefore we would note the limited comparability between their figures and those of Lafarge Tarmac.

14. Based on Tables 5 to 8 below, we consider the kiln reliability for each of the Top 3 cement producers' cement plants:

(a) *Lafarge Tarmac.* In terms of the number of days in a year that a plant was operated, both the Cauldon and Tunstead plants consistently achieved the highest figures over the period from FY10 to FY12, compared with those of the Aberthaw and Dunbar plants. For example, operating days at the Cauldon and Tunstead plants did not fall below [✂] and [✂] days in a year respectively. However, operating days ranged from [✂] to [✂] days at the Aberthaw plant, and from [✂] to [✂] days at the Dunbar plant. The Cauldon plant also benefited from one of the lowest downtime percentages at [✂] per cent (similar to [✂] per cent at the Aberthaw plant), compared with [✂] per cent and [✂] per cent for the Tunstead and Dunbar plants respectively.

(b) *Hanson.* In terms of the number of days in a year that a plant was operated, the Ketton plant achieved the highest figures over the period from FY10 to FY12, with operating days ranging from [✂] to [✂] days. The Ribblesdale plant operated between [✂] and [✂] days over the same period, whilst the South Ferriby plant was operated [✂], [✂] days in FY11 and [✂] days in FY12.

(c) *Cemex.* In terms of the number of days in a year that a plant was operated, the Rugby plant was operated between [✂] and [✂] days, whilst for the South Ferriby plant this ranged from [✂] to [✂] days.

15. We note that both Hanson and Cemex included outages relating to planned maintenance into their calculation of 'breakdown' days, and therefore their downtime percent-

ages in Tables 7 and 8 below respectively do not reveal the underlying reliability of their respective kilns.

16. The figures used in our assessment above are set out below in Tables 5 to 8.

17. Tables 5 and 6 set out our analysis of the operating days and breakdown days for each of Lafarge Tarmac's cement plants.

TABLE 5 **Lafarge Tarmac: kiln operating and breakdown days (Cauldon plant and Tunstead plant)**

	Cauldon plant			*Tunstead plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*
Operating days						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Breakdown days						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
*Downtime (% of total)**						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Operating days a year (%)†						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

S*ource:* Lafarge Tarmac.

*We calculated a kiln's downtime by taking the number of its breakdown days as a percentage of the sum of its breakdown and operating days.
†We calculated a kiln's operating days a year by taking the number of operating days as a percentage of a 365-day year.

TABLE 6 **Lafarge Tarmac: kiln operating and breakdown days (Aberthaw plant and Dunbar plant)**

	Aberthaw plant			*Dunbar plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*
Operating days						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Breakdown days						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
*Downtime (% of total)**						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Operating days a year (%)†						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

S*ource:* Lafarge Tarmac.

*We calculated a kiln's downtime by taking the number of its breakdown days as a percentage of the sum of its breakdown and operating days.
†We calculated a kiln's operating days a year by taking the number of operating days as a percentage of a 365-day year.
Note: N/A = not applicable.

18. Table 7 sets out our analysis of the operating days and breakdown days for each of Hanson's cement plants.

TABLE 7 **Hanson: kiln operating and breakdown days**

	*Ketton plant**			*Padeswood plant*			*Ribblesdale plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*	*2010*	*2011*	*2012*
Operating days†									
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Breakdown days‡									
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Downtime (% of total)§									
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Operating days a year (%)¶									
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

S*ource:* Hanson.

*Kiln 2 (as labelled by us) at the Ketton plant was mothballed for the whole year during the period under consideration, ie FY10 to FY12 (both years inclusive).
†Hanson calculated its operating days by taking the hours operated in each year and dividing it by 24 hours.
‡Hanson calculated its breakdown days based on 365 days less operating days, ie breakdown days also include downtime for routine maintenance and production planning.
§We calculated a kiln's downtime by taking the number of its breakdown days as a percentage of the sum of its breakdown and operating days.
¶We calculated a kiln's operating days a year by taking the number of operating days as a percentage of a 365-day year.
Notes:
1. N/A = not applicable.
2. Where cells are shaded in grey, these show when the kiln was mothballed for the whole year.

19. Table 8 sets out our analysis of the operating days and breakdown days for each of Cemex's cement plants.

TABLE 8 **Cemex: kiln operating and breakdown days**

	Rugby plant			*South Ferriby plant**		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*
Operating days						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Breakdown days†						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Downtime (% of total)‡						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Operating days a year (%)§						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Cemex.

*At the South Ferriby plant, Kiln 1 (as labelled by us) [✂].
†[✂]
‡We calculated a kiln's downtime by taking the number of its breakdown days as a percentage of the sum of its breakdown and operating days.
§We calculated a kiln's operating days a year by taking the number of operating days as a percentage of a 365-day year.
Notes:
1. N/A = not applicable.
2. Where cells are shaded in grey, these show when the kiln was mothballed for the whole year. Where cells are shaded in blue, these show when the kiln was mothballed for only part of the year.

Capacity utilization based on ETS benchmark allocations

Introduction

1. This annex sets out our assessment estimating the total amount of cement that each cement plant might be able to produce within its benchmark allocation of ETS carbon allowances. Since all cement producers operating under the ETS currently receive 100 per cent of their benchmark allocations free, a cement plant that has an insufficient benchmark allocation would need to purchase additional carbon allowances.

Our assessment

2. Our analysis involved calculating how much cement could be produced by each GB cement plant based on the amount of carbon emissions it was permitted to produce each year based on its free benchmark allocation of carbon allowances, and then calculate the amount of cement production that would be associated with these levels of carbon emissions based on its emissions factor (ie the amount of carbon emissions per tonne of clinker produced), whereby a more carbon-efficient cement plant would be capable of producing more clinker and cement for each carbon allowance. In addition, this could also give rise to a higher surplus of carbon allowances than required, which could either be sold on to the secondary carbon market and provide an additional source of income for the cement producer, or rolled over into the following year.

3. This analysis is all the more relevant for a new entrant with a single cement plant, in particular if it does not operate any other installations covered by the ETS: given the freely tradable nature of carbon allowances, this gives an operator that owns multiple installations covered by the ETS greater flexibility in choosing how and where to allocate its total allocation of carbon allowances. The availability of carbon allowances

from other ETS installations could be diverted to the production of cement over and above a level permitted by a cement plant's own benchmark allocation. A new entrant that owns a single cement plant would noticeably not have this flexibility.

4. We first estimated each cement plant's emissions factor based on its verified emissions over the period FY10 to FY12, and clinker production volumes. This is set out in Table 1.

TABLE 1 **Estimating a cement plant's emissions factor**

Lafarge Tarmac (Cauldon & Tunstead plants)	*Cauldon plant*			*Tunstead plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*
Verified emissions (kt)						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker produced (kt)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Emissions factor*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
3-year average†			[✂]			[✂]

Lafarge Tarmac (Aberthaw & Dunbar plants)	*Aberthaw plant*			*Dunbar plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*
Verified emissions (kt)						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker produced (kt)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Emissions factor*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
3-year average†			[✂]			[✂]

Hanson	*Ketton plant*			*Padeswood plant*			*Ribblesdale plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*	*2010*	*2011*	*2012*
Verified emissions (kt)									
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker produced (kt)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Emissions factor*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
3-year average†			[✂]			[✂]			[✂]

Cemex	*Rugby plant*			*South Ferriby plant‡*		
Verified emissions (kt)						
Kiln 1	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Kiln 2	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Clinker produced (kt)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Emissions factor*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
3-year average†			[✂]			[✂]

Source: Lafarge Tarmac, Hanson and Cemex.

*The emissions factor is calculated by dividing verified emissions by clinker production and represents the amount of carbon emissions that are produced from producing one tonne of clinker.
†We took a three-year average for the emissions factor, but the latest emissions factor may be more indicative of the emissions factor that could be expected going forwards.
‡Since verified emissions data is required only at an installation level rather than by kiln, Cemex had attempted to apportion the South Ferriby plant's total verified emissions to each of its two kilns in FY12 (based on each kiln's clinker production), [✂].
Note: Where cells are shaded in grey, these show when the kiln was mothballed for the whole year. Where cells are shaded in blue, these show when the kiln was mothballed for only part of the year.

5. In Table 2, we set out the number of free carbon allowances granted to each cement plant based on its preliminary benchmark allocation,[2] where each carbon allowance permits the holder to emit 1 tonne of carbon emissions. We note that these preliminary benchmark allocations have recently been updated, and we will update our analysis for these updated allocations in our final report. Using our estimates of the average emissions factor for each cement plant in Table 1 above, we calculated how much clinker production (in tonnes) would be permitted if only these free carbon allowances were used to determine production decisions. We also set out the clinker capacity of each plant based on: *(a)* its active kilns only (labelled 'active clinker capacity' in Table 2 below); and *(b)* both its active and mothballed kilns (if any) (labelled 'total clinker capacity' in Table 2 below).

TABLE 2 **ETS Phase III: clinker production from benchmark allocation of carbon allowances**

	Emissions factor (3-yr average)*	*Benchmark allocation ('000)†*	*Clinker production from benchmark (kt)‡*	*3-yr max active clinker capacity (kt)§*	*3-yr max total clinker capacity (kt)§*
Lafarge Tarmac					
Aberthaw plant	[✂]	[✂]	[✂]	[✂]	[✂]
Cauldon plant	[✂]	[✂]	[✂]	[✂]	[✂]
Dunbar plant	[✂]	[✂]	[✂]	[✂]	[✂]
Tunstead plant	[✂]	[✂]	[✂]	[✂]	[✂]
		[✂]	[✂]	[✂]	[✂]
Hanson					
Ketton plant	[✂]	[✂]	[✂]	[✂]	[✂]
Padeswood plant	[✂]	[✂]	[✂]	[✂]	[✂]
Ribblesdale plant	[✂]	[✂]	[✂]	[✂]	[✂]
		[✂]	[✂]	[✂]	[✂]
Cemex					
Rugby plant	[✂]	[✂]	[✂]	[✂]	[✂]
South Ferriby plant	[✂]	[✂]	[✂]	[✂]	[✂]
		[✂]	[✂]	[✂]	[✂]

Source: Lafarge Tarmac, Hanson and Cemex. Preliminary benchmark allocations based on the document 'Modified UK National Implementation Measures for Phase III of the EU Emissions Trading System', April 2012.

*The emissions factor is calculated by dividing verified emissions by clinker production and represents the amount of carbon emissions that are produced from producing 1 tonne of clinker.
†The benchmark allocation represents the amount of free carbon allowances received by each cement plant (or ETS installation) under ETS Phase III. Each carbon allowance permits the holder to emit 1 tonne of carbon (or carbon equivalent) emissions. The figures presented in this table were based on preliminary figures set out in the document 'Modified UK National Implementation Measures for Phase III of the EU Emissions Trading System', April 2012.
‡The 'clinker production from benchmark' column represents the amount of clinker that could be produced if only the benchmark allocation of carbon allowances were surrendered. After surrendering all of its benchmark allocation, ie emitting carbon emissions up to the maximum permitted by these free carbon allowances, an ETS installation must source additional carbon allowances to produce beyond this level.
§We adopted the maximum clinker production capacity achieved over the period FY10 to FY12 by a kiln. This was because the maximum clinker capacity can vary from year to year depending on the assumptions used, eg Hanson's 'Reliability Coefficient'. The difference between active and total clinker production capacity is that the former includes only active kilns whilst the latter includes the reactivation of the mothballed kilns at the Ketton and the South Ferriby plants.

[2] 'Modified UK National Implementation Measures for Phase III of the EU Emissions Trading System', April 2012. This document contains 'preliminary' benchmark allocations of carbon allowances for UK installations for each year during ETS Phase III (ie from the beginning of 2013 to the end of 2020).

6. In Table 3, we show the percentage of clinker capacity that would be utilized if only a cement plant's free allocation of carbon allowances were used to produce clinker and cement. Table 3 shows that only the Ketton, Padeswood and [✂]. However, we note that grinding capacity is not taken into account in this analysis, and that if we took grinding capacity into account, it may not be possible for a cement plant to produce at 100 per cent clinker capacity (eg grinding capacity can act as a bottleneck to achieving full clinker capacity).

TABLE 3 **Clinker capacity utilization based on production from surrendering only benchmark allocations**

per cent

	*Benchmark active capacity utilization**	*Benchmark total capacity utilization**
Lafarge Tarmac		
Aberthaw plant	[✂]	[✂]
Cauldon plant	[✂]	[✂]
Dunbar plant	[✂]	[✂]
Tunstead plant	[✂]	[✂]
	[✂]	[✂]
Hanson		
Ketton plant	[✂]	[✂]
Padeswood plant	[✂]	[✂]
Ribblesdale plant	[✂]	[✂]
	[✂]	[✂]
Cemex		
Rugby plant	[✂]	[✂]
South Ferriby plant	[✂]	[✂]
	[✂]	[✂]

Source: Lafarge Tarmac, Hanson and Cemex.

*The difference between active and total clinker production capacity is that the former includes only active kilns whilst the latter includes the reactivation of the mothballed kilns at the Ketton and South Ferriby plants.
Note: Cells shaded in grey show where production based on surrendering the benchmark carbon allowances exceeds current clinker capacity, ie a surplus of carbon allowances arises even when operating at the plant's theoretical maximum capacity.

7. Figure 1 shows how ETS carbon allowances (or EUA) have traded since early 2012, when prices collapsed from over €9 down to the current price of €4.40,[3] and has generally remained below a price of €5 in recent months. However, Lafarge Tarmac told us that it was inevitable that the price of carbon allowances would rise and that this would impact on the price of cement.[4]

[3] www.theice.com, 5 August 2013.
[4] Summary of response hearing with Lafarge Tarmac, paragraph 15.

FIGURE 1

ETS carbon allowance prices

Source: www.theice.com.
Note: ICE EUA futures – Emissions Index .

8. Given the current price of carbon allowances, the consequences of an insufficient benchmark allocation may not be as significant in absolute terms. However, if a benchmark allocation was insufficient, that cement plant would still incur additional costs which its competitors would not be facing.

Historic financial performance

Introduction

1. This annex sets out the historic profit and loss accounts for each of the Top 3 cement producers' cement plants in GB from FY07 to FY12.

2. We note, however, that none of the cement plants we looked at had been operated as a stand-alone plant, and that whilst shared overhead costs have been allocated to each cement plant to reflect a stand-alone site, in practice, and in our view, the financial effects of being part of a wider network of cement plants cannot be eliminated from each plant's profit and loss account data, eg in our provisional findings we stated that having a network of plants could allow a producer to schedule its production efficiently across its different plants.[5]

3. Therefore, it would be difficult to assess a cement plant's future stand-alone financial performance based purely on its historic data, in particular given its operation as part of a wider network. Furthermore, given that capacity utilization at each plant can vary between different cement plants within a network, a plant's revenue and profit figures shown below may not be indicative of a plant's potential financial performance if it had been operated on a fully stand-alone basis.

4. Bearing this caveat in mind, we set out the individual profit and loss account data below.

Lafarge Tarmac

5. Table 1 sets out some key financial performance indicators for Lafarge Tarmac's cement plants over the period FY10 to FY12.

[5] Provisional findings, paragraph 7.47.

TABLE 1 **Lafarge Tarmac: cement plant key financial performance indicators, FY10 to FY12**

	FYE 31 December		
	2010	*2011*	*2012*
Aberthaw plant			
Sales volumes (Mt)	[✂]	[✂]	[✂]
Gross revenues (£m)	[✂]	[✂]	[✂]
Net revenues (£m)	[✂]	[✂]	[✂]
Variable profit* (£m)	[✂]	[✂]	[✂]
Site profit† (£m)	[✂]	[✂]	[✂]
EBITDA‡ (£m)	[✂]	[✂]	[✂]
Unit net revenues (£/t)	[✂]	[✂]	[✂]
Unit variable profit (£/t)	[✂]	[✂]	[✂]
Variable profit margin§ (%)	[✂]	[✂]	[✂]
Site profit margin§ (%)	[✂]	[✂]	[✂]
EBITDA margin§ (%)	[✂]	[✂]	[✂]
Cauldon plant			
Sales volumes (Mt)	[✂]	[✂]	[✂]
Gross revenues (£m)	[✂]	[✂]	[✂]
Net revenues (£m)	[✂]	[✂]	[✂]
Variable profit* (£m)	[✂]	[✂]	[✂]
Site profit† (£m)	[✂]	[✂]	[✂]
EBITDA‡ (£m)	[✂]	[✂]	[✂]
Unit net revenues (£/t)	[✂]	[✂]	[✂]
Unit variable profit (£/t)	[✂]	[✂]	[✂]
Variable profit margin§ (%)	[✂]	[✂]	[✂]
Site profit margin§ (%)	[✂]	[✂]	[✂]
EBITDA margin§ (%)	[✂]	[✂]	[✂]
Dunbar plant			
Sales volumes (Mt)	[✂]	[✂]	[✂]
Gross revenues (£m)	[✂]	[✂]	[✂]
Net revenues (£m)	[✂]	[✂]	[✂]
Variable profit* (£m)	[✂]	[✂]	[✂]
Site profit† (£m)	[✂]	[✂]	[✂]
EBITDA‡ (£m)	[✂]	[✂]	[✂]
Unit net revenues (£/t)	[✂]	[✂]	[✂]
Unit variable profit (£/t)	[✂]	[✂]	[✂]
Variable profit margin§ (%)	[✂]	[✂]	[✂]
Site profit margin§ (%)	[✂]	[✂]	[✂]
EBITDA margin§ (%)	[✂]	[✂]	[✂]
Tunstead plant			
Sales volumes (Mt)	[✂]	[✂]	[✂]
Gross revenues (£m)	[✂]	[✂]	[✂]
Net revenues (£m)	[✂]	[✂]	[✂]
Variable profit* (£m)	[✂]	[✂]	[✂]
Site profit† (£m)	[✂]	[✂]	[✂]
EBITDA‡ (£m)	[✂]	[✂]	[✂]
Unit net revenues (£/t)	[✂]	[✂]	[✂]
Unit variable profit (£/t)	[✂]	[✂]	[✂]
Variable profit margin§ (%)	[✂]	[✂]	[✂]
Site profit margin§ (%)	[✂]	[✂]	[✂]
EBITDA margin§ (%)	[✂]	[✂]	[✂]

Source: Lafarge Tarmac.

*Variable profit is calculated after the deduction of variable costs from net revenues, where variable costs largely comprise raw material and power costs.
†Site profit is calculated after the deducting of plant-level fixed costs from variable profit.
‡EBITDA is calculated by deducting divisional level fixed costs (associated with the national cement operations) from site profit, but not deducting central and head office costs, eg including those associated with the ultimate parent company.
§Percentage margins are calculated by dividing the relevant profit measure by net revenues.
¶Lafarge Tarmac did not allocate any divisional fixed costs and therefore its site profit is the same as its EBITDA.

Hanson

6. Table 2 sets out some key financial performance indicators for Hanson's cement plants over the period FY10 to FY12.

TABLE 2 **Hanson: cement plant key financial performance indicators, FY10 to FY12**

	FYE 31 December		
	2010	*2011*	*2012*
Ketton plant			
Sales volumes (Mt)	[✂]	[✂]	[✂]
Gross revenues (£m)	[✂]	[✂]	[✂]
Net revenues (£m)	[✂]	[✂]	[✂]
Variable profit* (£m)	[✂]	[✂]	[✂]
Site profit† (£m)	[✂]	[✂]	[✂]
EBITDA‡ (£m)	[✂]	[✂]	[✂]
Unit net revenues (£/t)	[✂]	[✂]	[✂]
Unit variable profit (£/t)	[✂]	[✂]	[✂]
Variable profit margin§	[✂]	[✂]	[✂]
Site profit margin§ (%)	[✂]	[✂]	[✂]
EBITDA margin§ (%)	[✂]	[✂]	[✂]
Padeswood plant			
Sales volumes (Mt)	[✂]	[✂]	[✂]
Gross revenues (£m)	[✂]	[✂]	[✂]
Net revenues (£m)	[✂]	[✂]	[✂]
Variable profit* (£m)	[✂]	[✂]	[✂]
Site profit† (£m)	[✂]	[✂]	[✂]
EBITDA‡ (£m)	[✂]	[✂]	[✂]
Unit net revenues (£/t)	[✂]	[✂]	[✂]
Unit variable profit (£/t)	[✂]	[✂]	[✂]
Variable profit margin§ (%)	[✂]	[✂]	[✂]
Site profit margin§ (%)	[✂]	[✂]	[✂]
EBITDA margin§ (%)	[✂]	[✂]	[✂]
Ribblesdale plant			
Sales volumes (Mt)	[✂]	[✂]	[✂]
Gross revenues (£m)	[✂]	[✂]	[✂]
Net revenues (£m)	[✂]	[✂]	[✂]
Variable profit* (£m)	[✂]	[✂]	[✂]
Site profit† (£m)	[✂]	[✂]	[✂]
EBITDA‡ (£m)	[✂]	[✂]	[✂]
Unit net revenues (£/t)	[✂]	[✂]	[✂]
Unit variable profit (£/t)	[✂]	[✂]	[✂]
Variable profit margin§ (%)	[✂]	[✂]	[✂]
Site profit margin§ (%)	[✂]	[✂]	[✂]
EBITDA margin§ (%)	[✂]	[✂]	[✂]

Source: Hanson.

*Variable profit is calculated after the deduction of variable costs from net revenues, where variable costs largely comprise raw material and power costs.
†Site profit is calculated after the deducting of plant-level fixed costs from variable profit.
‡EBITDA is calculated by deducting divisional level fixed costs (associated with the national cement operations) from site profit, but not deducting central and head office costs, eg including those associated with the ultimate parent company.
§Percentage margins are calculated by dividing the relevant profit measure by net revenues.

Cemex

7. Table 3 sets out some key financial performance indicators for Cemex's cement plants over the period FY10 to FY12.

TABLE 3 **Cemex: cement plant key financial performance indicators, FY10 to FY12**

	FYE 31 December		
	2010	*2011*	*2012*
Rugby plant			
Sales volumes (Mt)	[✂]	[✂]	[✂]
Gross revenues (£m)	[✂]	[✂]	[✂]
Net revenues (£m)	[✂]	[✂]	[✂]
Variable profit* (£m)	[✂]	[✂]	[✂]
Site profit† (£m)	[✂]	[✂]	[✂]
EBITDA‡ (£m)	[✂]	[✂]	[✂]
Unit net revenues (£/t)	[✂]	[✂]	[✂]
Unit variable profit (£/t)	[✂]	[✂]	[✂]
Variable profit margin§ (%)	[✂]	[✂]	[✂]
Site profit margin§ (%)	[✂]	[✂]	[✂]
EBITDA margin§ (%)	[✂]	[✂]	[✂]
South Ferriby			
Sales volumes (Mt)	[✂]	[✂]	[✂]
Gross revenues (£m)	[✂]	[✂]	[✂]
Net revenues (£m)	[✂]	[✂]	[✂]
Variable profit* (£m)	[✂]	[✂]	[✂]
Site profit† (£m)	[✂]	[✂]	[✂]
EBITDA‡ (£m)	[✂]	[✂]	[✂]
Unit net revenues (£/t)	[✂]	[✂]	[✂]
Unit variable profit (£/t)	[✂]	[✂]	[✂]
Variable profit margin§ (%)	[✂]	[✂]	[✂]
Site profit margin§ (%)	[✂]	[✂]	[✂]
EBITDA margin§ (%)	[✂]	[✂]	[✂]

Source: Cemex.

*Variable profit is calculated after the deduction of variable costs from net revenues, where variable costs largely comprise raw material and power costs.
†Site profit is calculated after the deducting of plant-level fixed costs from variable profit.
‡EBITDA is calculated by deducting divisional level fixed costs (associated with the national cement operations) from site profit, but not deducting central and head office costs, eg including those associated with the ultimate parent company.
§Percentage margins are calculated by dividing the relevant profit measure by net revenues.

Estimating the number of RMX plants within a divestiture package

Introduction

1. In this annex, we estimate the number of RMX plants that might be divested should it be included within a divestiture package. We provide analysis of this for illustrative purposes only.

2. We based our analysis on the following assumptions:

   (a) A purchaser is currently not vertically integrated and aims to acquire RMX plants up to its permitted 15 per cent upper limit, ie total internal cementitious requirement by downstream operations as a percentage of acquired cement production capacity.

   (b) Given our preliminary conclusions on this remedy, we limit this analysis to a divestiture of either the Cauldon plant or the Tunstead plant.

   (c) We assumed that around 300 kg of cementitious materials are required to produce 1 cubic metre of RMX. Therefore 1 kt of cement is required to produce 3,333 cubic metres of RMX.

   (d) We have assumed, for the purposes of this analysis only, that a small-sized plant produces 25,000 cubic metres of RMX a year; a mid-sized plant produces 50,000 cubic metres; and a large-sized plant produces 75,000 cubic metres. This was loosely based on Appendix 9.1, Table 1, of our provisional findings, where we set out the Majors' estimates of what constituted a small-, medium- and large-scale entrant into the RMX market.

3. Based on the above assumptions, we estimated the maximum permitted level of internal cement sales for each plant, based on a 15 per cent upper limit (with an illustrative sensitivity based on a lower limit of 10 per cent). We then estimated the amount of RMX that could be produced from these internal cement volumes. Taking

the different RMX plant size scenarios, we then calculated how many RMX plants might be required. This analysis is set out in Table 1.

TABLE 1 **Estimating the number of RMX plant divestitures based on a VI ratio* of 10 or 15 per cent**

	Cauldon	*Tunstead*
Cement production capacity (kt)	1,000§	1,000§
Maximum internal cement sales (kt)		
VI ratio of: 10%	100	100
VI ratio of: 15%	150	150
RMX produced from internal cement ('000 m^3)†		
VI ratio of: 10%	333	333
VI ratio of: 15%	500	500
RMX plant divestitures for 10% VI ratio‡		
Large plant (annual: 75,000m^3)	4	4
Medium plant (annual: 50,000m^3)	7	7
Small plant (annual: 25,000m^3)	13	13
RMX plant divestitures for 15% VI ratio‡		
Large plant (annual: 75,000m^3)	7	7
Medium plant (annual: 50,000m^3)	10	10
Small plant (annual: 25,000m^3)	20	20

Source: Appendix 7.2 of the provisional findings for cement production capacity figures.

*The VI ratio is calculated the percentage of a purchaser's total cement production accounted for by its own internal cementitious requirement, ie by its own downstream operations that require cement as an input into their production activities.
†Based on a rule of thumb whereby 1 kt of cement is needed to make 3,333m^3 of RMX.
‡What constitutes a small, medium and large RMX plant was based loosely on Appendix 9.1, Table 1, of the provisional findings.
§ Figures are used for illustrative purposes only.

4. Based on our estimates in Table 1 above, given the similarity in the cement production capacity of the Cauldon and Tunstead plants, the results of our estimates were the same for each. We assumed for simplicity that both plants have total cement production capacity of exactly 1,000 kt or 1 Mt. We estimated that either seven 'large-scale' or 20 'small-scale' RMX plants might need to be divested, if a purchaser of either the Cauldon or the Tunstead plant were to acquire RMX plants up to its permitted upper limit (ie internal cementitious requirement of up to 15 per cent of acquired cement production capacity). To put these figures into context, we note that as at 30 June 2013, Lafarge Tarmac operated 84 active RMX plants, 11 mothballed plants and seven dormant or closed plants, which brings the total to 102 plants.

Impact of divestiture on market structure

Introduction

1. In this annex, we examine the impact on current capacity and market shares of a single plant divestiture involving either the Cauldon or the Tunstead plant.

2. For the purposes of our analysis, our definition of 'current capacity' was the active cement production capacity of all the GB cement producers. We then looked at the impact on current capacity shares of either a divestiture of the Cauldon or the Tunstead plant under different definitions of 'post-divestiture capacity', ie the capacity shares resulting from the implementation of a single cement plant divestiture. We considered the following definition scenarios of post-divestiture capacity:
   (a) *Base scenario:* where we defined 'post-divestiture capacity' as active production capacity only.
   (b) *Mothballed scenario:* where we defined 'post-divestiture capacity' as active and mothballed production capacity only.
   (c) *Permitted (K2) scenario:* where we defined 'post-divestiture capacity' as active, mothballed, and the permitted capacity at the Tunstead plant only (ie excluding the Medway planning permission). Whilst we have taken the Tunstead plant's planning permission into account here, we have largely disregarded or discounted Lafarge Tarmac's consented development of a new cement plant at Medway.

3. We then conducted a separate assessment of how market shares, ie shares of GB cement sales (including sales by cement importers), might be affected by a divestiture of either the Cauldon or the Tunstead plant.

Our assessment of the impact of divestiture on capacity shares

4. We have been careful not to rely too heavily on getting the exact figure for production capacity. As acknowledged in our provisional findings, there is no single measure of total capacity to produce cement.[6] We considered that variations in how cement production capacity was defined and measured would not be material and not undermine our analysis which does not rely on exact calculations of production capacity shares.

5. In Table 1, we set out the clinker and cement production capacity of each GB cement plant.

TABLE 1 **GB clinker and cement production capacity**

kt

	*Active clinker capacity**	*Mothballed clinker capacity**	*Total clinker capacity**	*FY11 active cement capacity†*
Lafarge Tarmac				
Aberthaw plant	[✂]	[✂]	[✂]	[✂]
Cauldon plant	[✂]	[✂]	[✂]	[✂]
Dunbar plant	[✂]	[✂]	[✂]	[✂]
Tunstead plant	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]
Hanson				
Ketton plant	[✂]	[✂]	[✂]	[✂]
Padeswood plant	[✂]	[✂]	[✂]	[✂]
Ribblesdale plant	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]
Cemex‡				
Rugby plant	[✂]	[✂]	[✂]	[✂]
South Ferriby plant	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]
HCM				
Hope plant	[✂]	[✂]	[✂]	[✂]
GB	[✂]	[✂]	[✂]	[✂]

Source: Top 3 cement producers and Appendix 7.2 of the provisional findings.

*The sum of active and mothballed clinker production capacity equals total clinker production capacity. Since the clinker production capacity figures can vary slightly from year to year, depending on the underlying assumptions used to calculate them, eg Hanson's Reliability Coefficient, we adopted the maximum capacity achieved by the cement plant during the period FY10 to FY12.
†FY11 active cement production capacity figures are based on Appendix 7.2 of the provisional findings.
‡[✂]
Note: N/A = not applicable for 'mothballed clinker capacity' and not available for 'FY11 active cement capacity'.

6. Based on Table 1 above, we show each cement plant's clinker and cement production capacity shares in Table 2 below. We note that clinker and cement production capacity shares are broadly in line with each other for Lafarge Tarmac

[6] Appendix 7.2, paragraph 2, of the provisional findings.

and HCM. The differences between clinker and cement capacity shares largely affect Hanson's and Cemex's relative shares. However, we did not find this to affect our analysis.

TABLE 2 **GB clinker and cement production capacity shares**

per cent

	*Active clinker capacity share**	*Total clinker capacity share**	*FY11 active cement capacity share†*
Lafarge Tarmac			
Aberthaw plant	[✂]	[✂]	[✂]
Cauldon plant	[✂]	[✂]	[✂]
Dunbar plant	[✂]	[✂]	[✂]
Tunstead plant	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]
Hanson			
Ketton plant	[✂]	[✂]	[✂]
Padeswood plant	[✂]	[✂]	[✂]
Ribblesdale plant	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]
Cemex			
Rugby plant	[✂]	[✂]	[✂]
South Ferriby plant	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]
HCM			
Hope plant	[✂]	[✂]	[✂]
GB	[✂]	[✂]	[✂]

Source: Top 3 cement producers and Appendix 7.2 of the provisional findings.

*The sum of active and mothballed clinker production capacity equals total clinker production capacity. Since the clinker production capacity figures can vary slightly from year to year, depending on the underlying assumptions used to calculate them, eg Hanson's Reliability Coefficient, we adopted the maximum capacity achieved by the cement plant during the period FY10 to FY12.
†FY11 active cement production capacity figures are based on Appendix 7.2 of the provisional findings.
‡Cemex's cement production capacity excludes the grinding capacity of its Tilbury grinding station.
Note: N/A = not applicable.

7. Table 3 shows the impact of a divestiture of either the Cauldon plant or Tunstead plant on clinker capacity shares under the three different scenarios.

TABLE 3 **Impact of a divestiture of either the Cauldon or the Tunstead plant on 'post-divestiture' capacity shares**

kt

	Current Active clinker	*Base Active clinker*	*Mothballed Active plus mothballed*	*Permitted (K2) Active plus moth-balled plus K2*
Divestiture of the Cauldon plant				
Lafarge Tarmac	[✂]	[✂]	[✂]	[✂]
Hanson	[✂]	[✂]	[✂]	[✂]
Cemex	[✂]	[✂]	[✂]	[✂]
HCM	[✂]	[✂]	[✂]	[✂]
New entrant	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]
	Current Active clinker*	*Base† Active clinker*	*Mothballed‡ Active plus mothballed*	*Permitted (K2)§ Active plus moth-balled plus K2*
Divestiture of the Tunstead plant				
After divestiture of Tunstead plant				
Lafarge Tarmac	[✂]	[✂]	[✂]	[✂]
Hanson	[✂]	[✂]	[✂]	[✂]
Cemex	[✂]	[✂]	[✂]	[✂]
HCM	[✂]	[✂]	[✂]	[✂]
New entrant	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]

Source: Top 3 cement producers

*Base scenario: where we define 'post-divestiture capacity' as active production capacity only.
†Mothballed scenario: where we defined 'post-divestiture capacity' as active and mothballed production capacity only.
‡Permitted (K2) scenario: where we defined 'post-divestiture capacity' as active, mothballed, and the permitted capacity at the Tunstead plant only (ie excluding the Medway planning permission).

8. We illustrate the above graphically in the following charts.

FIGURE 1

Impact of divestiture on clinker capacity shares

[✂]

Source: Top 3 cement producers.
Note: We considered the following 'post-divestiture' capacity scenarios: *(a)* Base scenario: where we define 'post-divestiture capacity' as active production capacity only; *(b)* Mothballed scenario: where we defined 'post-divestiture capacity' as active and mothballed production capacity only; and *(c)* Permitted (K2) scenario: where we defined 'post-divestiture capacity' as active, mothballed, and the permitted capacity at the Tunstead plant only (ie excluding the Medway planning permission).

9. Table 4 shows the impact of a divestiture of either the Cauldon or Tunstead plant on the relative sizes of the coordinating group and the group of non-coordinating GB cement producers based on clinker capacity shares (ie excluding cement importers) under the three different definitions of 'post-divestiture' capacity.

TABLE 4 **Impact of divestiture on relative clinker capacity of the coordinating group and the group of non-coordinating GB cement producers**

per cent

	Current	*Base**	*Mothballed*†	*Permitted (K2)*‡
Cauldon plant divestiture				
Coordinating group	[80–90	[70–80]	[70–80]	[70–80]
Non-coordinating GB cement producers	[10–20	[20–30]	[20–30]	[20–30]
Tunstead plant divestiture				
Coordinating group	[80–90]	[70–80]	[70–80]	[70–80]
Non-coordinating GB cement producers	[10–20]	[20–30]	[20–30]	[20–30]

Source: Top 3 cement producers and Appendix 7.2 of the provisional findings.

*Base scenario: where we define 'post-divestiture capacity' as active production capacity only.
†Mothballed scenario: where we defined 'post-divestiture capacity' as active and mothballed production capacity only.
‡Permitted (K2) scenario: where we defined 'post-divestiture capacity' as active, mothballed, and the permitted capacity at the Tunstead plant only (ie excluding the Medway planning permission).

Impact of divestiture on market shares

10. We conducted a separate assessment to look at the impact of a divestiture of either the Cauldon or the Tunstead plant on market shares. This was based on MPA data which showed that FY12 GB cement sales volumes were 8.9 Mt in total, of which 7.7 Mt were sales made by the GB cement producers and 1.2 Mt were by importers without a GB cement plant (including Aggregate Industries). With HCM and a new entrant having cement production volumes of around [✂] and [✂] respectively, and combined with imported cement sales of 1.2 Mt, this gives a total potential sales volumes figure of [3–4] Mt, or [35–45] per cent combined market share (out of a total of 8.9 Mt). This compares with a current situation, ie without a new entrant, of [25–35] per cent, ie HCM ([✂]) and cement importers (1.2 Mt).

Illustrative customer-specific price announcement letter

To: [Insert contact name, company name and address]

Date:

Re: [Insert customer account number] — notice of price changes effective from [date]

Dear [customer name],

We write to inform you [insert reason for the correspondence and price change where relevant].

We set out below in Table 1 a list of the cementitious products affected by this price change and which you have purchased from us in the last [insert months since last price change]. We note the price at which we supplied these products to you previously and the new price which will take effect from [insert date].

[Where relevant] We also wish to inform you that [insert reason for a change in fuel surcharge].

We also include in Table 1, the old fuel surcharge paid by you and the new surcharge that will be applied by us from [insert date]. You will find at Annex [to be prepared by cement supplier] our methodology and calculations for this change in fuel surcharge.

TABLE 1 **Price changes taking effect from [insert date]**

Cementitious product name	Old price to customer	New price to customer	Old fuel surcharge to customer	New fuel surcharge to customer

We have also made changes to our other products in our portfolio and can send you a price specific to you, your demand and location upon request.

[salutation]

Supporting analysis to GGBS and GBS remedies

The ability of the GB cement producers to produce GGBS

Introduction

1. This annex examines the ability of the GB cement producers to grind clinker at their existing cement plants. We treated clinker grinding capability as one possible indication for GBS grinding capacity to produce GGBS, although we note that a clinker grinding mill would require investment to modify it to enable it to grind GBS into GGBS.

2. We asked the GB cement producers to provide details of their ability to grind GBS into GGBS using their existing clinker grinding mills based on two possible options, either: *(a)* the use of a clinker grinding mill to grind both GBS and clinker simultaneously, ie co-grinding or inter-grinding; or *(b)* the dedicated use of a clinker grinding mill to produce GGBS. We also asked each GB cement producer to provide details of their available clinker grinding capacity to understand the scope for any potential GBS grinding capacity within the GB cement producers' existing clinker grinding mills.

Lafarge Tarmac: ability to grind GBS to GGBS

3. Table 1 below shows Lafarge Tarmac's current availability of clinker grinding capacity and its ability to either co-grind or use an existing clinker grinding mill as a dedicated GBS grinding mill, ie similar to a GGBS plant.

TABLE 1 **Lafarge Tarmac: ability to grind clinker into cement (figures for FY12 or as at 31 December 2012)**

	Aberthaw plant	*Cauldon plant*	*Dunbar plant*	*Tunstead plant*
Number of active grinding mills	[✂]	[✂]	[✂]	[✂]
Number of mothballed grinding mills	[✂]	[✂]	[✂]	[✂]
Daily grinding capacity (active) (kt)*	[✂]	[✂]	[✂]	[✂]
Daily grinding capacity (active/mothballed) (kt)†	[✂]	[✂]	[✂]	[✂]
Annual grinding capacity (active) (kt)‡	[✂]	[✂]	[✂]	[✂]
Annual grinding capacity (active/mothballed) (kt)§	[✂]	[✂]	[✂]	[✂]
Clinker ground during FY12 (kt)¶	[✂]	[✂]	[✂]	[✂]
Cement ground during FY12 (kt)§	[✂]	[✂]	[✂]	[✂]
Active grinding capacity utilization (%)#	[✂]	[✂]	[✂]	[✂]
Current ability to co-grind clinker and GBS?	[✂]	[✂]	[✂]	[✂]
Current ability to use existing mill as a GGBS plant	[✂]	[✂]	[✂]	[✂]

Source: Lafarge Tarmac's response to co-grinding questions.

*Grinding capacity per day based on active grinding mills (kt). Lafarge Tarmac calculated this as annual grinding capacity divided by 365 days.
†Grinding capacity per day based on active + mothballed grinding mills (kt). Lafarge Tarmac calculated this as annual grinding capacity divided by 365 days.
‡Grinding capacity per year based on active grinding mills (kt). Lafarge Tarmac's annual grinding capacity was based on average cement output from the mills based on 2012 average cement (tonnes per hour) x [✂] utilization factor.
§Grinding capacity per year based on active and mothballed grinding mills (kt). Lafarge Tarmac's annual grinding capacity was based on average cement output from the mills based on 2012 average cement (tonnes per hour) x [✂] utilization factor.
¶Clinker actually ground in active mills during FY12 (kt).
#Active grinding capacity utilized in FY12 (% of grinding capacity per year based on active grinding mills).
§Lafarge Tarmac told us that cement had other constituents besides clinker which were also added to the mills such that grinding capacity utilization should be based on all mill inputs including clinker, gypsum, additives (eg PFA and limestone) and ferrous sulphate as required in the make-up of the cement produced on the mills.
Note: Figures are based on FY12 or as at 31 December 2012.

4. Lafarge Tarmac told us that its clinker grinding mills were not set up for co-grinding, and therefore, as a minimum, investment requirements included storage for inbound GBS, feed system for GBS to the mill and storage for the resulting finished 'slag blend cement'. It added that in relation to the investment required to modify one of its existing clinker grinding mills to enable co-grinding, it estimated that investment of between £[✂] and £[✂] million would be required for each clinker grinding mill, and that it would take between [✂] and [✂] months to complete. However, given that GBS had a moisture content of around 10 per cent, Lafarge Tarmac told us that this would limit the amount of GBS that could be added to its ball grinding mill to a rate of 10 to 15 per cent due to 'flow issues'. Therefore, in order to increase this beyond 10 to 15 per cent, it would also need to invest in a drying system for the GBS.

5. Based on Lafarge Tarmac's high-level estimate, including the cost of the GBS drying system, the total investment could be between £[✂] and [✂] million which was the level of investment required if it intended to convert a spare clinker grinding mill into a dedicated GGBS plant.

Hanson: ability to grind GBS to GGBS

6. Table 2 below shows Hanson's current availability of clinker grinding capacity and its ability to either co-grind or use an existing clinker grinding mill as a dedicated GBS grinding mill, ie similar to a GGBS plant. We note that Hanson already has GGBS plants for this purpose.

TABLE 2 **Hanson: ability to grind clinker into cement (figures for FY12 or as at 31 December 2012)**

	Ketton plant	*Padeswood plant*	*Ribblesdale plant*
Number of active grinding mills	[✂]	[✂]	[✂]
Number of mothballed grinding mills	[✂]	[✂]	[✂]
Daily grinding capacity (active) (kt)*	[✂]	[✂]	[✂]
Daily grinding capacity (active/mothballed) (kt)†	[✂]	[✂]	[✂]
Annual grinding capacity (active) (kt)‡	[✂]	[✂]	[✂]
Annual grinding capacity (active/mothballed) (kt)§	[✂]	[✂]	[✂]
Clinker ground during FY12 (kt)¶	[✂]	[✂]	[✂]
Active grinding capacity utilization (%)#	[✂]	[✂]	[✂]
Current ability to co-grind clinker and GBS?	[✂]	[✂]	[✂]
Current ability to use existing mill as a GGBS plant	[✂]	[✂]	[✂]

Source: Hanson's response to co-grinding questions.

*Grinding capacity per day based on active grinding mills (kt). Hanson calculated this as annual grinding capacity divided by 366 days.
†Grinding capacity per day based on active + mothballed grinding mills (kt). Hanson calculated this as annual grinding capacity divided by 366 days.
‡Grinding capacity per year based on active grinding mills (kt). Hanson based its annual grinding capacity based on its ultimate parent company's (HeidelbergCement AG) capacity model, using the formula: grinding mill output (tonnes per day) x Reliability Coefficient x (366 days less planned maintenance downtime).
§Grinding capacity per year based on active and mothballed grinding mills (kt).
¶Clinker actually ground in active mills during FY12 (kt).
#Active grinding capacity utilized in FY12 (% of grinding capacity per year based on active grinding mills).
Note: Figures are based on FY12 or as at 31 December 2012. We note that Hanson already has GGBS plants for the purpose of dedicated GBS grinding to produce GGBS.

7. Hanson told us that whilst its Padeswood plant had two 'very small' grinding mills that were mothballed, these had been disconnected from the silos and it therefore considered that it was unlikely they would ever be run in the future. It also added that the current level of spare capacity only existed 'by virtue of the reduction in demand

for RMX', and that it would 'require this capacity if the RMX market increased in the future and as such it would cease to be spare'.

8. Hanson told us that a clinker grinding mill in its current form could not grind GBS and produce GGBS, although with modifications and significant investments it could hypothetically incorporate the drying process required for GGBS. Whilst co-grinding to produce a higher quality output was possible, it told us that there were commercial considerations that made this considerably less attractive, eg the grinding process could be amended to grind both GBS and GGBS, but the requirements for the storage of GBS and clinker were different. It added that grinding of GBS did not necessarily have to be adjacent to a steelworks.[1]

9. However, Hanson told us that the costs and complexity of these modifications would vary between each site and individual grinding mill, depending on the civil structure, location, feed hoppers, process to extract from the mill, storage silos and transportation methods. It estimated, however, that any modification would take at least [✂] months, but this could increase if planning permission would be required or unforeseen complications arose.

Cemex: ability to grind GBS to GGBS

10. Table 3 below shows Cemex's current availability of clinker grinding capacity and its ability to either co-grind or use an existing clinker grinding mill as a dedicated GBS grinding mill, ie similar to a GGBS plant.

[1] Paragraph 34 of summary of GGBS response hearing with Hanson.

TABLE 3 **Cemex: ability to grind clinker into cement (figures for FY12 or as at 31 December 2012)**

	Rugby plant	*South Ferriby plant*	*Tilbury grinding station*
Number of active grinding mills	[✂]	[✂]	[✂]
Number of mothballed grinding mills	[✂]	[✂]	[✂]
Daily grinding capacity (active) (kt)*	[✂]	[✂]	[✂]
Daily grinding capacity (active/mothballed) (kt)†	[✂]	[✂]	[✂]
Annual grinding capacity (active) (kt)‡	[✂]	[✂]	[✂]
Annual grinding capacity (active/mothballed) (kt)§	[✂]	[✂]	[✂]
Cement produced during FY12 (kt)¶	[✂]	[✂]	[✂]
Active cement capacity utilization (%)#	[✂]	[✂]	[✂]
Current ability to co-grind clinker and GBS?	[✂]	[✂]	[✂]
Current ability to use existing mill as a GGBS plant	[✂]	[✂]	[✂]

Source: Cemex's response to co-grinding questions.

*Grinding capacity per day based on active grinding mills (kt).
†Grinding capacity per day based on active + mothballed grinding mills (kt).
‡Grinding capacity per year based on active grinding mills (kt).
§Grinding capacity per year based on active and mothballed grinding mills (kt).
¶Whilst we requested figures for the clinker ground during FY12, Cemex was only able to provide cement production figures.
#[✂]
Note: Figures are based on FY12 or as at 31 December 2012.

11. Cemex told us that only its Tilbury grinding station might be converted: *(a)* to enable co-grinding; or *(b)* to a dedicated GBS grinding plant. It estimated that this investment could be around £[✂] million, but highlighted that it had not considered this possibility before, and therefore this was a highly approximated figure.

HCM: ability to grind GBS to GGBS

12. Table 4 below shows HCM's current availability of clinker grinding capacity and its ability to either co-grind or use an existing clinker grinding mill as a dedicated GBS grinding mill, ie similar to a GGBS plant.

TABLE 4 **HCM: ability to grind clinker into cement (figures to 31 July 2013 or as at 31 July 2013)**

	Hope plant
Number of active grinding mills	[✂]
Number of mothballed grinding mills	[✂]
Daily grinding capacity (active) (kt)*	[✂]
Daily grinding capacity (active/mothballed) (kt)†	[✂]
Annual grinding capacity (active) (kt)‡	[✂]
Annual grinding capacity (active/mothballed) (kt)§	[✂]
Clinker ground during H1 FY13 (kt)¶	[✂]
Active grinding capacity utilization (%)#	[✂]
Ability to co-grind clinker and GBS?	[✂]
Current ability to use existing mill as a GGBS plant	[✂]

Source: HCM's response to co-grinding questions.

*Grinding capacity per day based on active grinding mills (kt).
†Grinding capacity per day based on active + mothballed grinding mills (kt).
‡Grinding capacity per year based on active grinding mills (kt).
§Grinding capacity per year based on active and mothballed grinding mills (kt).
¶Clinker actually ground in active mills during first six months of FY13 (kt).
#Active grinding capacity utilized during first six months of FY13 (% of grinding capacity based on active grinding mills).
Note: Figures are to 31 July 2013 or as at 31 July 2013.

Composition of the GBS customer base

Introduction

1. This annex examines the possible composition of the customer base for GBS.

Composition of the GBS customer base

2. Absent the exclusive GBS agreements and any divestiture of GGBS plants, we considered which firms could be potential buyers of GBS. Given that GBS can be considered an intermediate product, we considered it reasonable that the demand for GBS would predominantly come from firms that had the capability to grind the GBS into GGBS, with very few exceptions (eg Calumite Slag). The four GB cement producers all operate clinker grinding mills which they use to grind clinker into cement.

3. In relation to potential GBS customers, Lafarge Tarmac told us that there would be several 'target audiences', eg existing GB cement producers could grind GBS themselves, or in the case of Hanson, using its GGBS plants. Alternatively, it considered that independent investors could buy grinding plants to produce GGBS. It added that this was a business model which already existed in other countries such as France and the Republic of Ireland, and this had been the business model of Civil and Marine.[2]

4. In Annex A, we found that the GB cement producers would have the ability to modify their existing clinker grinding mills to grind GBS into GGBS. We assess their incentives to do so in Annex D. If we assumed that the GB cement producers were incentivized to make modifications to their existing clinker grinding mills to either

[2] Lafarge Tarmac response hearing summary, paragraph 32.

grind GBS on its own or co-grind, we estimated the amount of GBS that each might purchase. We based our estimate on Hanson's GGBS customers in FY11, which we used as a proxy for Lafarge Tarmac's GBS customers (see Table 1 below).

TABLE 1 **Estimate of Lafarge Tarmac's potential GBS customer absent the exclusive GBS agreements**

	% of Hanson's GGBS sales	*Lafarge Tarmac customers* (%)*
Hanson†	[✂]	[✂]
Cemex	[✂]	[✂]
Lafarge	[✂]	[✂]
Tarmac	[✂]	[✂]
Aggregate Industries	[✂]	[✂]
Independent	[✂]	[✂]
Total	100	100

Source: Provisional findings, Appendix 7.6, Table 4.

*This represents our estimate of Lafarge Tarmac's potential GBS customers based on the assumption that only the GB cement producers would be able to grind the GBS into GGBS.
†In FY11, Hanson sold [✂] Mt of GGBS in GB.

5. We would note that our analysis only represents an estimate and does not take into account the RMX plant divestitures required by Lafarge and Tarmac as part of the remedies process for completing their Lafarge Tarmac JV, and the possibility that Hanson may choose to import GBS instead of buying GBS from Lafarge Tarmac. However, based on the data we had available, we considered our assumptions to be reasonable.

6. Based on Table 1 above, Hanson sold [✂] Mt of GGBS during FY11, of which the four GB cement producers at the time, namely Lafarge, Tarmac, Hanson and Cemex accounted for around [✂] per cent of total sales volumes, with Aggregate Industries and independent customers accounting for the remaining [✂] per cent. Since only the GB cement producers would have the plant and equipment (subject to modifications) to grind GBS into GGBS, we excluded Aggregate Industries and the independent customers to determine the potential customer base for GBS.

7. Since Lafarge and Tarmac now form part of the same JV entity, one possible view of Lafarge Tarmac's potential GBS customers is that [✂] per cent of Lafarge Tarmac's GBS customers would be the current Top 3 cement producers that form the coordinating group in the GB cement markets. We also note the high proportion of GGBS purchased by Tarmac during FY11 at [✂] per cent, just behind Hanson at [✂] per cent. Therefore Lafarge Tarmac and Hanson have the potential to represent the vast majority of Lafarge Tarmac's GBS sales (absent the GBS agreements).

The competitive constraint from imported GBS

Introduction

1. This annex examines whether absent the GBS agreements, and Lafarge Tarmac remains the sole producer of GBS in GB, whether its ability and incentive to restrict GBS volumes and set higher prices, would be constrained by imported GBS.

Our assessment of the competitive constraint from imported GBS

2. We considered whether imported GBS posed a competitive constraint on Lafarge Tarmac's domestically produced GBS.

3. Hanson told us that it recently imported around [✂] of GBS from ArcelorMittal Ghent (Mittal Ghent) which was Mittal's steel producer in Belgium, and part of ArcelorMittal SA (ArcelorMittal), and that this was a better quality product than the GBS it purchased from Lafarge Tarmac. It told us that historically it had imported in excess of 100 kt from Mittal Ghent. It added that this allowed for a saving in costs due to decreased grinding time and therefore saved energy costs. Hanson noted that the exclusive agreement with Lafarge Tarmac put a limit on the level of GBS it could purchase from other sources (unless Lafarge Tarmac was unable to provide suitable material in which case there were no limits) which Hanson considered was natural given the requirement of the steel industry for a GGBS supplier to commit to a GBS offtake.[1] Lafarge Tarmac confirmed that under the GBS agreements, Hanson could source up to 200 kt of GBS from third parties (for processing at its Purfleet GGBS plant) and could also source GBS from third parties where Lafarge Tarmac could not supply sufficient GBS of such quality to meet its requirements.

[1] Summary of GGBS response hearing with Hanson, paragraph 16.

4. Hanson told us that Mittal Ghent had been part of the ArcelorMittal group since 2006, and argued that since ArcelorMittal had been exporting its own GBS into GB for many years in the context of its GBS sales to Hanson, ArcelorMittal was clearly already a long-established exporter of GBS to GB, and therefore would be certain to consider GBS and/or GGBS exports to GB for HCM's use at some stage. It also told us that whilst HCM was not importing any GGBS, ArcelorMittal had unlimited access to GBS and also to GGBS within continental Europe which would affect the market dynamic.[2]

5. During FY12, Hanson purchased [✂] of GBS from Tarmac (now Lafarge Tarmac), and [✂] from Mittal Ghent. Table 1 below shows the ex-works and delivered prices of GBS to Hanson's Purfleet GGBS plant.

TABLE 1 **Landed GBS prices (FY12) at Hanson's Purfleet GGBS plant***

				£/t
From (location)	*To (location)*	*Dry tonnes*	*Shipping cost (wet basis)*	*Total landed price*
Port Talbot GBS plant*	Purfleet GGBS plant	[✂]	[✂]	[✂]
Mittal Ghent (Belgium)	Purfleet GGBS plant	[✂]	[✂]	[✂]
Teesside GBS plant†	Purfleet GGBS plant	[✂]	[✂]	[✂]

Source: Hanson's response to GGBS questions.

*GBS from Lafarge Tarmac's Port Talbot GBS plant is sent to both Hanson's Port Talbot and Purfleet GGBS plants.
†The Teesside GBS plant is not located near an active GGBS plant and therefore ships its GBS to Hanson's Purfleet GGBS plant.
Note: The Purfleet GGBS plant is not located near a GBS plant and therefore it sources its GBS from Lafarge Tarmac's Port Talbot and Teesside GBS plants, as well as from Mittal Ghent.

6. Based on Table 1 above, the FY12 ex-works price for GBS produced at Lafarge Tarmac's Port Talbot and Teesside GBS plants was £[✂] per tonne. This compares with an ex-works price for GBS from Mittal Ghent of £[✂]. Including shipping costs, the landed price of GBS from Lafarge Tarmac's GBS operations was £[✂] from the Port Talbot GBS plant, and £[✂] from the Teesside GBS plant. This compares with a landed price from Mittal Ghent of £[✂].

[2] Summary of GGBS response hearing with Hanson, paragraph 17.

7. Hanson argued that these figures showed that imports of GBS could be cheaper than domestically produced GBS (when shipping costs are taken into account). It added that shipping costs from Belgium to Purfleet were [✂]. It added that by the same reasoning, where a suitable supply source could be found, it would also expect imports of GGBS to be cheaper in the same manner.

8. However, we considered that the figures in Table 1 above only demonstrate that during FY12, Hanson's Purfleet GGBS plant was able to source GBS cheaper from imports than from Lafarge Tarmac. We note that the Purfleet GGBS plant is Hanson's only active GGBS plant that is not located close to a GBS plant, and considered that its Port Talbot and Teesport GGBS plants which are located at, or close to, the Port Talbot steelworks and the Teesside steelworks respectively would not suffer the same shipping cost penalties that are faced by its Purfleet GGBS plant.

9. Table 2 below shows the ex-works prices (ie excluding any distribution or shipping costs) of GBS for all of Hanson's GGBS plants, based on Hanson's data.

TABLE 2 **Ex-works GBS prices paid by Hanson's GGBS plants, FY07 to FY12**

£

GGBS plant	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
Port Talbot*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Purfleet	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Scunthorpe*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Llanwern†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Teesport†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Hanson's response to GGBS questions.

*The Port Talbot GGBS plant sources all of its GBS from the Port Talbot GBS plant, and the Scunthorpe GGBS plant sources all of its GBS from the Scunthorpe GBS plant.
†Both the Llanwern and Teesport GGBS plants are currently mothballed.

10. Based on Table 2 above, we note that the Port Talbot GGBS plant sources all of its GBS from the Port Talbot GBS plant, and the Scunthorpe GGBS plant sources all of its GBS from the Scunthorpe GBS plant. Given the proximity of Hanson's Port Talbot and Scunthorpe GGBS plants to their respective sources of GBS, ie the Port Talbot

and Scunthorpe GBS plants, the ex-works prices of GBS for these two GGBS plants largely represent their respective delivered prices, ie around £[✂] for the Port Talbot GGBS plant and around £[✂] for the Scunthorpe GGBS plant. We confirmed this with Lafarge Tarmac's data, where in Table 3 below, we show that the unit gross revenue (a reasonable proxy for the average delivered price) of GBS sold by the Port Talbot and Scunthorpe GBS plants based on Lafarge Tarmac's data was also around £[✂] per tonne and £[✂] per tonne respectively, which were in line with their respective ex-works prices shown in Table 2 above.

TABLE 3 **Lafarge Tarmac: Port Talbot and Scunthorpe GBS plants: unit gross revenue for GBS**

£/t

	Port Talbot GBS plant			*Scunthorpe GBS plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*
*Unit gross revenues**						
Hanson (for GGBS)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂]†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other (not for GGBS)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total sales	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Lafarge Tarmac's response to GGBS questions.

*Unit gross revenue is calculated by dividing the relevant gross revenue figure by total sales volume. We treat unit gross revenue as a proxy for the average delivered price for GBS.
†[✂] is Lafarge Tarmac's only other GGBS customer.
Note: N/A = not applicable.

11. Since we understand that other than the Purfleet GGBS plant, Hanson's other two GGBS plants do not import any GBS, we therefore did not have any data showing landed prices of GBS imports at, or near, the Port Talbot or Scunthorpe GGBS plants. We therefore used Mittal Ghent's ex-works price of GBS to Hanson's Purfleet GGBS plant as a reasonable estimate for the competitive ex-works price that another potential GBS exporter might be able to offer Hanson's Port Talbot or Scunthorpe GGBS plants. Based on Table 2 above, the ex-works price per tonne was £[✂] for GBS from Mittal Ghent, and in relation to GBS from Lafarge Tarmac, £[✂] for the Port Talbot GGBS plant and £[✂] for the Scunthorpe GGBS plant. As mentioned above, given the proximity of the Port Talbot and Scunthorpe GGBS plants to their respective local sources of GBS, we would expect their ex-works prices for GBS to

be broadly similar with their respective delivered prices. Therefore, in order for imported GBS to be the same price as the local GBS price (in landed price terms), the shipping costs for the GBS exporter cannot exceed £[✂] per tonne to the Port Talbot GGBS plant, and £[✂] per tonne to the Scunthorpe GGBS plant. Since shipping costs (as shown in Table 2 above) were £[✂] per tonne from Port Talbot to Purfleet, £[✂] from Belgium to Purfleet, and £[✂] from Teesside to Purfleet, we concluded that there would be a very significant cost disadvantage faced by GBS imports to the Port Talbot and Scunthorpe GGBS plants.

12. We note that should the GB cement producers decide to use their existing cement plants to grind GBS into GGBS, then they may be able to import GBS on different terms. Our consideration of whether the GB cement producers would be incentivized to grind GBS at their cement plants is set out in Annex D.

13. We also found Hanson's argument that GBS could be imported more cheaply than domestically produced GBS difficult to reconcile with its argument that its exclusive GBS agreements with Lafarge Tarmac were essential. We would argue that the cessation of its GBS agreements would remove the cap on how much GBS Hanson could import, thereby enabling Hanson to take advantage of what it considers to be cheaper and higher quality GBS than what it currently sources from Lafarge Tarmac.

14. Therefore, based on our assessment, we did not find any evidence to suggest that the Port Talbot and Scunthorpe GGBS plants would be able to source cheaper imported GBS compared with local sources. Instead, given the proximity of the Port Talbot and Scunthorpe GGBS plants to their respective sources of GBS, we concluded that imported GBS would face a significant shipping penalty compared with domestically produced GBS for these two GGBS plants.

The incentive of GB cement producers to co-grind GBS and clinker

Introduction

1. This annex contains details concerning the incentives of the GB cement producers to co-grind, ie grinding both clinker and GBS together to produce 'slag cement' or pre-blended cement.

Assessment of the incentive of GB cement producers to co-grind

2. In relation to determining whether a GB cement producer would have the incentive to co-grind, we considered the following factors:

   (a) the relative prices on CEM I and blended cement sales;

   (b) the downstream demand for pre-blended cement; and

   (c) the advantages and disadvantages of co-grinding.

Relative prices on CEM I and blended cement sales

3. Based on FY12 cement sales, Table 1 sets out the split of sales volumes and gross revenues between bulk CEM I cement, bulk blended cement and bagged cement for the GB cement producers for FY12, ie Lafarge, Hanson, Cemex and Tarmac.

TABLE 1 **FY12 cement sales volumes and gross revenues split by bulk (CEM I and blended) and bagged cement**

kt

Sales volumes	*Bulk CEM I cement*	*Bulk blended cement**	*Bagged cement*	*Total (FY12)*
Lafarge	[✂]	[✂]	[✂]	[✂]
% of total	[✂]	[✂]	[✂]	[✂]
Hanson	[✂]	[✂]	[✂]	[✂]
% of total	[✂]	[✂]	[✂]	[✂]
Cemex	[✂]	[✂]	[✂]	[✂]
% of total	[✂]	[✂]	[✂]	[✂]
Tarmac	[✂]	[✂]	[✂]	[✂]
% of total	[✂]	[✂]	[✂]	[✂]

£'000

Gross revenues†	*Bulk CEM I cement*	*Bulk blended cement**	*Bagged cement*	*Total (FY12)*
Lafarge	[✂]	[✂]	[✂]	[✂]
% of total	[✂]	[✂]	[✂]	[✂]
Hanson	[✂]	[✂]	[✂]	[✂]
% of total	[✂]	[✂]	[✂]	[✂]
Cemex	[✂]	[✂]	[✂]	[✂]
% of total	[✂]	[✂]	[✂]	[✂]
Tarmac	[✂]	[✂]	[✂]	[✂]
% of total	[✂]	[✂]	[✂]	[✂]

Source: Responses from the GB cement producers to the post provisional findings information request.

*Bulk blended cement means CEM II, III and IV.
†Gross revenues mean the sales revenues net of any rebates and discounts, but including delivery charges.

4. Based on Table 1 above, as a percentage of total cement sales volumes, sales of bulk blended cement were limited for all of the GB cement producers during FY12: [✂] per cent for Lafarge and [✂] per cent for Cemex at one end, and [✂] per cent for Hanson and Tarmac. The proportions accounted for by bulk blended cement were relatively similar for their respective gross revenues: [✂] per cent for Lafarge, [✂] per cent for Cemex, and [✂] per cent for each of Hanson and Tarmac.

5. In relation to its blended cement sales, Hanson told us that the proportion of its cement sales accounted for by cement pre-blended with GGBS was zero, although a 'negligible' and 'immaterial' amount was blended with Calumite and was sold to one customer for use in [✂], with annual volumes of less than [✂].

6. Table 2 below sets out the average gross revenue per tonne for bulk CEM I cement sales, bulk blended cement sales, and bagged cement sales for FY12.

TABLE 2 **FY12 average gross revenue per tonne for sales of bulk (CEM I and blended) and bagged cement**

£/t

*Unit gross revenue**	*Bulk CEM I cement*	*Bulk blended cement†*	*Bagged cement*	*Total (FY12)*
Lafarge	[✂]	[✂]	[✂]	[✂]
Hanson	[✂]	[✂]	[✂]	[✂]
Cemex	[✂]	[✂]	[✂]	[✂]
Tarmac	[✂]	[✂]	[✂]	[✂]

Source: Responses from the GB cement producers to the post-provisional-findings information request.

*Gross revenues mean the sales revenues net of any rebates and discounts, but including delivery charges.
†Bulk blended cement means CEM II, III and IV.

7. Based on Table 2 above, the average unit gross revenue for bulk blended cement was consistently lower than the unit gross revenue for bulk CEM I sales: Lafarge (£[✂] for bulk blended cement and £[✂] for bulk CEM I cement), Tarmac (£[✂] and £[✂]), Hanson (£[✂] and £[✂]) and Cemex (£[✂] and £[✂]). This suggests that pre-blended cement prices would likely be lower than CEM I, and it would be relatively less attractive for a GB cement producer to use its existing clinker grinding mill to produce pre-blended cement at the expense of CEM I cement production.

8. Based on our assessment, we considered it unlikely that co-grinding would represent a more profitable utilization of clinker grinding capacity compared with grinding only clinker.

Downstream demand for pre-blended cement or self-blending

9. Hanson told us that in the UK, GGBS was usually supplied as a separate component for concrete and was added at the concrete mixer. It added that on occasion specification standards or preferences could influence a customer's decision as to which product to purchase, eg GGBS or PFA. However, Hanson argued that due to the high level of substitutability between GGBS and PFA, this was not common, and that whilst it could not be sure why individual customers chose one product over the

other, it considered, based on its experience, that the cubic metre price of RMX and commercial relationships were 'influential'.[1]

10. However, Hanson told us that in continental Europe, GGBS and PFA were not sold as stand-alone materials to RMX producers, and that cement producers tended to blend GGBS into cement at the upstream level, and then sold the cement blend to RMX customers. It added that since RMX producers required various cement blend mixtures, cement producers would offer a variety of pre-fabricated cement blends. It told us that the 'GB model' provided a more flexible offering by allowing RMX producers to 'dose' their CEM I/GGBS/PFA requirements, and that the UK RMX industry operated on this basis, and had developed as such to demand the 'self-blend flexibility', which Hanson argued increased competition between cement producers.[2]

11. Lafarge Tarmac provided us with a report from CEMBUREAU published in 2010,[3] which provided an overview of blended cements used in the EU member states and other countries. Lafarge Tarmac told us that whilst GGBS and PFA were predominantly blended with cement at the downstream level in the UK, in contrast to some other European countries, it suggested that when benchmarking the level of clinker replacement in the UK with other European countries, there was scope for further clinker replacement in the UK, and that GGBS was key to driving further clinker replacement in GB since it could achieve higher clinker replacement than PFA or limestone.

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[1] Summary of GGBS response hearing with Hanson, paragraph 10.
[2] Hanson response to request concerning GGBS and PFA in other European countries (Section 1, p.2).
[3] CEMBUREAU, 'Cements for a low-carbon Europe' (published 2010).

12. We also noted the comments from some parties that expressed a preference for either PFA or GGBS, which suggests that pre-blended cement production may reduce product choice for customers:

(a) CPV told us that its cement blended particularly well with PFA, and that there were technical reasons why customers might choose to use PFA instead of GGBS.[4]

(b) Brett Group told us that it had bought GGBS since the 1980s and preferred it to PFA, eg GGBS worked better in its RMX plants given that PFA had different handling characteristics.[5]

13. We considered that there were considerable advantages to self-blending, given that varying the proportion of GGBS imparted different properties to the concrete, and both concrete producers and end-users of concrete may prefer to have the choice of varying this proportion themselves without this being predetermined by the cement supplier. The relatively low proportion of total bulk cement sales currently accounted for by blended cement suggests that this advantage is considerable (see Table 1 above).

14. There may also be considerable inertia in relation to the uptake of pre-blended cement both in relation to the GB cement producers opting to co-grind and in relation to changing industry practice among the downstream customers to choose pre-blended cement over self-blending. In our provisional findings, we stated that concrete produced through self-blending was 'effectively identical' to concrete made from blended cement.[6]

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[4] CPV response hearing summary, paragraph 27.
[5] Brett Group response hearing summary, paragraph 25.
[6] Provisional findings, paragraph 7.107.

15. Based on our assessment, we found it highly unlikely that demand for pre-blended cement (ie from co-grinding) in GB would increase significantly such that we would be sufficiently convinced that the GB cement producers would be highly incentivized to opt for co-grinding. In particular, we considered that there would not only be general inertia that would be associated with changing a widely accepted industry practice, but also, the loss of greater flexibility afforded by self-blending may result in customers being resistant to such changes.

Advantages and disadvantages of co-grinding

16. Lafarge Tarmac told us that one of the issues of co-grinding would be that GBS was inherently harder than clinker, and therefore co-grinding the GBS to a specific fineness necessitated that the clinker component was effectively over-ground, ie excess power consumption which increases with increasing levels of GBS. Therefore, Lafarge Tarmac told us that dedicated GBS grinding would be a more efficient and preferable process than co-grinding. It added that instead of co-grinding, once the GBS was ground into GGBS in a dedicated GBS grinding plant, it could then either be added to a clinker grinding mill together with other additions (eg gypsum), or blended with the cement at a blending station.

17. A similar argument was made by another source, where we noted that in the past most of the 'blast furnace slag cement' had been produced by grinding GBS and clinker together. However, according to this source, since GBS was harder to grind than clinker, co-grinding left the GGBS coarser than the cement, which was not considered desirable since the 'slow hydrating GGBS' should be finer than the cement. The source also stated that grinding the GBS separately from the clinker had

the advantage of permitting the GBS and clinker to be ground to their own optimum fineness.[7]

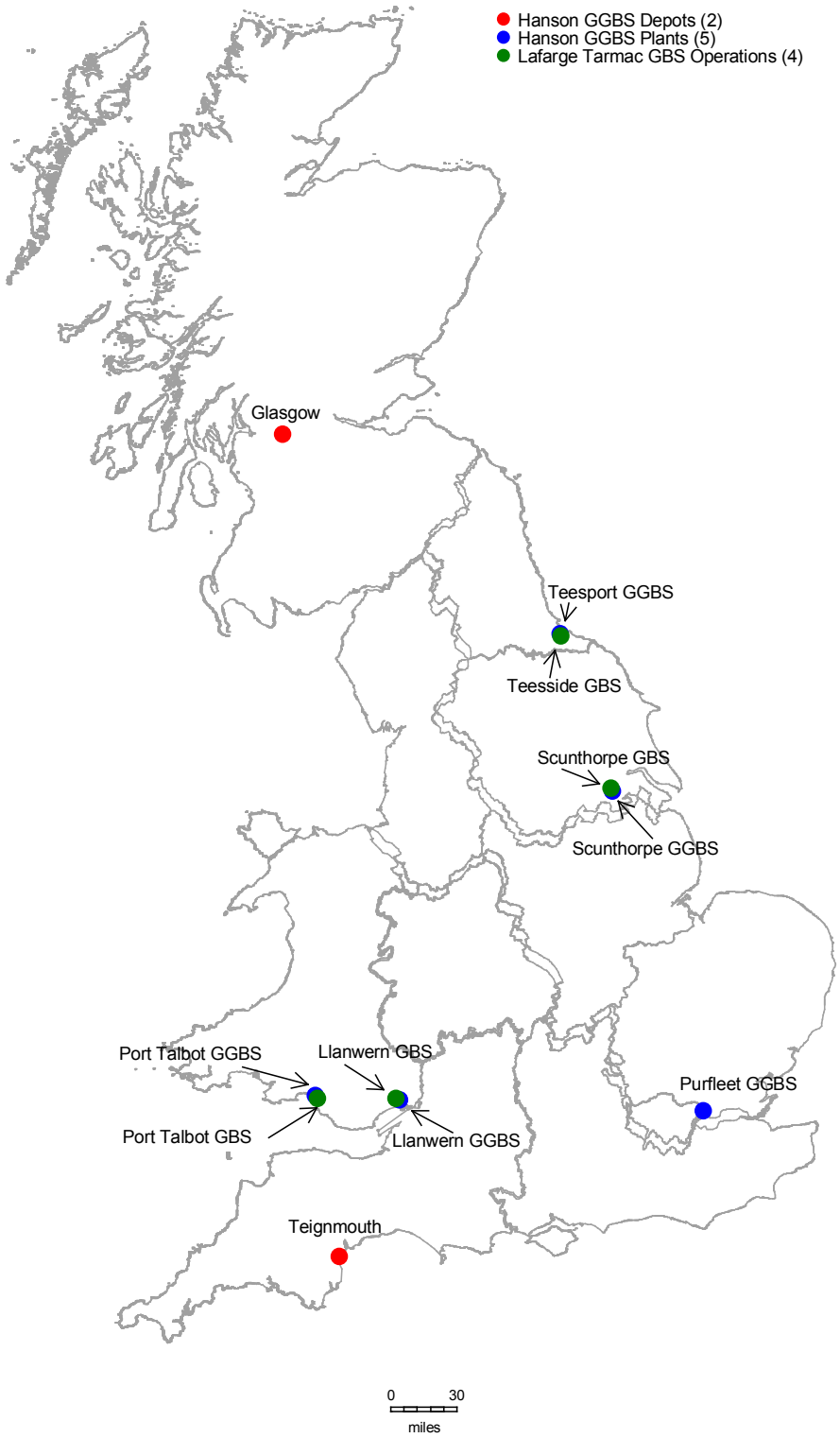
[7]Presentation on 'History of slag cements' (1981), p6.

GB map of GBS and GGBS site locations

1. Figure 1 below shows a map of the locations of each GBS plant, GGBS plant and GGBS depots.

FIGURE 1

Locations of GBS and GGBS sites in GB



Source: Lafarge Tarmac and Hanson.
Note: Hanson also owns a dormant depot in Belfast, which is not shown on this map. Lafarge Tarmac operates three active GBS plants at Port Talbot, Scunthorpe and Teesside, each of which is co-located at a steelworks. The Llanwern GBS plant was mothballed in 2002 when the Llanwern steelworks closed. Hanson operates three active GGBS plants, these are the Port Talbot, Purfleet and Scunthorpe GGBS plants; and two mothballed GGBS plants at Llanwern ([✂]) and Teesport, close to the Teesside GBS plant and Teesside steelworks. Hanson operates two depots in GB: Teignmouth and Glasgow.

Production capacity across the GGBS supply chain

Introduction

1. This annex sets out details of the production capacity of:

   (a) the GB steelworks in relation to BFS;

   (b) the GBS plants; and

   (c) the GGBS plants.

The steel producers' BFS production capacity

2. There are three integrated steelworks in operation in GB: the Port Talbot steelworks in South Wales, and the Scunthorpe steelworks in Lincolnshire, which are both owned by Tata; and the Teesside steelworks in North Yorkshire, which reopened in April 2012 and is owned by SSI.[1]

3. In relation to iron or steel production capacity:

   (a) *Port Talbot steelworks:* Tata told us that this steelworks had two blast furnaces and had capacity to [✂].[2]

   (b) *Scunthorpe steelworks:* Tata told us that it was [✂] liquid iron [✂]. Of its four blast furnaces, it told us that only two were currently operational, and that if all four blast furnaces were operated at the same time, they would generate the same output as the two blast furnaces at its Port Talbot works.[3]

   (c) *Teesside steelworks:* SSI told us that its Teesside steelworks had one blast furnace that had iron production capacity of more than 3 Mt (based on an

[1] Provisional findings, Appendix 7.6, paragraph 26.
[2] Tata response hearing summary, paragraph 4.
[3] ibid, paragraph 5.

estimated current run-rate). It told us that it was targeting production at between 3.6 and 4.2 Mt in the coming years.[4]

4. In relation to the production of BFS from each steelworks:

(a) *Port Talbot and Scunthorpe steelworks:* Tata told us that if both of its steelworks operated at maximum capacity, they could produce around [✂] of BFS. It added that BFS accounted for around [✂] per cent of the total metal output (between around [✂] to [✂] kg of BFS per tonne of total metal output).[5]

(b) *Teesside steelworks:* SSI told us that for each tonne of iron made, around 200 to 300 kg (or 20 to 30 per cent) of BFS was produced. Based on its current iron production volumes of 3 Mt, and a 30 per cent 'BFS rate', it estimated that around 0.9 Mt of BFS was produced each year at its Teesside steelworks.[6]

Lafarge Tarmac's GBS production capacity

5. Table 1 sets out the GBS production capacity by GBS plant.

[4] SSI response to the Remedies Notice, footnote i, p4.
[5] Tata response hearing summary, paragraph 24.
[6] SSI response to the Remedies Notice, p1.

TABLE 1 **Lafarge Tarmac GBS plant production capacity**

Steelworks	*Current status**	*Total capacity (kt)*	*Active capacity (kt)*
Port Talbot†			
Granulator 1	Active	500	500
Granulator 2	Active	500	500
Scunthorpe			
Granulator 1	Active	500	500
Granulator 2	Active‡	225	225
Teesside§			
Granulator	Active	500	500
Pelletiser¶	Active	500	500
		2,725	2,725

Source: Lafarge Tarmac.

*Current status as at 30 June 2013.
†One of the blast furnaces (also known as furnace 'Number 4') at the Port Talbot steelworks was offline between January 2009 and October 2009.
‡One of the blast furnaces (also known as 'Queen Bess') at the Scunthorpe steelworks was offline between January 2009 and December 2009; and since October 2011. Lafarge Tarmac told us that the blast furnace would resume in the final half of 2013. We have assumed that this blast furnace is active given its imminent reactivation.
§All blast furnace activity at the Teesside steelworks ceased from March 2010 to April 2012, when the blast furnace was restarted.
¶The 'pelletiser' plant produces pellite. Lafarge Tarmac treats GBS as including both granulates and pellites.
#Total capacity figures represent 'nameplate capacity'. Lafarge Tarmac told us that actual capacity would be lower due to the blast furnace. It added that it had a target of producing at around 85 per cent of nameplate capacity.

6. A GBS plant can contain more than one granulator (water-cooling equipment that converts the BFS into GBS) depending on the number of active blast furnaces:

   (a) *Port Talbot steelworks:* there are two granulators, where each services one blast furnace given that the configuration of the steelworks meant that the blast furnaces were further apart.[7]

   (b) *Scunthorpe steelworks:* there are two granulators each serving two of its four blast furnaces.[8]

   (c) *Teesside steelworks:* there is one granulator and one pelletiser for its single blast furnace.[9]

7. SSI told us that based on its annual BFS production of around 900 kt, around 360 kt (40 per cent) was processed to become GBS, whilst 180 kt (20 per cent) was processed to become 'pellite' (pelletised slag) and around 360 kt (40 per cent) was

[7] Tata response hearing summary, paragraph 17.
[8] ibid, paragraph 17.
[9] SSI response hearing summary, paragraph 22.

simply air-cooled. It added that pelletised slag could be further processed through grinding to form substantially the same product as GGBS.[10]

Hanson's GGBS production capacity

8. Table 2 below sets out the maximum GGBS production capacity of Hanson's GGBS plants (in terms of maximum mechanical grinding capacity).

TABLE 2 **Maximum grinding capacity by GGBS plant**

	kt
GGBS plant	*Grinding capacity**
Port Talbot	[✂]
Purfleet†	[✂]
Scunthorpe	[✂]
	[✂]
Llanwern	[✂]
Teesport	[✂]
	[✂]
Total	[✂]

Source: Hanson's response to GGBS questions.

*Grinding capacity based on the following operating assumptions: 5.5 operating days x 24 hours x 49 weeks for all GGBS plants, except for the Llanwern GGBS plant where 6 operating days were assumed. Hanson told us that this calculation assumed 100 per cent reliability, ie no headroom for breakdowns.
†The Purfleet GGBS plant has [✂] grinding mills with grinding capacities of around [✂].

9. Hanson told us that the above capacity figures in Table 2 showed the 'hypothetical mere mechanical grinding capacity', and that this capacity measure yielded a far higher number than what a GGBS plant could actually produce. It told us that its calculation of 'true' grinding capacity should take into account the restriction imposed by the actual volumes of GBS made available to it by the granulation stage. Given that there was a limitation on the annual amount of GBS that could be produced, Hanson told us that the total 'effective' GBS production capacity during FY12 was around [✂] (or around [✂] of GGBS). This is set out in Table 3 below.

[10] SSI response to the Remedies Notice, p1.

TABLE 3 **Hanson's estimate of 'effective' GBS and GGBS capacity**

kt

*GBS supplied to Hanson (FY12)**	*GBS*	*GGBS equivalent†*
Port Talbot steelworks	[✂]	[✂]
Scunthorpe steelworks	[✂]	[✂]
Teesside steelworks	[✂]	[✂]
	[✂]	[✂]

Source: Question 7 of Hanson's response to GGBS/GBS hearing follow-up questions (9 August 2013).

*GB steelworks GBS produced and made available to Hanson during FY12.
†GGBS equivalent based on Hanson's assumption that GGBS conversion reduces GBS tonnage by a factor of 10 per cent.

Summary of production capacity

10. A summary of these production capacity figures is set out in Table 4 below.

TABLE 4 **Estimated maximum production capacity for BFS, GBS and GGBS**

Mt

Steelworks	*Iron or steel**	*BFS§*	*GBS plant*	*GBS*	*GGBS plant*	*GGBS*
Port Talbot†	[✂]	[✂]	**Port Talbot**	[✂]	**Port Talbot**	[✂]
Scunthorpe	[✂]	[✂]	**Scunthorpe**	[✂]	**Scunthorpe**	[✂]
Teesside‡	[✂]	[✂]	Teesside¶	[✂]	Purfleet	[✂]
	[✂]	[✂]		[✂]		[✂]
					Mothballed#	*GGBS*
					Llanwern	[✂]
					Teesport	[✂]
						[✂]

per cent

Steelworks	*Iron or steel*	*BFS*	*GBS plant*	*GBS*	*GGBS plant*	*GGBS*
Port Talbot	[✂]	[✂]	Port Talbot	[✂]	Port Talbot	[✂]
Scunthorpe	[✂]	[✂]	Scunthorpe	[✂]	Scunthorpe	[✂]
Teesside	[✂]	[✂]	Teesside	[✂]	Purfleet	[✂]

Source: Lafarge Tarmac, Hanson, Tata and SSI.

*Iron to steel conversion rate assumed to be 1:1 (source: SSI response hearing).
†Tata told us that the Port Talbot steelworks produced between 4 and 4.5 Mt.
‡3 Mt based on achieved record monthly run-rate. SSI told us that it was targeting production of between 3.6 and 4.2 Mt.
§The proportion of iron accounted for by BFS can vary: Tata estimated between 25.5 and 26.5 per cent. SSI estimated 20 to 30 per cent.
¶The Teesside GBS plant production capacity of [✂] Mt comprises [✂] Mt for GBS and [✂] Mt for pellite (which can be ground into GBS).
#The Llanwern GGBS plant is currently mothballed. [✂]
Note: The GBS and GGBS plants that are local to each other have been highlighted.

11. Table 4 above shows that currently, total annual iron production capacity in GB is [✂] Mt, around 25 per cent of which converts into [✂] Mt of BFS. Maximum GBS production capacity is [✂] Mt whilst maximum GGBS production capacity is [✂] Mt (based on active GGBS plants only). We note, however, that based on Hanson's assumption that GBS converts to GGBS at a rate of [✂] per cent, based on a

maximum GBS production figure of [✂] Mt, this equates to around [✂] Mt of GGBS that could be potentially produced if iron production was at full capacity. We note, however, that GGBS production capacity based on total active GGBS plant capacity is currently around [✂] Mt. We also note that this figure could increase if SSI achieves a higher production figure of just over 4 Mt.[11] However, the above figures represent a theoretical maximum, and in Annex G, we set out the historic actual production figures across the supply chain.

[11] SSI response to the Remedies Notice, footnote i, p4.

Actual production at each stage of the GGBS supply chain

Introduction

1. This annex sets out details of the actual production at each stage of the supply chain.

BFS produced

2. Table 1 below shows the volumes of BFS and steel slag supplied to Lafarge Tarmac's GBS operations between FY10 and FY12.

TABLE 1 **Lafarge Tarmac: BFS and steel slag products, 2010 to 2012**

	Port Talbot GBS plant			*Scunthorpe GBS plant*			*Teesside GBS plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*	*2010*	*2011*	*2012*
BFS volumes purchased (kt)									
To produce GBS*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
To produce air-cooled slag†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
BFS volumes purchased (%)									
To produce GBS*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
To produce air-cooled slag†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Steel slag purchased (kt)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Sales volumes (kt)									
GBS*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Air-cooled slag†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Crushed steel slag‡	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Gross revenues (£m)									
GBS*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Air-cooled slag†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Crushed steel slag‡	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Lafarge Tarmac's response to GGBS questions.

*Lafarge Tarmac treats granulates and pellites as GBS.
†Air-cooled slag is also known as crushed BFS. Air-cooled slag is produced when the molten BFS is poured into pits, air-cooled and then cooled.
‡Steel slag is produced where molten BFS is poured using ladles into pits and air-cooled, then sprayed with water. Steel slag de-metallization and screening requires a screen and/or crusher with the ability to use magnets to separate off free metals.
Note: N/A = not applicable.

3. Based on Table 1 above, we summarized the volumes of BFS produced by the steelworks over the period FY10 to FY12 in Table 2 below, where we also show actual BFS production against maximum production capacity.

TABLE 2 **BFS production against BFS capacity, 2010 to 2012**

	BFS capacity	*BFS produced (FY10)*	*BFS produced (FY11)*	*BFS produced (FY12)*
Steelworks				
Port Talbot	1.1	[✂]	[✂]	[✂]
Scunthorpe	0.8	[✂]	[✂]	[✂]
Teesside	0.9	[✂]	[✂]	[✂]
	2.8	[✂]	[✂]	[✂]
				per cent
		Capacity utilized	*Capacity utilized*	*Capacity utilized*
Steelworks				
Port Talbot		[✂]	[✂]	[✂]
Scunthorpe		[✂]	[✂]	[✂]
Teesside		[✂]	[✂]	[✂]
		[✂]	[✂]	[✂]

Source: Lafarge Tarmac.

*Iron to steel conversion rate assumed to be 1:1.
†Tata told us that the Port Talbot steelworks produced between 4 and 4.5 Mt.
‡3 Mt based on achieved record monthly run-rate. SSI told us that it was targeting production of between 3.6 and 4.2 Mt.
§The proportion of iron accounted for by BFS can vary: Tata estimated between 25.5 and 26.5 per cent. SSI estimated 20 to 30 per cent.
¶The Teesside GBS plant production capacity of [✂] Mt comprises [✂] Mt for GBS and [✂] Mt for pellite (which can be ground into GBS).
#The Llanwern GGBS plant is currently mothballed.
Note: The GBS and GGBS plants that are local to each other have been highlighted.

4. Based on Table 2 above, maximum capacity utilization appears only to have been achieved consistently at the Scunthorpe steelworks whilst capacity utilization was over [✂] per cent in FY10 and FY11 for the Port Talbot steelworks before dropping to [✂] per cent in FY12. We note that the Teesside steelworks was closed for a large part of the period considered, and therefore we placed little meaning behind its capacity utilization figures.

GBS produced and supplied

5. Table 3 below shows the total GBS produced and sold over the period from FY07 to FY12.

TABLE 3 **Lafarge Tarmac: GBS operations' GBS production and sales volumes, 2007 to 2012**

kt

	2007	*2008*	*2009*	*2010*	*2011*	*2012*
GBS production	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
GBS sale	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
*Surplus/(shortfall)**	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Lafarge Tarmac's response to GGBS questions.

*A surplus over production implies stockpile additions whilst a shortage implied a stockpile reduction.

6. Table 4 below shows the GBS that was produced and supplied to Hanson's GGBS plants in FY11 and FY12. We note that Lafarge Tarmac's GBS sales volumes did not fully reconcile with Hanson's GBS purchased volumes.

TABLE 4 **GBS produced* and supplied to GGBS plants, 2011 and 2012**

	2011 (kt)				*2012 (kt)*			
	GBS plant				*GBS plant*			
	Port Talbot	*Scunthorpe*	*Teesside*	*Total*	*Port Talbot*	*Scunthorpe*	*Teesside*	*Total*
GGBS plants								
Port Talbot	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Purfleet	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Scunthorpe	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total ground	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
GBS plants								
Port Talbot	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Purfleet	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Scunthorpe	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total ground	100	100	100	100	100	100	100	100

Source: Hanson's response to GGBS questions.

*Production figures do not fully reconcile with Lafarge Tarmac's figures.

GGBS production

7. Table 5 below shows Hanson's GGBS production volumes between FY07 and FY12.

TABLE 5 **GGBS production volumes, 2007 to 2012**

						kt
GGBS plant	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
Port Talbot	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Purfleet	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Scunthorpe	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Llanwern*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Teesport†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
						per cent
Port Talbot	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Purfleet	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Scunthorpe	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Llanwern*	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Teesport†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	100	100	100	100	100	100

Source: Hanson's response to GGBS questions.

*Mothballed in 2008.
†Mothballed in August 2010.

8. Based on Hanson's production volumes, Table 6 below shows its active capacity utilization over the period FY07 to FY12.

TABLE 6 **GGBS plant: active capacity utilization rates, 2007 to 2012**

						per cent
*GGBS plant**	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
Port Talbot	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Purfleet	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Scunthorpe	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Llanwern	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Teesport	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Active capacity†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Hanson's response to GGBS questions.

*The individual GGBS plant capacity utilization figures were calculated based on Hanson's estimate of GGBS production capacity figures.
†The total active capacity utilization figures were calculated based on dividing production by the capacity of active GGBS plants. The active capacity utilization figures for 2008 and 2010 are affected by the mothballing of the Llanwern and Teesport GGBS plants respectively. For these years, we have assumed that their respective capacities were active during the whole year.
Note: N/A = not applicable.

Estimates of the size of the GBS stockpile

Introduction

1. This annex sets out the views of Lafarge Tarmac and Hanson in relation to the estimated size of the GBS stockpile.

Lafarge Tarmac: views on GBS stockpile

2. Lafarge Tarmac told us that its latest estimate for its GBS stockpile as at the end of FY13 was around [✂] Mt, but noted that historic stockpiles were unlikely to be indicative of stockpiles going forward.

3. Lafarge Tarmac told us that at the Teesside steelworks, SSI had recently invested in its steelworks to increase iron production to around 3.5 Mt. It estimated that based on typical slag production rates of around 25 to 30 per cent, and granulation rates of 70 to 80 per cent, this would give an annual GBS production at the Teesside steelworks alone of around 0.6 to 0.8 Mt a year. It told us that this contrasted with Hanson's off-take from the Teesside GBS plant of less than 0.2 Mt a year. Accordingly, it argued that there would be a build-up of stock of around 0.4 to 0.6 Mt a year at this site alone going forward. It added that there was also considerable excess production of GBS, albeit at lower levels, at both the Port Talbot and Scunthorpe GBS plants, as a result of similar investments by the steelworks.

4. Lafarge Tarmac considered that there would be significant levels of excess GBS production in the future, generating up to around 1 Mt going forward (equivalent to a large cement plant).

5. Lafarge Tarmac appeared to suggest that based on an independent study conducted in Germany,[1] GBS products could be stored for long periods of time (five years in the study). It added, however, that GBS degraded when left in stock over time, and argued that if the steel producers were to acquire the GBS plants, they would be incentivized to sell all fresh stocks of GBS arising.

6. We asked Lafarge Tarmac to provide us with the historic levels of its GBS stockpiles. This is set out in Table 1 below.

TABLE 1 **Lafarge Tarmac analysis of GBS stockpile**

kt

GBS plant	*2008*	*2009*	*2010*	*2011*	*2012*
Port Talbot	[✂]	[✂]	[✂]	[✂]	[✂]
% available for grinding into GGBS	*100*	*100*	*100*	*100*	*100*
Scunthorpe	[✂]	[✂]	[✂]	[✂]	[✂]
% available for grinding into GGBS	*100*	*100*	*100*	*100*	*100*
Teesside (pellites)*	[✂]	[✂]	[✂]	[✂]	[✂]
% available for grinding into GGBS	*100*	*100*	*100*	*100*	*100*
Teesside (GBS)	[✂]	[✂]	[✂]	[✂]	[✂]
% available for grinding into GGBS	*100*	*100*	*100*	*100*	*100*

Source: Lafarge Tarmac's response to GGBS questions.

*Pellites can be ground into GGBS.

7. Based on Table 1 above, the GBS stockpile as at the end of FY12 was around [less than 1 Mt]. As Hanson mentions below, an earlier estimate by Lafarge Tarmac of the stockpile was far higher at between 1 and 1.5 Mt. We note that Lafarge Tarmac subsequently corrected its initial estimate from 1 to 1.5 Mt, down to [less than 1 Mt].

Hanson: views on GBS stockpile

8. Hanson told us that Lafarge Tarmac's estimates of the GBS stockpile was 'vastly inflated', and that much of the GBS stockpile that did exist, was 'difficult to use' for GGBS production. It added that both the age and quality of GBS varied widely between plants, and where the GBS stockpiled or produced was not of sufficient

[1] Study conducted by the German Institut für Baustoff-Forschung (Institute for Building Materials Research).

quality or was old, it must be blended with 'fresher' and higher quality GBS before it could be used in GGBS production. Hanson told us that it controlled the process of blending this 'variable' GBS through the use of a technical laboratory that measured the quality of the GBS and the end quality of GGBS mix it produced. It considered that much of the low-quality GBS was not immediately available as it could only be used in limited quantities and was dependent on the production of more high-quality GBS.

9. Hanson told us that whilst Lafarge Tarmac quoted that 1.5 Mt of GBS was stockpiled, its own figure of suitable material that could go into its GGBS plants was much less at an absolute maximum of around [less than 1 Mt], but added that this figure was likely to be much lower at [✂] Mt due to age and quality issues. It told us that Lafarge Tarmac's estimates of the stockpile level depended on the inclusion of air-cooled material, which was not cementitious in any way and could not be converted to GGBS.[2] It added that the quality of the stockpiled GBS varied between plants and degraded over time. Hanson told us that it could only use this lower quality GBS in low quantities, blended with higher quality GBS to produce the necessary standard for its customers. It told us that it imported higher quality GBS from abroad to produce blended GGBS that satisfied technical specifications.[3]

10. Hanson told us that it was not possible for it to be restricting supply to the market, and that the current existence of a 'small GBS stockpile' was due to reduced demand for GGBS in comparison with iron and steel production.[4] It noted that this dynamic could quickly change in future, in particular given the risks faced by the steel industry. It believed that it was producing and distributing as much GGBS as was currently

[2] Summary of GGBS response hearing with Hanson, paragraph 23.
[3] ibid, paragraph 23.
[4] ibid, paragraph 23.

being demanded by the market and for the most recent full year had used nearly all the GBS that had been produced in 2012.[5]

11. Hanson provided us with its analysis to demonstrate that GBS production was insufficient to meet GGBS demand, which necessitated pre-existing GBS stocks to be run down. This is set out in Table 2 below.

TABLE 2 **Hanson analysis of GBS production and GGBS demand**

kt

GBS plant	*FY12 GBS production**	*GGBS from FY12 GBS production only†*	*FY12 GGBS sold ex GBS plant‡*	*GGBS surplus/(shortage) from FY12 GBS production*
Port Talbot	[✂]	[✂]	[✂]	[✂]
Scunthorpe	[✂]	[✂]	[✂]	[✂]
Teesside§	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]

Source: Hanson's response to GGBS questions.

*GBS volumes produced and made available by a GBS plant.
†GGBS production from GBS produced in FY12 only based on Hanson's assumption that GGBS production decreases GBS tonnage by a factor of [✂].
‡GGBS sold ex-GBS plant means the GGBS that was produced using GBS produced from the GBS plant concerned. For example, the figure of [✂] for the Port Talbot GBS plant means that [✂] of GGBS was produced in FY12 using only GBS produced by the Port Talbot GBS plant (regardless of whether the GBS was produced in FY12 or prior to FY12).
§Hanson told us that the Teesside GBS plant also made available some [✂] of pelletised slag in FY12, although it told us that this was no longer processed by Hanson.

12. Based on Table 2 above, Hanson told us that in FY12:

(a) The Port Talbot GBS plant produced [✂] of GBS, which equated to around [✂] of GGBS. However, total GGBS sold from GBS produced at the Port Talbot GBS plant was [✂] in FY12, which resulted in a GGBS shortage from FY12 GBS production of [✂].

(b) The Scunthorpe GBS plant produced [✂] of GBS, equivalent to around [✂] of GGBS. However, [✂] of GGBS was produced and sold by Hanson using GBS produced by the Scunthorpe GBS plant. This resulted in a GGBS shortage from FY12 GBS production of [✂].

[5] ibid, paragraph 23.

(c) The Teesside GBS plant produced [✂] of GBS, equivalent to around [✂] of GGBS. Hanson sold around [✂] of GGBS using GBS from the Teesside GBS plant, which resulted in a 'hypothetical' (as the GGBS was not produced) GGBS surplus from FY12 GBS production of [✂]. Hanson told us that [✂].

13. Hanson argued that during FY12 there were shortfalls of GBS production at Port Talbot and Scunthorpe, which it had to meet by utilizing pre-existing stockpiles. It told us that there was no surplus capacity in the 'GGBS industry' and that for the most recent full year (FY12), Hanson's GGBS sales of [✂] were slightly higher than the effective GGBS production capacity of [✂] (based on GBS availability), and therefore was reliant on both imports from Mittal Ghent and the 'usable tonnage' within the pre-existing GBS stockpile.

GBS plants: distribution capabilities

Introduction

1. This annex sets out details of the distribution capabilities of Lafarge Tarmac's GBS operations.

GBS plants' distribution capabilities

2. Table 1 below shows that each of Lafarge Tarmac's GBS plants can use rail, road and ships to distribute its GBS.

TABLE 1 **Modes of transport available to Lafarge Tarmac's GBS plants***

GBS plant	*Road*	*Ship*	*Rail*
Port Talbot	Yes	Yes (onsite)	Yes (onsite)
Scunthorpe	Yes	Yes (in vicinity)	Yes (onsite)
Teesside	Yes	Yes (in vicinity)	Yes (in vicinity)

Source: Question 2 of Lafarge Tarmac response to GBS information request (8 August 2013).

*This table shows the modes of transport available.

3. For each of Lafarge Tarmac's GBS plants, Table 2 below shows the volumes of GBS dispatched by each mode of transport.

TABLE 2 **GBS volumes dispatched* by each mode of transport**

				kt				per cent
GBS plant	*Road*	*Ship*	*Rail*	*Total*	*Road*	*Ship*	*Rail*	*Total*
Port Talbot								
2010	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
2011	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
2012	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
Scunthorpe								
2010	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
2011	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
2012	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
Teesside								
2010	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
2011	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
2012	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100

Source: Question 2 of Lafarge Tarmac response to GBS information request, 8 August 2013.

*GBS volumes dispatched may not necessarily equate to GBS volumes produced in that year.

4. Table 3 below shows the volumes of GBS dispatched by each GBS plant according to destination.

TABLE 3 **GBS volumes dispatched by each GBS plant according to each GGBS plant**

	Port Talbot GBS			*Scunthorpe GBS*			*Teesside GBS**		
By GGBS plant†	*2010*	*2011*	*2012*	*2010*	*2011*	*2012*	*2010*	*2011*	*2012*
Purfleet GGBS plant	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Port Talbot GGBS plant	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Scunthorpe GGBS plant	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total GBS sold‡	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
% dispatched to Hanson	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Lafarge Tarmac.

*Lafarge Tarmac told us that the GBS produced at its Teesside GBS plant was first sold internally to its subsidiary Cambrian Stone Ltd, and then sold on to Hanson.
†Hanson's mothballed GGBS plants (Llanwern and Teesport) are not shown.
‡It is our understanding that this figure represents GBS sales volumes rather than GBS production volumes made in that year.

GGBS plants: distribution capabilities

Introduction

1. This annex sets out details of the distribution capabilities of Hanson's GGBS operations.

GGBS plant distribution capabilities

2. Table 1 below shows the GGBS distribution capabilities of Hanson's GGBS plants.

TABLE 1 **Modes of transport available to Hanson's GGBS plants**

GGBS plant	*Road*	*Ship*	*Rail*
Port Talbot*	Yes	Yes	No
Purfleet†	Yes	Yes	No
Scunthorpe	Yes	No	No
Teesport‡	Yes	Yes	No
Llanwern	Yes	No	No

Source: Question 7 of Hanson's response to GGBS/GBS hearing follow-up questions (9 August 2013).

*Exports GGBS by ship from Hanson's own wharf to Glasgow ([✂]), Teignmouth ([✂]) and historically to Belfast ([✂]). GBS is exported by ship to Purfleet (from Tarmac wharf).
†Imports GBS by ship from Mittal Ghent, Port Talbot and Teesport. Does not export GGBS.
‡Only export facility for GBS by ship direct from plant—facility owned by Lafarge Tarmac.

3. Hanson told us that significant investment would be required at all sites (except Port Talbot) in order to enable exports of GGBS. However, it told us that this would depend on obtaining an international customer base and being able to compete effectively and economically with international producers in their domestic markets. It added that exports from the UK were highly unlikely to succeed, since the UK and Norway alone suffered by far the highest industrial fixed costs of all Europe.

4. Table 2 below shows the GGBS volumes dispatched by each mode of transport.

TABLE 2 **GGBS volumes dispatched by each mode of transport**

				kt				per cent
GGBS plant†	*Road*	*Ship*	*Rail*	*Total*	*Road*	*Ship*	*Rail*	*Total*
Port Talbot								
2010	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
2011	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
2012	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
*Purfleet**								
2010	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
2011	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
2012	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
Scunthorpe								
2010	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
2011	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100
2012	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	100

Source: Hanson.

*The Purfleet GGBS plant does not have a local GBS plant nearby.
†Hanson's mothballed GGBS plants (Llanwern and Teesport) are not shown.
Note: N/A = not applicable.

5. Table 3 below shows Hanson's deliveries to its GGBS depots.

TABLE 3 **Hanson GGBS deliveries to its depots**

						kt
*GGBS depot**	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
Glasgow	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Teesport†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Teignmouth	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
						per cent
GGBS depot	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
Glasgow	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Teesport†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Teignmouth	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Hanson.

*Excludes Hanson's Belfast GGBS depot, which is outside GB.
†Hanson told us that it no longer used the Teesport GGBS plant site for storage.

6. Based on Table 3 above, in relation to its depots, Hanson told us that:

(a) nominal capacity at the Glasgow depot was [✂], with a practical working limit of [✂];

(b) it owned a similar facility within Belfast docks which was currently dormant. It told us that both facilities were adjacent to similar GGBS import facilities operated by

competitors. It told us that GGBS was also stored on all three of its cement works and in the Middlesbrough cement depot [✂]; and

(c) the Teignmouth depot had a [✂] steel silo for loading tankers. It told us that GBS was moved in the building to the pit as required by a loading shovel. It told us that the building was close to the dockside and was filled by a Kovako ship un-loader.

Financial information: Lafarge Tarmac's GBS operations

Introduction

1. This annex contains financial information for each of Lafarge Tarmac's GBS operations.

GBS operations: historic profit and loss performance

2. Table 1 below sets out Lafarge Tarmac's GBS operations' financial performance between FY10 and FY12.

TABLE 1 **Financial performance by GBS operation, 2010 to 2012***

£ million

	Port Talbot GBS plant			*Scunthorpe GBS plant*			*Teesside GBS plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*	*2010*	*2011*	*2012*
GBS sales volumes (kt):									
Hanson (for GGBS)†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂] (for GGBS)‡	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other (not for GGBS)§	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Gross revenues:									
Hanson (for GGBS)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
O'Brien (for GGBS)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other (not for GGBS)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Net revenues:									
Hanson (for GGBS)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂] (for GGBS)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other (not for GGBS)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Variable costs	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Variable profit	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Margin (%)¶	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Fixed costs	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
EBITDA	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Margin (%)¶	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Lafarge Tarmac.

*Figures exclude volume, revenue and cost information relating to depots and mothballed GBS plants.
†Sales of GBS to Hanson to grind into GGBS.
‡Sales of GBS to [✂] (Ireland) to grind into GGBS.
§Sales of GBS to other third parties in the UK, but not to grind into GGBS.
¶Margin on net revenues.

GBS operations: unit financial performance

3. Table 2 below sets out the unit financial performance by GBS operation between FY10 and FY12.

TABLE 2 **Unit financial performance by GBS operation, 2010 to 2012***

£/t

	Port Talbot GBS plant			*Scunthorpe GBS plant*			*Teesside GBS plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*	*2010*	*2011*	*2012*
Unit gross revenues:									
Hanson (for GGBS)†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂] (for GGBS)‡	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other (not for GGBS)§	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total sales	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Unit net revenues:									
Hanson (for GGBS)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
[✂] (for GGBS)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other (not for GGBS)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Other	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total sales	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Unit variable costs	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Unit variable profit	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Unit EBITDA	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Lafarge Tarmac.

*Figures exclude volume, revenue and cost information relating to depots and mothballed GBS plants.
†Sales of GBS to Hanson to grind into GGBS.
‡Sales of GBS to [✂] (Ireland) to grind into GGBS.
§Sales of GBS to other third parties in the UK, but not to grind into GGBS.
Note: N/A = not applicable.

GBS operations: cost structure (FY12)

4. Table 3 below sets out the FY12 cost structure by GBS operation.

TABLE 3 **Cost structure by GBS plant, 2012***

per cent

	Port Talbot	*Scunthorpe*	*Teesside*
Variable costs:			
BFS purchases	[✂]	[✂]	[✂]
Energy	[✂]	[✂]	[✂]
Other†	[✂]	[✂]	[✂]
	100	100	100
Variable costs	[✂]	[✂]	[✂]
Fixed costs (including depreciation)‡	[✂]	[✂]	[✂]
	100	100	100

Source: Lafarge Tarmac.

*Figures exclude volume, revenue and cost information relating to depots and mothballed GBS plants.
†'Other' variable cost items include the costs of other materials, internal logistics, contract crushing, and load and haul.
‡Fixed costs include (among others) the costs of depreciation, wages and salaries, repairs and maintenance, and centrally attributable support functions, but exclude 'stock movement'. Whilst we focused on EBITDA (ie a profit measure before depreciation) to look at financial performance, we considered cost structures by including depreciation as a component within fixed costs.

Financial information: Hanson's GGBS operations

Introduction

1. This annex contains financial information for each of Hanson's GGBS plants.

GGBS operations: historic profit and loss performance

2. Table 1 below sets out Hanson's GGBS operations' financial performance between FY10 and FY12.

TABLE 1 **Financial performance by GGBS plant, 2010 to 2012***

£ million

	Port Talbot GGBS plant			*Purfleet GGBS plant*			*Scunthorpe GGBS plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*	*2010*	*2011*	*2012*
GGBS production (kt)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
GGBS sales volumes (kt):									
Internal sales into RMX	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
External sales (others)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
External sales (Tarmac)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Gross revenues:									
Internal sales into RMX	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
External sales (others)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
External sales (Tarmac)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Net revenues:									
Internal sales into RMX	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
External sales (others)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
External sales (Tarmac)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Variable costs	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Variable profit	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Margin (%)†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Fixed costs	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
EBITDA	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Margin (%)†	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Hanson.

*Figures exclude volume, revenue and cost information relating to depots and mothballed GGBS plants.
†Margin on net revenues.

GGBS operations: unit financial performance

3. Table 2 below sets out the unit financial performance by GGBS plant between FY10 and FY12.

TABLE 2 **Unit financials by GGBS plant, 2010 to 2012***

£/t

	Port Talbot GGBS plant			*Purfleet GGBS plant*			*Scunthorpe GGBS plant*		
	2010	*2011*	*2012*	*2010*	*2011*	*2012*	*2010*	*2011*	*2012*
Unit gross revenue:									
Internal sales into RMX	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
External sales (others)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
External sales (Tarmac)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total sales	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Unit net revenue:									
Internal sales into RMX	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
External sales (others)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
External sales (Tarmac)	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Total sales	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Unit variable cost	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Unit variable profit	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]
Unit EBITDA	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Hanson.

*Figures exclude volume, revenue and cost information relating to depots and mothballed GGBS plants.

GGBS operations: cost structure (FY12)

4. Table 3 below sets out the FY12 cost structure by GGBS plant.

TABLE 3 **Cost structure by GGBS plant, 2012***

	Port Talbot	*Purfleet*	*Scunthorpe*
Variable costs:			
GBS (Tarmac)†	[✂]	[✂]	[✂]
Raw materials (other)†	[✂]	[✂]	[✂]
Electricity	[✂]	[✂]	[✂]
Fuels	[✂]	[✂]	[✂]
Other‡	[✂]	[✂]	[✂]
	100	100	100
Variable costs	[✂]	[✂]	[✂]
Fixed costs (including depreciation)§	[✂]	[✂]	[✂]
	100	100	100

Source: Hanson.

*Figures exclude volume, revenue and cost information relating to depots and mothballed GGBS plants.
†The GBS (Tarmac) item relates to raw materials procured from Tarmac. [✂]
‡Other variable cost items include consumables, packaging and third party production services, but excludes inventory change.
§Fixed costs include the costs of depreciation, wages and salaries, repair materials and services, and SG&A (sales, general and administration). Whilst we focused on EBITDA (ie a profit measure before depreciation) to look at financial performance, we considered cost structures by including depreciation as a component within fixed costs.

Background on the UK steel market

Introduction

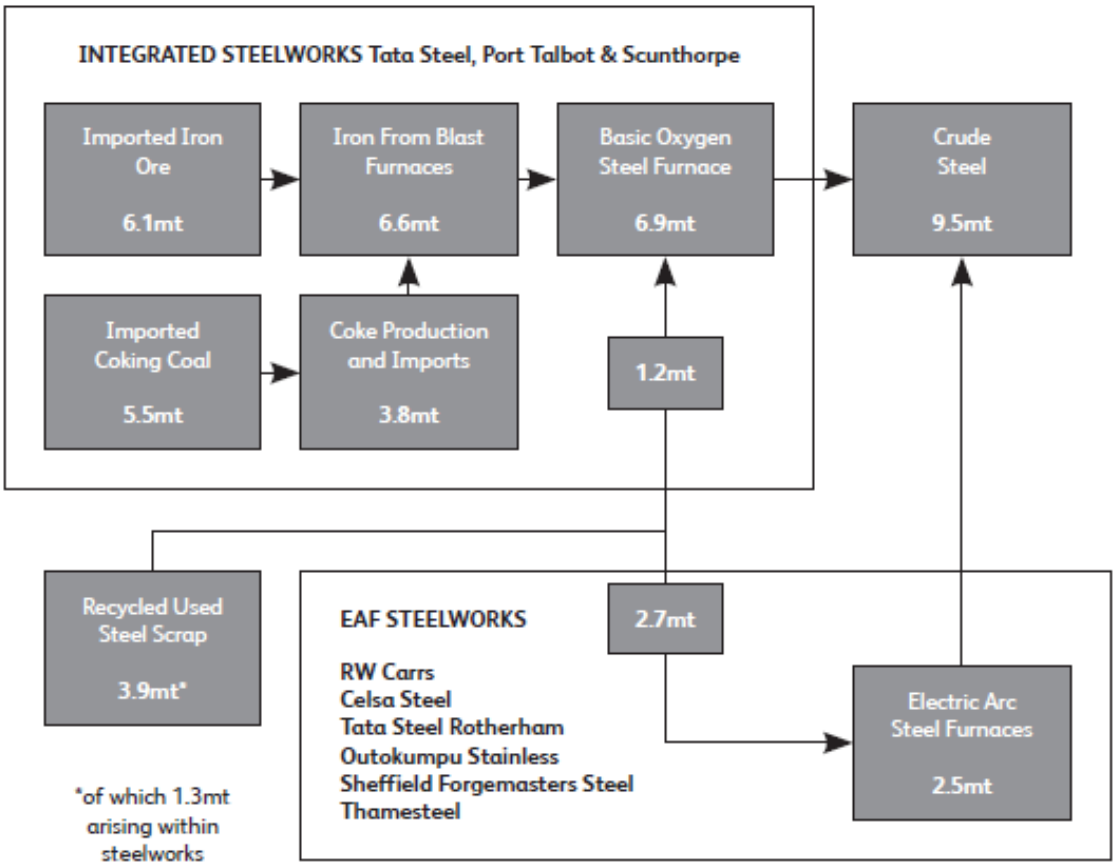
1. This annex contains information concerning the UK steel market.

UK steelmaking

2. Figure 1 below shows an overview of the steelmaking process, and where the three integrated steelworks fit into the overall UK steel market.

FIGURE 1

UK steelmaking (based on 2011 production figures)



Source: UK Steel, 'Key Statistics 2012' (EEF manufacturers association) and the ISSB (International Steel Statistics Bureau).
Note: The Teesside works is not shown in this diagram as it was not in operation during 2011.

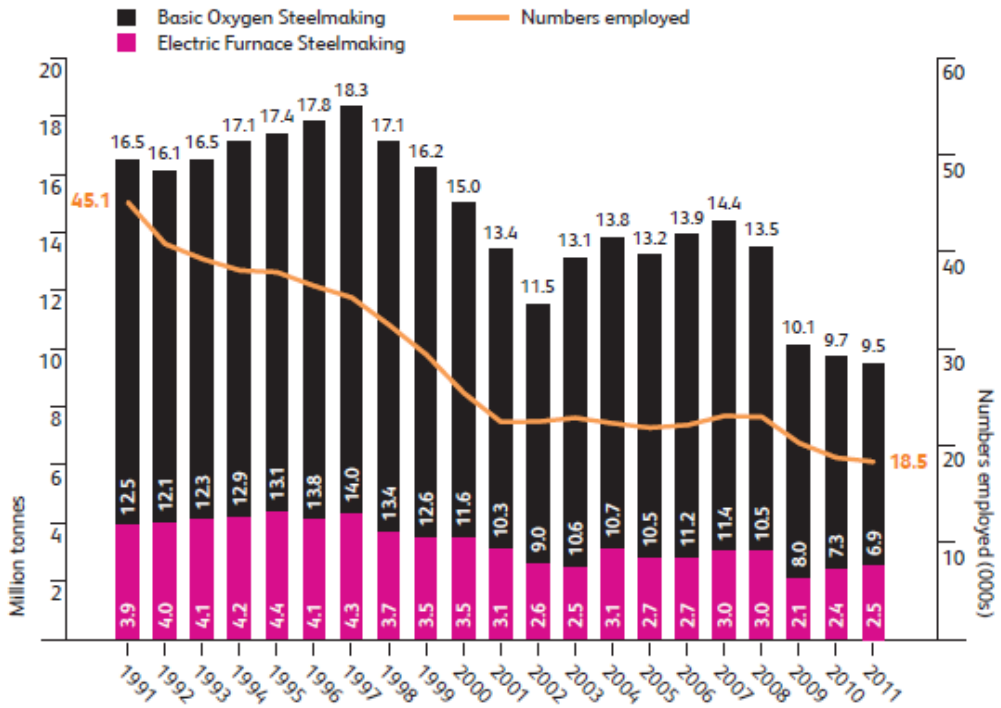
3. Based on Figure 1 above, the iron blast furnace from where BFS is produced as a waste by-product forms part of the integrated steelworks' production process. In FY11, there were two integrated steelworks, the Port Talbot works and the Scunthorpe works, both of which were, and are still, owned by Tata. Whilst the Teesside works is also an integrated steelworks, it was closed during the whole of 2011, and therefore does not appear in the diagram above. UK crude steel production was 9.5 Mt in 2011, of which the integrated steelworks produced 6.9 Mt (around 73 per cent of UK crude steel production), whilst the Electric Arc Steel Furnace (EAF) steelworks produced 2.5 Mt (around 27 per cent). The relative trends in UK crude steel production between the integrated steelworks and the EAF steelworks are shown in Figure 2 below.

UK steel production

4. Figure 2 below shows annual crude steel production in the UK (and the numbers employed) between 1999 and 2011. It also shows the split of UK production between the integrated steelworks ('Basic Oxygen Steelmaking' in the diagram) and the EAF steelworks ('Electric Furnace Steelmaking' in the diagram). We note that Tata's Port Talbot works and Scunthorpe works, and SSI's Teesside works are part of the former, and are all integrated steelworks.

FIGURE 2

UK steel production and employment, 1991 to 2011



Source: UK Steel, 'Key Statistics 2012' (EEF manufacturers association) and the ISSB (International Steel Statistics Bureau).
Note: BFS comes from 'Basic Oxygen' steelmaking.

5. Figure 2 above shows that over the period between 1991 and 2011, UK crude steel production reached its lowest production level in 2011 at 9.5 Mt, down from a high over the period of 18.3 Mt back in 1997. Whilst total UK production remained broadly stable between 2003 and 2008, when annual production ranged from 13 to 14 Mt, it dropped sharply in 2009, when production fell from 13.5 Mt in 2008 to 10.1 Mt in 2009. Since then, annual production has remained broadly at around 10 Mt, albeit declining slightly year on year. We note that the relatively large falls in production in 2002 and 2009 can partly be explained by the closure of the Llanwern works in 2002 and the reduced production at the Teesside works in 2009 before its full closure in 2010.

6. Based on Figure 2 above, over the period 1991 to 2011, UK production accounted for by the integrated steelworks declined in absolute terms from 12.5 Mt (or 76 per cent of total production) in 1991 to 6.9 Mt (or 73 per cent) in 2011. The figures suggest that UK production will continue to be predominantly driven by production from the integrated steelworks.

7. In relation to 2012 production figures, according to the source, ISSB, following the lowest annual crude steel production figure since the 1930s in 2011, the total in 2012 was fractionally higher, which included the contribution from the Teesside works, which reopened in April 2012 to produce steel for the export market. The ISSB went on to state that without the contribution of the Teesside plant, crude steel production in 2012 would have hit a 'new record low'.[1]

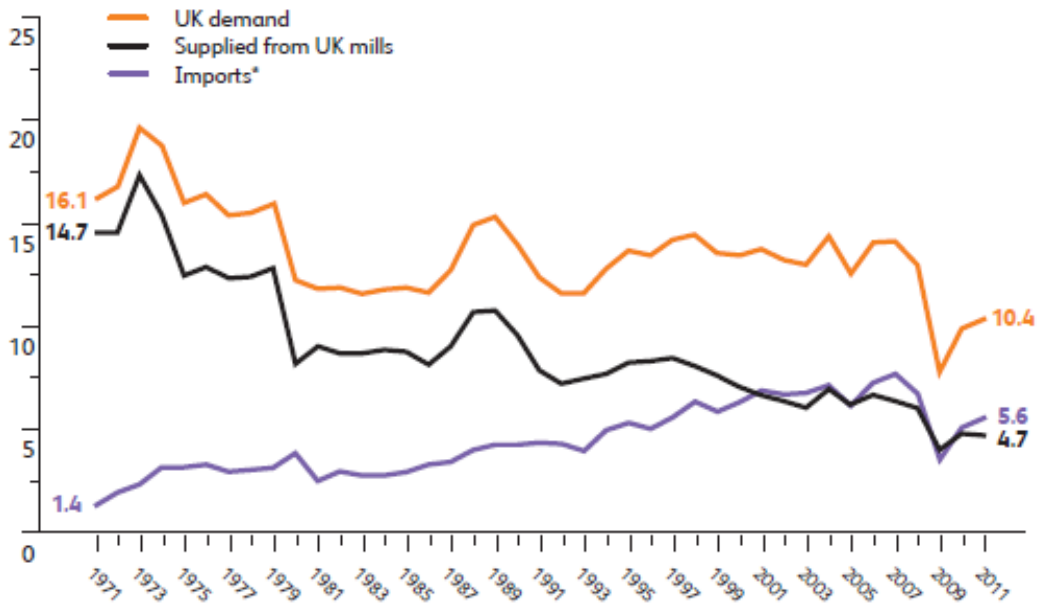
UK steel demand

8. Figure 3 below shows the UK demand for steel mill products between 1971 and 2011.

[1] ISSB Ltd website (International Steel Statistics Bureau)—www.issb.co.uk.

FIGURE 3

UK steel mill demand, 1971 to 2011 (Mt)



Source: UK Steel, 'Key Statistics 2012' (EEF manufacturers association) and the ISSB (International Steel Statistics Bureau).
Note: Excludes any imports made by UK steel producers.

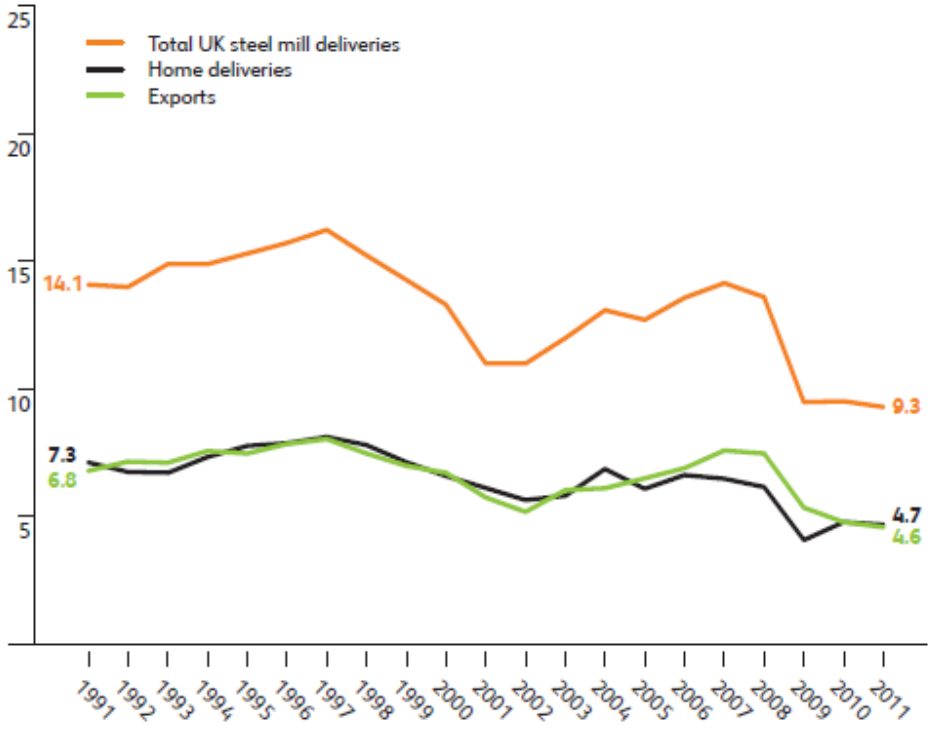
9. Figure 3 above shows that since 1971, UK annual demand for steel declined by 35 per cent from around 16 to 10 Mt in 2011. During this period, there was a significant change in how UK demand was met: in 1971, 91 per cent of UK demand was supplied by UK production and 9 per cent by imports. By 2011, these shares changed to 45 and 54 per cent respectively.

UK domestic and export sales

10. Figure 4 below sets out the proportion of UK steel mill sales sold in the UK and the proportion that was exported over the period 1991 to 2011.

FIGURE 4

UK steel mill home and export deliveries, 1991 to 2011 (Mt)



Source: UK Steel, 'Key Statistics 2012' (EEF manufacturers association) and the ISSB (International Steel Statistics Bureau).

11. Figure 4 above shows that around half of UK steel mill sales went to the domestic market whilst the other half was exported, and that this relative split was broadly maintained over the period 1991 to 2011. We note the relatively similar trends exhibited by both domestic and export sales over the period.

12. According to the ISSB, despite UK import and export levels being relatively high in relation to domestic production and demand levels, the UK was a net exporter of steel over the period 2007 to 2009. It also stated that given that the 'export orientated' Teesside works was mothballed for the majority of 2010, the UK became a 'small' net importer of steel in 2010 with the trend continuing through 2011. It added

that the Teesside works, which restarted during 2012, had closed this gap, but the UK still remained a net importer during the year.[2]

[2] ISSB Ltd website (International Steel Statistics Bureau)—www.issb.co.uk.

Diagram illustrating how the GBS agreements govern GBS supply

Introduction

1. Figure 1 below illustrates how the three supply agreements that comprise the current GBS agreements govern Lafarge Tarmac's supply of GBS to Hanson.

FIGURE 1

GBS supply under the GBS agreements

[✂]

2. [✂]

3. [✂]

Interaction between our proposed package of remedies and EU competition law

1. In this appendix we consider a number of issues concerning the interaction between our proposed package of remedies and the application of EU competition law.

Issues raised by parties

2. In response to our Remedies Notice, we received a number of submissions concerning the relationship between the remedies that we might implement and EU competition law. In particular:

   (a) Hanson stated that the GGBS industry structure had been expressly approved by the European Commission in its Heidelberg/Hanson merger decision of 2007.[1] Hanson stated that the application by the CC of structural remedies would in effect allow the CC to apply national competition legislation to a concentration already expressly approved by the European Commission, which it stated would be a perversion of the EUMR[2] if a member state could bypass the one-stop-shop principle (and its underlying principles of subsidiarity and legal certainty) through the application of the market investigation regime. Hanson stated that the agreements were fully disclosed to and visible to the European Commission at the time it assessed the merger, that the European Commission reviewed the arrangements and had no concerns regarding the arrangements or otherwise requiring remedial actions or any form of undertakings. Hanson further stated that the CC could, in principle, seek to revisit the analysis if changes in the market conditions warranted and thereafter point to the type of changes it considered might be relevant to such an analysis.

[1] M.4719 HeidelbergCement/Hanson.
[2] Council Regulation (EC) No 139/2004 of 20 January 2004 on the control of concentrations between undertakings (EUMR).

(b) Hanson also stated that if the GBS agreements (by which we understand it to mean the agreements that were entered into and maintained with Lafarge Tarmac) were to be analysed under Article 101 (or 102) of the TFEU, the analysis would take into account the position of GGBS within the wider cementitious products sector. In this regard, Hanson stated that the limited scope for impact on the wider cementitious sector, of which it estimated that GGBS production was equivalent to only about 12.5 per cent, would be balanced against the efficiencies created by the GBS supply agreements. Hanson stated that this would suggest no scope for intervention under the TFEU and that it would be perverse of the CC to intervene in the same arrangements, ostensibly applying similar principles of competition analysis.

(c) Lafarge Tarmac stated that the potential relevance of Article 3 of Regulation 1/2003 (the Regulation)[3] was that the CC had no power to apply Article 101 TFEU, which only the OFT and certain regulators had been designated with responsibility to apply in the UK. Lafarge Tarmac highlighted that there was an ongoing parallel investigation under Article 101 TFEU by the European Commission which was already in progress when the OFT referred the market investigation to the CC.

Our assessment of these issues

3. Article 3 of the Regulation contains two distinct requirements, namely those contained in Article 3(1) and 3(2). Article 3(1) provides that if the national competition authorities apply national competition law to agreements within the meaning of Article 101(1) TFEU which may affect trade between member states within the meaning of that provision, they shall also apply Article 101 TFEU to such agreements. Article 3(2) states that the application of national competition law may not lead to the

[3] Council Regulation (EC) No1/2003 of 16 December 2002 on the implementation of the rules on competition laid down in Articles 81 and 82 of the Treaty (now Articles 101 and 102 of the TFEU).

prohibition of agreements which may affect trade between member states but which do not restrict competition within the meaning of Article 101(1) TFEU or which fulfil the conditions of Article 101(3) TFEU or which are covered by a Regulation for the application of Article 101(3).

4. It is recognized that the CC's market investigation regime sits within a broad spectrum of competition law, operating alongside other regulatory mechanisms such as the prohibitions under the TFEU and the Competition Act 1998.[4] A market investigation assesses whether competition in a market is working well as opposed to focusing on a single aspect of it or the conduct of particular firms within it. The CC is not precluded from considering agreements that may or may not engage Article 101 TFEU but the CC recognizes that when considering remedial action it will take account of its duties under Article 3 of the Regulation. Where an AEC is found, the CC is able to impose a wide range of legally enforceable remedies that typically focus on making the market more competitive in the future. The CC's guidelines are clear that the identification of anticompetitive features in a market investigation or the imposition of remedies does not mean that market participants have infringed the law.

5. Taking the relevance of the European Commission Heidelberg/Hanson merger case first. The European Commission considered potential horizontal and vertical effects arising from the merger as part of its analysis and concluded that the merger was unlikely to raise competition concerns under any of the theories of harm assessed. We have assessed the relevance of this decision in our further analysis on GGBS contained in our addendum to provisional findings, where we noted that the context of our assessment is different from that of the European Commission, where the CC is looking at a market investigation under the Enterprise Act and how competition as

[4] The Guidelines, paragraph 18.

a whole operates in the market(s) defined. It is important to understand that the European Commission was examining the incremental effect from a merger between suppliers of cement and GGBS respectively, which is not equivalent to the scope of the market investigation conducted by the CC. We do not agree with Hanson's submission that the European Commission's findings in relation to the merger between HeidelbergCement and Hanson mean that the European Commission, having been provided with the agreements, had 'no concerns regarding the arrangements or otherwise requiring remedial actions or any form or undertakings'. The European Commission did not consider the issues now being considered by the CC.

6. We have further noted that we are examining the market in GB six years after the European Commission conducted its merger assessment. Accordingly, we are of the view that the existence of the European Commission merger clearance decision would not preclude the CC from making findings as to how the market currently operates, nor proceeding to remedy the AECs and resulting consumer detriment.

7. Turning to the existence of an ongoing European Commission investigation, the CC has been clear to date that it is not within its remit to apply Article 101 TFEU as it is not a designated competition authority for the purposes of Articles 5 and 35 of the Regulation. We do not agree that the existence of the European Commission's investigation prohibits the CC from proceeding to investigate the markets referred to it by the OFT, or from seeking to remedy the AECs that have provisionally been found. The CC is not aware of any risk of conflict between the CC's findings and the European Commission's investigation.

8. Finally, we considered Hanson's submission that, were the GBS agreements to be analysed under Article 101 (or 102) TFEU, there would be no scope for intervention

given the limited scope of impact of the agreements on the wider cementitious sector when balanced against the efficiencies created by them. This argument appears to be directed at the application of Article 101(3) TFEU: we did not understand Hanson to argue that the agreements would not fall within Article 101(1) on the basis that they had the effect of preventing, restricting and distorting competition. We note the following relevant factors that we have found as part of our market investigation:

(a) We have identified a separate economic market for the provision of GGBS in GB. We noted that Hanson, as the sole GB producer of GGBS, has a market share of approximately 90 per cent, with limited constraint from imports given the nature of the product and associated transport costs.[5] We noted that the paper prepared for Hanson by [✂], in the context Hanson's acquisition of Civil and Marine (Holdings) Ltd in 2006 observed, based on management estimates, that granulated slag could only be imported in small quantities and at higher cost than purchasing from Tarmac.[6] As such, the activities of Hanson and Lafarge Tarmac are predominantly domestic in nature (and there is accordingly some doubt as to whether the potential effect on trade between member states is sufficient for the agreements to fall within the Article 3 of the Regulation).

(b) Hanson, which owns all the plants currently used in GB for producing GGBS, has exclusive rights to purchase all GBS and pelletized slag (together GBS) produced in the UK which is the primary input in the production of GGBS. Hanson and Lafarge Tarmac entered into long-term exclusive supply agreements which were all varied in 1999 and which expire in 2029.

(c) Hanson purchases GBS from Lafarge Tarmac which in turn is the sole producer of such products in GB by virtue of it owning all the plants currently used in GB for producing GBS and of having entered into and maintained a series of exclusive agreements with the GB steel producers.

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[5] [✂]
[6] Ibid, paragraph 58.

(d) The supply agreements between Hanson and Lafarge Tarmac restrict Lafarge Tarmac's ability to sell excess capacity of GBS to any third party who would use such tonnage to produce GGBS or other cementitious product for use, sale or resale in any part of the UK and the price paid by Hanson to Lafarge Tarmac is tied to the price at which Hanson sells GGBS.

(e) It follows from above that there is a high likelihood that the agreements restrict competition within the meaning of Article 101(1) TFEU. We note Hanson's claims that the benefit of the exiting contractual arrangements and exclusivity has most of all been to customers, who have been afforded continuing national access to GGBS and who have been able to maintain a degree of confidence in the continued GB supply of a cheaper cement substitute. However, our analysis of Hanson and Lafarge Tarmac owning all the relevant plants and entering into and maintaining this series of agreements as well as their involvement in the GB cement markets has led the CC to a provisional finding of an AEC in GB observed through higher GGBS and cement prices than would be expected in a well-functioning market. As part of our analysis in this regard, the CC has found that Hanson's profitability for the supply of GGBS in GB was well in excess of the estimate of Hanson's cost of capital, in each of 2007 to 2012, and for all measures of profitability we considered.[7] We conducted an analysis of the profitability of GGBS in order to understand the extent of the AECs provisionally found and the resulting customer detriments. Our current view is that the extent of overcharging for GGBS has been around of the order of £15–20 million on average per year over the six-year period from 2007 to 2012.[8]

(f) We are of the view that the competition problems in the GGBS market are unlikely to be self-correcting and that the adverse effects would endure at the

[7] ibid, paragraph 56 and Appendix A to that paper.
[8] We note that the parties will be afforded the opportunity to respond to the CC on this analysis.

least until the end of the current contractual arrangements in 2029, and possibly beyond. [9]

(g) As set out in the PDR, we have assessed Hanson's claims that there are inherent risks in the UK steel industry which it states is extremely fragile and at real risk of imminent closure, a factor which it claims justifies the long-term supply agreements.[10] We considered the nature of the supply risks concerning GBS and the likelihood of the supply risks concerning GBS. In doing so we considered evidence from the UK steel producers, Tata and SSI. We concluded that we would place limited weight on changes in GBS production volumes seen over the last three years, as a guide to levels and variability of future GBS production. We note that the steel producers did not indicate any intention to scale back their production and that the recent acquisition by SSI of the Teesside steelworks could be regarded as an indication of investor confidence in the UK steel industry, which together with the significant investments recently made by both Tata and SSI suggested a more positive outlook for the UK steel industry than that painted by Hanson.

(h) We note Hanson's claim that the high purchase price for Civil and Marine sought to capture the high/pioneering risks undertaken in offering GGBS in the market on a national scale. In our assessment of the costs of remedies, we note that the Civil and Marine GGBS business was well established at the time that Hanson purchased it and therefore that many of the risks that may have been present at the time of the original investment in the business (such as growing demand for GGBS within GB) are likely to have been much less significant at the time that Hanson purchased the business in 2006.[11] We noted that the specific innovation of grinding the slag separately to create GGBS first began in England in the

[9] PDR paragraph 6.110.
[10] CC's provisional decision on remedies, paragraphs 64–89.
[11] Appendix H, Costs of remedies, paragraph 88.

1970s.[12] We also observed from Hanson's GGBS operations that expenditure on marketing accounted for at most [✂] per cent of total costs in 2007 and has accounted for less than [✂] per cent since, dropping below [✂] per cent in 2011 and 2012.[13]

(i) Hanson submitted that there were efficiencies associated with the existence of a single GGBS producer. We have considered these efficiencies in our assessment of the costs of remedies in Appendix 8, paragraphs 97 to 105. We concluded that there are unlikely to be any RCBs from Hanson being able to swap production from one GGBS plant to another to remedy potential shortages in the supply of GBS at a particular plant; these being benefits which can be obtained through the normal process of competition between suppliers of a certain product. We noted that there may be some efficiencies associated with Hanson holding a portfolio of GGBS plans and thereby having flexibility to manage production across its plants. However, from a customer perspective, we considered that the ability to muti-source form a number of different suppliers would encourage GGBS producers to offer keener and more competitive prices to its customers.[14] Overall, we concluded that we had not seen evidence of significant efficiencies arising from Hanson being the single producer of GGBS in GB. We consider that, for essentially the same reasons, this point is unlikely to establish benefits to consumers for the purposes of Article 101(3) TFEU.

9. In considering effective remedial action to the AECs provisionally found, the CC will of course have regard to any duties arising under Article 3 of the Regulation, and for that purpose may have to reach a view as to whether particular agreements are in fact prohibited by Article 101 TFEU. Taking the above points together with our findings concerning the impact of the agreements on consumers (GGBS and cement

[12] We also noted that the technology for using GGBS as a cement replacement has been available since the 19th century and that the use of GGBS for this purpose within GB dates back at least to the Second World War. Supra.
[13] ibid, paragraph 104.
[14] Ibid, paragraph 103.

prices higher than they would otherwise be if GGBS was a well-functioning market), our preliminary view is that the CC would not be in breach of its Article 3(2) duty by proceeding with the remedial action set out in this provisional decision on remedies. The CC will keep under review its need to conduct further analysis of the agreements and will take account of parties' views on the issues raised in this appendix in doing so.

Costs of remedies

Introduction

1. This appendix sets out our analysis of the costs associated with each of the measures in our proposed package of remedies:

   (a) a cement plant divestiture involving either Lafarge Tarmac's Cauldon or Tunstead plant;

   (b) two measures aimed at reducing the extent of market transparency:

   (i) restrictions on the publication of GB cement market data; and

   (ii) a prohibition of the practice of issuing generic cement price announcements; and

   (c) measures to increase competition in the GGBS supply chain.

2. This analysis informs our assessment of the proportionality of our proposed remedy measures (see paragraphs 6.46 to 6.128) and is based on the evidence that we have been able to collect to date in relation to these measures. We would welcome views on this analysis and invite further evidence on the costs of our proposed remedies. We will give careful consideration to such comments and further evidence in reaching our final decision.

3. We examine the costs of each of the measures in turn.

Costs of divestiture of Lafarge Tarmac's Cauldon or Tunstead plant

4. We consider the costs associated with divesting either Lafarge Tarmac's Cauldon or Tunstead plant (see Figure 3.1) of the main text).

5. Lafarge Tarmac submitted some evidence and its views on the costs associated with the divestiture of a cement plant.[1] Some of the other GB cement producers also submitted evidence and their views on the types of costs that were likely to be associated with a cement plant divestiture (see paragraphs 6.90 to 6.99). Of the categories of costs put forward to us, we considered the following to be relevant to our assessment:

   (a) One-off costs associated with a cement plant divestiture. These include:

   (i) the costs of separation, including both the costs of separating the divested assets from Lafarge Tarmac and the costs of reorganizing the retained operations with a smaller network of plants;

   (ii) the costs of implementing the divestiture, including fees payable to third-party advisers, eg bankers and lawyers; and

   (iii) the costs to the divesting party of not attracting a fair value for the divested assets.

   (b) Ongoing costs. These costs mainly relate to the loss of any economies of scale and scope to Lafarge Tarmac from operating a smaller network of plants.

6. We examine each of the above categories of costs further below.

7. Some parties identified other categories of costs that might be associated with the divestiture of a cement plant, which we considered not to be relevant to our assessment. We discuss these at paragraphs 55 to 59 below.

8. To assist us in our analysis, we requested Lafarge Tarmac to provide us with information on the costs that were associated with its recent sale of the Hope divestiture package to MI, which comprised the Hope cement plant and a package of associated operations including both Lafarge's and Tarmac's RMX, aggregates and

[1] Lafarge Tarmac response to provisional findings and notice of possible remedies, 25 June 2013; and other submissions.

asphalt sites (the Hope divestiture package). We recognized that the divestiture of the Hope divestiture package would have entailed different costs from those that may be incurred from the potential separation of either the Cauldon or Tunstead plant, for example due to factors specific to the cement plant; the larger scale and complexity of the Hope divestiture package; and the fact that the divested assets that formed part of the Hope divestiture package came from two firms rather than one. However, we considered that evidence concerning the costs of divesting the Hope divestiture package could provide us with some insight—albeit likely to be an overestimate given the additional scale and complexity of the Hope divestiture package and divestiture process—into the costs of a divestiture of either the Cauldon or Tunstead plant.

9. To place into context the issues associated with separating either the Cauldon or Tunstead plant from Lafarge Tarmac's network of plants, and the potential costs associated with operating a smaller network of plants, we first outline Lafarge Tarmac's current network of cement plants and the possible impact of a cement plant divestiture on its network.

Lafarge Tarmac's current network of cement plants and the impact of divestiture

10. Lafarge Tarmac operates four cement plants in GB, namely the Aberthaw, Cauldon, Dunbar, and Tunstead plants, as well as one specialist cement facility at Barnstone, and a number of depots and blending stations. Divestiture of either the Tunstead or Cauldon plant would:

(a) reduce the number of cement plants operated by Lafarge Tarmac in GB from four to three;

(b) reduce Lafarge Tarmac's GB cement production capacity by around [✂] Mt per year (nameplate capacity) out of a current total nameplate capacity of around [✂] million tonnes, ie Lafarge Tarmac's GB cement production capacity would be reduced by around 30 per cent; and

(c) whilst the Cauldon and Tunstead plants are located relatively close to each other, and have similar catchment areas in relation to 50 per cent of their respective sales volumes, we found that the Tunstead plant has a wider customer catchment area than the Cauldon plant at the 80 and 90 per cent levels (see paragraphs 26 to 29 of Annex E of Appendix 4). Therefore, there might be some impact on the geographical coverage that Lafarge Tarmac would be able to achieve depending on which of the two cement plants is divested.

11. For the purpose of our analysis of the costs of remedies that follows, it is worth noting some of the specific assets that are associated with each of the two cement plants:

(a) The Tunstead plant is partially rail-linked whilst the Cauldon plant is not rail-linked.

(b) Cauldon has [✂] cement packers, [✂] of which produce plastic-packed cement products, the other paper packed products.

(c) Cauldon is home to Lafarge Tarmac's National Laboratory and Sapphire Energy Recovery, Lafarge Tarmac's alternative energy operations.

One-off costs of divestiture

12. The following broad categories of one-off costs may be associated with a cement plant divestiture:

(a) costs of running the divestiture process;

(b) one-off costs of separating either the Tunstead or Cauldon plant from the Lafarge Tarmac business, including costs of restructuring Lafarge Tarmac's remaining business across a smaller network of plants; and

(c) any cost to Lafarge Tarmac of not realizing a fair value for the divested plant.

13. We examine each of the above in turn.

One-off costs of running the divestiture process

14. Lafarge Tarmac submitted that the divestiture of one of its cement plants would entail the following one-off costs in relation to running the divestiture process:

(a) Costs arising from diverting management and staff time to assess and run the divestiture process, including preparing due diligence data rooms; responding to queries; conducting site visits; and collecting, preparing and verifying data and information provided to potential purchasers. Lafarge Tarmac told us that [✂] full-time equivalent mid-senior level employees were involved in managing the divestiture process of the Hope divestiture package, which took place between May 2012 and January 2013. Whilst we acknowledge that the work involved in separating out a cement plant from a network is considerable, we would expect the resources employed in the divestiture of the Hope divestiture package to represent an overestimate of the potential management costs associated with a divestiture of either the Cauldon or Tunstead plant, as the divestiture package under our remedy proposal would be smaller; involve many fewer sites; and would not involve a 'mix-and-match' of operations from two separate parent companies, ie Anglo American and Lafarge.

(b) Costs associated with the uncertainty up until the point of divestiture, during which time capital expenditure would be suspended which may otherwise have resulted in efficiency improvements. Lafarge Tarmac told us that it was not able to put forward an estimate of these costs in relation to the divestiture of the Hope divestiture package. We did not consider that the cost of uncertainty would be significant as any uncertainty on whether a particular cement plant would be divested was largely within Lafarge Tarmac's control and, in any case, would be substantially reduced once Lafarge Tarmac decides which cement plant it chooses to divest.

(c) Costs of appointing an investment bank to run a sale process. Lafarge Tarmac told us that the costs of appointing an investment bank to run the sale process

would be around 3 to 5 per cent of the sale price. Lafarge Tarmac did not provide any information or documentary evidence about the scale of the fees which Lafarge and Anglo American had paid in relation to the divestiture of the Hope divestiture package, although we would expect such evidence to exist.

(d) Costs of legal fees to negotiate and agree the sale and purchase agreement. Lafarge Tarmac did not provide any information or documentary evidence about the scale of such fees, either in general or in relation to what Lafarge and Anglo American had paid in relation to the divestiture of the Hope divestiture package. Again, we would expect such evidence to exist.

(e) Costs of appointing a monitoring trustee. Based on our experience, we would not expect this to exceed £0.5–0.75 million.

One-off costs of separation

15. Some of the one-off costs of divestiture relate to the costs of separating the relevant cement plant from Lafarge Tarmac's remaining network. In this context, Lafarge Tarmac identified the following costs:

(a) Costs of physically extracting the asset from the network (including costs of purchasing new hardware required to operate two separate IT systems). Lafarge Tarmac told us that it had incurred £[✂] million in creating an IT system for HCM as part of the divestiture of the Hope divestiture package.

(b) Capital investment in the residual network to replicate key elements lost in the divestiture, eg rail-linking, packing facilities, blending facilities, storage for products, laboratory, and alternative fuel operations.

16. In relation to item *(b)* above, we considered that the costs associated with any capital investment that Lafarge Tarmac might need to make to replicate any key elements lost through the divestiture of a cement plant to be potentially relevant, though only in part.

17. We considered that the costs associated with replicating key elements of Lafarge Tarmac's plant sold in the divestiture would not be relevant costs if those key elements were wholly part of the production process of the cement plant being divested. Subject to considerations about the risk of not receiving a fair value on divestiture, which we consider further below, we concluded that the cost to Lafarge Tarmac of having those key elements divested would be fully reflected in the sale price of the divestiture.

18. On the other hand, we considered it appropriate to take account of any one-off costs incurred by Lafarge Tarmac to reorganize its network in order to continue the same activities from the set of plants that remain in its network as before. The divestiture of a key asset would give rise to such costs to the extent that the divested asset was also part of the production process of Lafarge Tarmac's remaining business.

19. Among the assets which could be divested as part of a divestiture of either the Cauldon or Tunstead plant, we found that the following assets have played an important part in Lafarge Tarmac's wider operations:

    (a) The limestone quarry at Tunstead. This quarry supplies limestone to Tunstead plant and to Lafarge Tarmac's lime business. We would consider various options for this quarry, including divesting it with the cement plant or requiring Lafarge Tarmac to provide a purchaser with access to limestone as part of the divestiture agreement. Given this, we would not expect Lafarge Tarmac's wider operations to be adversely impacted should it choose to divest its Tunstead plant (see paragraph 3.128).

    (b) National Laboratory. Lafarge Tarmac's National Laboratory is located within the Cauldon plant and conducts research and development activities into cement and concrete applications. We would not require or expect Lafarge Tarmac to divest the National Laboratory, should it choose to divest the Cauldon plant. In that

event, Lafarge Tarmac would retain the employment of the laboratory staff and relevant laboratory *equipment that could* be extracted from the site. Lafarge Tarmac would incur some costs of relocating the facility. The evidence submitted by Lafarge Tarmac to date did not suggest that the costs of such relocation were likely to be large, given that Lafarge Tarmac also has other operations close to the Cauldon plant (notably the Tunstead plant) and these could be potential candidate locations to which to relocate its laboratory. We would expect Lafarge Tarmac to be able to find alternative locations sufficiently close to the Cauldon plant, whether at other locations owned by Lafarge Tarmac or not, that would allow Lafarge Tarmac to retain its current laboratory staff. We note that in 2007 Lafarge Tarmac had relocated its National Laboratory from Greenhithe (Kent) to its current site in Cauldon. Lafarge Tarmac told us that that relocation had taken several years to plan and implement.

(c) *Sapphire Energy Recovery*. This is Lafarge Tarmac's alternative fuel operations, which are located at the Cauldon site. We would consider various options in relation to these operations, which would not necessarily form part of any divestiture package. We therefore recognize that some facilities and employees of Sapphire Energy Recovery might need to relocate should the Cauldon plant be divested. This would involve the relocation of the Sapphire Energy Recovery staff working at the Cauldon site. In 2011, Sapphire Energy Recovery employed around [✂] staff. However, we expect that not all of the staff to be based in Cauldon.[2] We considered that it would be a commercial decision for Sapphire Energy Recovery and any acquirer of the Cauldon plant to decide whether or not the Cauldon plant continued to use the alternative fuels provided by Sapphire Energy Recovery to power the Cauldon plant following any divestiture.

[2] Sapphire Energy Recovery annual accounts for 2011 report the number of employees as [✂]. We understand Sapphire Energy Recovery operates various regional facilities across the country, where we expect some of the 51 to be based.

20. We have not identified any other major assets that would be divested as part of the divestiture of either the Cauldon or Tunstead plant, which are employed in the production process of what would be Lafarge Tarmac's remaining network. In particular, we are not aware that any of the packaging facilities, blending facilities, rail depots and other depots that would be divested as part of the divestiture of either the Cauldon or Tunstead plant are shared to any significant extent by the remaining cement plants within Lafarge Tarmac's network. However, we will consider any further information about one-off costs associated with any network reorganization.

21. We noted that, during the Anglo-Lafarge remedies process, Anglo American and Lafarge had opted to integrate the Tunstead plant into Lafarge's network and divest the Hope plant, rather than divesting the Tunstead plant (which was not part of Lafarge's network). Lafarge therefore chose not to avoid the one-off costs associated with the separation of the Hope plant and those associated with the integration of the Tunstead plant into its network. This suggests that the perceived benefits of acquiring the Tunstead plant rather than keeping the Hope plant outweighed any costs of separation and integration.

Cost of not achieving fair value

22. Lafarge Tarmac submitted to us that it would face a risk that the divestiture of one of its cement plants would not attract a fair value. We see fair value as being the value that the sale of the asset would achieve when the sale process is not unduly hindered, and where there is competition among potential buyers for the purchase of the asset. Further, fair value reflects the valuation by interested buyers of the business assuming that that business operates in a competitive environment.

23. Lafarge Tarmac told us that the conditions of a forced sale would render it highly unlikely that the seller would obtain full or fair value for the asset.[3] Further, it put to us that in the present case, given that the other major GB cement producers would be excluded as potential purchasers, there was every reason to suppose that there would be very few, if any, purchasers for a cement plant and the seller would therefore be likely to obtain a price well below the fair value of the cement plant.[4]

24. In our view, the potential difference between the sale price of divested assets and their fair value was a cost that would be relevant to our consideration. We considered that a seller's ability to secure a fair price for its divested assets would be affected by its ability to generate competition to buy the assets. There are a number of factors that would contribute to this:

(a) Consideration of the number, and type, of potential purchasers. We have provisionally decided to exclude from the set of potential buyers, the other GB cement producers, namely Hanson, Cemex and HCM (MI). However, we expect interest in acquiring a divested cement plant to come from other sources, both within and outside the cement industry. At the time of the remedies process for the Anglo-Lafarge JV in 2012, for example, we saw evidence of interest from a variety of parties interested in acquiring a cement plant. [✂] In our view, Anglo American and Lafarge were able to attract a number of credible bidders to generate sufficient competitive tension to ensure that Hope divestiture package was sold at a fair price.

(b) Consideration of the cement plant being divested, and of the divestiture package as a whole, eg whether or not some RMX plants would be included in the divestiture package. We reflected on the parties' views on what would represent a suitable divestiture package in the design of this remedy (see paragraphs 3.39

[3] Lafarge Tarmac response to provisional findings and notice of possible remedies, paragraphs 234 & 235.
[4] Lafarge Tarmac response to provisional findings and notice of possible remedies, paragraph 234.

to 3.147). We expect either the Cauldon or Tunstead plant, together with the envisaged RMX plant divestitures and other facilities (eg depots), to be attractive to potential purchasers.

(c) Consideration of time allowed for the divestiture to happen. Our provisional decision is that we should allow [✂] months for divestiture following agreement of undertakings or an Order (whichever may be appropriate). This is significantly longer than the period of time (just over [✂] months) between the CC's final report on the Anglo-Lafarge JV inquiry and the divestiture of the Hope divestiture package. We concluded that our proposed maximum divestiture period in relation to the divestiture of either the Cauldon or Tunstead plant is more than adequate to enable Lafarge Tarmac to secure a fair value for its assets.

25. A report prepared by Lafarge Tarmac's external financial expert stated that the EBITDA contribution of the Hope plant to Lafarge's UK business, prior to the creation of Lafarge Tarmac was £[✂] million, and that the EBITDA of the whole business that was divested was £[✂] million and that the sale price of the whole business was £[✂] million, ie the Enterprise Value (EV).[5] Based on these numbers, Lafarge Tarmac's external financial expert attributed a transaction price relating to the Hope plant of £[✂] million ([✂]).[6] Lafarge Tarmac submitted that this represented an EV/EBITDA of [✂], which it perceived as a low number and indicative of having sold the Hope plant at a significant discount.

26. We considered this analysis. We noted that the £[✂] million EBITDA attributed to the Hope plant was based on the EBITDA of the Hope plant in 2011 before the allocation of any central costs. However, we considered it more appropriate for the exercise at hand to take into account the EBITDA after the allocation of central costs given that

[5] Expert Report of Professor Chris Higson, paragraph 52. The report was submitted as part of Lafarge Tarmac's response to the provisional findings.
[6] Expert Report of Professor Chris Higson, paragraph 52. The report was submitted as part of Lafarge Tarmac's response to the provisional findings.

central costs (or at least its allocation) would necessarily be incurred by any purchaser of the Hope plant, and we would expect a purchaser to take such costs into consideration. We used Lafarge Tarmac's own allocation of central costs to its Hope plant, and calculated that the EBITDA after central cost allocations of the Hope plant was around £[✂] million in 2011 and £[✂] million in 2012. In our view, since the transaction was completed in January 2013, we would expect the Hope plant's 2012 EBITDA (outturn) to have been a relevant consideration in its valuation.

27. If we take Lafarge Tarmac's estimate of the EV of the Hope plant element of £[✂] million, then based on the Hope plant's 2012 EBITDA of £[✂] million, the EV/EBITDA multiple achieved on its sale would be eight times whilst the multiple would be six times if 2011 EBITDA of £[✂] million was used. Furthermore, we also note that in Lafarge Tarmac's submission, the allocation of the total purchase price to the Hope plant element was based on the proportion of the EBITDA of the divestiture package accounted for by the Hope plant. This implies that the same EV/EBITDA multiple applies for the Hope plant as well as for each of the other divested assets, including aggregates sites, asphalt and RMX plants. Given the inherent and significant differences between such production assets and respective markets of operation, we did not expect that the same valuation multiple should apply to each of these different operations. Given this, as well as the inherent uncertainty in such exercises, we did not consider that this analysis of valuation multiples provided any evidence that Lafarge Tarmac received less than fair value for the sale of the Hope plant.

28. Lafarge Tarmac also submitted an extract from a broker report listing the EV/EBITDA multiples of European building companies. Based on this report's 2012 data, these multiples ranged from 5.8 to 13.2, with the sector average reported to be 8.5. Lafarge Tarmac also told us that the value of consideration on the sale of a cement plant in

Honduras by Lafarge SA was 8.6 times EBITDA. We attached little weight to this evidence as we considered that the trading valuation multiples of European building material companies (some of which operated outside our reference markets) and the sale of a cement plant in Honduras were far removed from the scenario we are interested in, ie the sale of one cement plant and a relatively small number of RMX plants within GB.

29. With regard to drawing a comparison between the level of interest in the purchase of the Hope plant in 2012 and the level of interest that there might be in the purchase of either the Cauldon or Tunstead plant under our proposed remedy, we note that there are some signs that the cement industry has moved on in the cycle. Monthly data from the MPA on GB cement sales up to and including July 2013 show that year-on-year sales have slowly increased since March 2013. To the extent that this reflects an upturn in the market, we might anticipate that expectations of future market growth would be reflected in the level of interest in the purchase of a GB cement plant at this point in time and, to some degree, in purchasers' valuations of the opportunity to enter the GB cement market in this way.

30. It is also the case that we are proposing a significantly longer period to implement this remedy than the period taken to complete the divestiture of the Hope divestiture package. We considered that this longer time period will further reduce the risk of Lafarge Tarmac selling the relevant assets below fair value.

Conclusions on one-off costs

31. We concluded that the one-off costs associated with the divestiture of either the Cauldon or Tunstead plant by Lafarge Tarmac, which are relevant to our assessment relate principally to the costs of separation and to the costs of carrying out the divestiture process. We further concluded that there was no evidence to suggest that

Lafarge Tarmac would not be able to receive a fair value for any of its divested operations.

32. Taking the evidence as a whole, we considered that these one-off costs could be in the region of around £10–20 million.

Ongoing costs associated with the divestiture of a cement plant

33. We considered that the relevant costs that would be ongoing as a result of the divestiture of a cement plant would be those associated with any economies of scale or scope that would be lost as a result of divestiture. Lafarge Tarmac submitted that there were efficiencies associated with the operation of a network of cement plants, and that the divestiture of one of its cement plants would mean that it would lose these, and raise the costs of production faced by Lafarge Tarmac.

Ongoing costs identified by Lafarge Tarmac

34. Lafarge Tarmac submitted that a divestiture of a cement plant was bound to cause significant harm to its efficiency of production and cause considerable disruption to production. It submitted that the reduction in the size of one of the major GB cement producers may result in an increase in average and marginal costs, and that this would be to the ultimate detriment of consumers. It told us that at present, Lafarge Tarmac operated effectively at full capacity at its operations at the Aberthaw, Tunstead and Cauldon plants, and that this network allowed certain efficiencies, such as Lafarge Tarmac's ability to concentrate bagged production atthe Cauldon.plant Lafarge Tarmac submitted that a divestiture would therefore undermine its operational efficiency.[7]

[7] Lafarge Tarmac response to provisional findings and notice of possible remedies, paragraph 237.

35. Lafarge Tarmac also submitted that, if it divested one of its cement plants, it would face increases in the costs of operating its remaining network of plants, as reduced scale would diminish its economies of scale. Specifically, Lafarge Tarmac submitted that:

(a) Cost efficiencies associated with the sharing of resources across cement plants, such as management and administration, and IT facilities would be reduced.

(b) The reduced size of Lafarge Tarmac's remaining network would likely diminish its negotiating power with its upstream suppliers, therefore increasing the unit cost of its inputs, such as fuels and raw materials.

(c) Road hauliers and rail freight providers would likely increase their rates to Lafarge Tarmac on the basis that they would be servicing a smaller network.

(d) A reduction in its cement plant network would have detrimental effects on Lafarge Tarmac's ability, and flexibility, to supply customers, as it would not be able to rely on as extensive a distribution network as it currently runs.

(e) The critical mass required for Lafarge Tarmac to justify research and development of new products for GB consumers would be eroded, thereby limiting the development of new value-creating services or low carbon products.

(f) Lafarge Tarmac would have a reduced capacity to benchmark efficiency and costs across and between cement plants that had the effect of driving efficiencies further.

(g) Lafarge Tarmac would have reduced resilience in its retained network to withstand instances of plant breakdowns and, accordingly, would need to increase spending on maintenance in order to reduce further the risk of breakdowns. Reduced resilience to breakdowns would have a direct impact on customers as a result of Lafarge Tarmac's reduced ability to ensure continuity of supply.

(h) Lafarge Tarmac also told us that it derived significant benefit from its current network by being able to draw on the management and expertise of a large team

of managers with extensive depth of experiences, and that to the extent that existing staff would move with the divested plant, the loss of such experience and corporate knowledge would give rise to further, unquantifiable costs.

(i) Lafarge Tarmac would have a smaller asset base from which revenues could be generated to meet these increased costs.

36. We asked Lafarge Tarmac to provide further evidence and analysis of these costs, drawing on its experience of the divestiture of the Hope divestiture package. In response, Lafarge Tarmac submitted its estimates of the ongoing annual costs associated with the divestiture of one of its cement plants, which made a distinction between the additional costs to Lafarge Tarmac; the additional costs to the purchaser of the divested plant; and the ongoing costs related to the loss of efficiencies associated with the separation of the divested plant from the remaining Lafarge Tarmac network. A summary of these estimates is set out in Table 1 below.

TABLE 1 **Lafarge Tarmac estimates of annual on-going costs of a cement plant divestiture (£ million per year)**

	£m per year
Additional cost to Lafarge Tarmac	
Selling General & Administrative costs (SG&A)	[✂]
Logistics contract and raw materials	[✂]
Purchase of other products	[✂]
	[✂]
Additional cost to new entrant (ie to a purchaser of a divested plant)	
SG&A	[✂]
Logistics contracts and raw materials	[✂]
Purchase of other products	[✂]
Establishment of a laboratory facility	[✂]
	[✂]
Inefficiencies of separation from Lafarge Tarmac's network	[✂]
Total	**£27.0 m**

Source: Lafarge Tarmac submission to the CC 11 September 2013, paragraphs 2.4–2.6.

37. We understand that the estimated £[✂] million associated with the inefficiencies from separating a cement plant from Lafarge Tarmac's network was based on the estimated synergies that Lafarge Tarmac expects to make at the Tunstead plant following the integration of that plant into its network. It argued that such synergies could be seen as an estimate of the additional costs a cement plant would face if it

moved away from the remaining network. We consider this issue further in paragraphs 47 to 52 below.

38. Lafarge Tarmac did not provide us with details of its workings and assumptions underlying its estimates of the other two sets of costs. This significantly reduces the weight that we can place on these estimates at this stage and we will continue to explore the basis of these estimates between now and publication of our final report. Moreover, a number of these costs seemed to us either not to be relevant or highly uncertain to arise in practice. For example, we did not find any reason why Lafarge Tarmac should incur any additional overhead (SG&A) costs for running a smaller network of cement plants. Nor did we consider that a potential purchaser would necessarily have to incur additional overhead costs of the scale anticipated by Lafarge Tarmac to run the divested business, if for example, a purchaser could combine its overheads with its other operations. The other categories of cost relate mainly to the terms on which Lafarge Tarmac and any purchaser of a cement plant could procure their inputs, which would depend on a range of factors, including the overall negotiating position of any purchaser of a cement plant as well as the scale of its cement activities. We consider this further below.

Our assessment of relevant ongoing costs

39. We considered that the main relevant costs that were identified by Lafarge Tarmac and which may be directly related to a reduction in the number of its plants and scale of its operations were the following:

(a) obtaining worse conditions from suppliers on the purchase of raw materials, energy, fuel, rail and road freight as a consequence of its reduced purchases of these goods and services; and

(b) a reduction in Lafarge Tarmac's flexibility to plan production across a larger number of cement plants (including possibly increased maintenance costs and loss of efficiencies in production and sales due to specialization of certain plants).

40. We consider each of these in turn below.

41. Table 1 in Annex F of Appendix 4 sets out the top five raw materials by volume consumed at each of Lafarge Tarmac's cement plants during 2012. To inform our view on the potential effect on the reduced purchasing power associated with the divestiture of a cement plant, we considered the overlap in the purchase of these top five raw materials between the plant that would be divested, either the Cauldon or Tunstead plant, and the remaining cement plants. The only overlap we identified related to Lafarge Tarmac's purchases of gypsum from [✂] for both its Cauldon and Tunstead plants. Each cement plant used around [✂]. There were no other overlaps in the purchase of the remaining set of top five raw materials as Lafarge Tarmac either sources the remaining top five raw material internally, or because it sources them from different external providers.

42. With regard to the purchase of energy, we understand that Lafarge Tarmac procures its energy at a UK-wide company level, which covers both its cement and other building materials operations (eg aggregates, RMX and asphalt) in GB and in Northern Ireland. We calculated that its cement plants accounted for a significant proportion of the total energy consumed at the company-wide level—around [✂] per cent in 2012 based on consumption data that included the Hope plant but excluded the Tunstead plant. This suggests that the sale of either the Cauldon or Tunstead plant could lead to a reduction in the amount of energy purchased by Lafarge Tarmac of around [✂]. We do not have information on how this may be expected to impact on Lafarge Tarmac's per unit energy cost, if at all.

43. The divestiture of either the Cauldon or Tunstead plant would also have a material impact on volumes transported by road; and a divestiture of the Tunstead plant would reduce volumes transported by rail (see Table 1 in Annex D of Appendix 4). Lafarge Tarmac submitted to us that road hauliers and freight train operators would offer it poorer terms if volumes were to reduce. Again, Lafarge Tarmac did not support its argument with information or evidence on how this may be expected to impact it's per unit transport cost, if at all.

44. We considered that there may be some loss of efficiency associated with Lafarge Tarmac having less flexibility to plan production across its network of plants following the divestiture of one cement plant. For example, if Lafarge Tarmac decided to interrupt or reduce production at one plant for maintenance purposes it may find it harder to meet demand by managing (and increasing) production at its remaining plants. We note, however, that, following the divestiture of either the Cauldon or Tunstead plant, Lafarge Tarmac would still retain around [✂] Mt of capacity, higher than that of any of the other GB cement producers.

45. We recognize that, following a cement plant divestiture and the choice by Lafarge Tarmac to replicate any lost capabilities, it may lose some efficiencies associated with specialization in its remaining plants. For example, were the Cauldon plant to be divested and Lafarge Tarmac decided to divert some of its production at the Tunstead plant away from bulk cement and towards packed cement, it may lose some efficiencies with regard to bulk cement. However, we have not seen evidence on the significance of this additional cost.

Categories of ongoing costs that we consider to be not relevant or not significant

46. Lafarge Tarmac submitted several categories of ongoing costs associated with the divestiture of a cement plant which we did not consider to be significant and/or relevant:

(a) Reduction in research and development (R&D) to develop new products for GB consumers because of the smaller size of Lafarge Tarmac's cement business in GB. In our view, Lafarge Tarmac benefits primarily from the R&D activities carried out by Lafarge SA on a global scale, and therefore a reduction in total GB sales is unlikely to impact materially on the R&D decisions of Lafarge Tarmac. The benefit to Lafarge Tarmac of the R&D carried out by Lafarge SA was a factor put forward by the main parties during the CC's investigation into the Anglo-Lafarge JV.

(b) Lafarge Tarmac also told us that it would have reduced capacity to benchmark efficiency and costs across and between plants, which had enabled driving efficiencies further. We are not persuaded by this argument. Lafarge Tarmac would continue to run three cement plants in GB, and we expect it would be still be able to benefit from benchmarking exercises with Lafarge SA's plants operated both in Europe and elsewhere. For example, in our provisional findings, Lafarge Tarmac stated that it could use technical key performance indicator data for [✂].[8]

(c) Lafarge Tarmac also told us that it derived significant benefit from its current network by being able to draw on the management and expertise of a large team of managers with extensive depth of experiences, and that to the extent that existing staff would move with the divested plant, the loss of such experience and corporate knowledge would give rise to further, unquantifiable, costs. Again, we considered that Lafarge Tarmac would continue to be able to benefit from

[8] Provisional findings, Appendix 6.5, paragraph 25*(a)*.

expertise and management of staff at its remaining three plants, as well as that from Lafarge SA's very extensive set of plants outside GB.

(d) Lafarge Tarmac would have a smaller asset base from which revenues can be generated to meet these increased costs. We considered that this point was a representation of the arguments put forward by Lafarge Tarmac in relation to the loss of efficiencies of scale and of network. We addressed those earlier.

Expected synergies at the Tunstead plant following the Anglo-Lafarge JV

47. In support of its submission, Lafarge Tarmac provided information on the synergies achieved by Lafarge Tarmac through the integration of the Tunstead plant. It told us that these synergies would amount to up to £[✂] million per year. This estimate forms the basis for Lafarge Tarmac's estimate that the one-off costs of separating a cement plant would be around £[✂] million (see paragraph 37 above).

48. The breakdown of the estimated synergies is set out in Table 2 below, which reports the sum of the synergies in 2015 at £[✂] million rather than the £[✂] million as quoted earlier.[9] We were told by Lafarge Tarmac that the figure of £[✂] million was a revision of the initial £[✂] million. We were not shown a breakdown based on the revised total and therefore we have decided to report the breakdown based on the unrevised higher figure.

[9] The figure of £[✂] million is reported in Table 3 of Lafarge Tarmac's submission to the CC on 31 July 2013.

TABLE [2] **Lafarge Tarmac's estimates of synergies from operating the Tunstead plant as part of its wider network, 2013–2015 (£ million)**

Synergy area	*2013*	*2014*	*2015*
Alternative fuels (10% increase in use of alternative fuels at the Tunstead plant)	[✂]	[✂]	[✂]
Grinding power	[✂]	[✂]	[✂]
Fixed cost reductions (reductions in the Tunstead plant's maintenance costs as a result of being part of a wider network, therefore being able to accept more breakdown risk. And relying on Lafarge's UK experience in maintaining cement plants in accordance with OEM guidance)	[✂]	[✂]	[✂]
Reduction in operating costs – SNCR[10] (reductions in the Tunstead plant's variable costs and reductions in material costs as a result of the SNCR capex)	[✂]	[✂]	[✂]
Increased proportion of production from the Tunstead plant (re-allocation of volumes to the Tunstead plant from a more expensive plant resulting in variable cost savings)	[✂]	[✂]	[✂]
Reduction in the Tunstead plant's variable costs	[✂]	[✂]	[✂]
Tunstead quarrying benefits identified in geo-mining review	[✂]	[✂]	[✂]
Significant improvements in product quality as perceived by Lafarge Tarmac customers and reduced customer complaints[11]	[✂]	[✂]	[✂]
Total synergies	[✂]	[✂]	[✂]

Source: Lafarge Tarmac submission to the CC 31 July 2013, Table 3.

49. The headline estimated figure of around £[✂] million of synergies to be achievable in 2015 should be read in the context of the site fixed and variable costs at Tunstead being around £[✂] million in 2012 (see Appendix 4, Annex I, Table 1).

50. In response to our request, Lafarge Tarmac provided further details of how those synergies were expected to be achieved. Based on our assessment of this evidence, the vast majority of the expected synergies related to cost savings expected to be made at the Tunstead plant on the implementation of several management and process changes which were identified by a number of different reviews carried out by Lafarge Tarmac, including through benchmarking practices with other plants within Lafarge SA's international network. Lafarge Tarmac told us that there was significant capital cost associated with the full realization of these synergies, notably involving the procurement and implementation of the SNCR.

51. We did not consider that the changes identified, and consequent expected savings, hinge on the Tunstead plant being part of Lafarge Tarmac's GB network of plants. Lafarge Tarmac is not the only source of expertise on the efficient operation of a

[10] Lafarge Tarmac told us that SNCR is 'Selective Non-Catalytic Reduction', a post combustion technology that is designed to control nitrogen oxides emissions from [✂] by the injection of ammonia or urea that reagents into the flue gas.
[11] Lafarge Tarmac told us that it had not yet quantified this benefit.

cement plant and, while it is no doubt helpful to Lafarge Tarmac to be able to benchmark domestically (and internationally), this is by no means the only way in which efficiency savings can be identified.

52. Nor do we consider it necessary for a party to run a network of four cement plants in GB to carry out a review to identify potential efficiency improvements. We considered that that expertise is available to other parties, either in-house or sourced from external consultants. Moreover, we would expect the increase in competition that we anticipate to arise from the implementation of our remedies to provide a substantial additional spur to efficiency improvements for all GB cement producers.

Conclusions on the ongoing costs of divestiture

53. We concluded that there might be some ongoing costs of the divestiture of a cement plant which would be relevant to our assessment. These are most likely to relate to potential efficiencies that would be lost by Lafarge Tarmac because of the reduction in the size of its network of cement plants.

54. We considered that the estimates provided by Lafarge Tarmac were likely to overestimate substantially the scale and magnitude of such costs and to include a number of costs which were not relevant to our considerations. Taking the evidence before us as a whole, we concluded that these costs were unlikely to exceed around £5 million per year. However, we will continue to explore this issue before the publication of our final report.

Other cement plant divestiture costs that we have considered not to be relevant

55. Lafarge Tarmac and Hanson identified some categories of costs relating to the divestiture of a cement plant which we considered not to be relevant to our assessment of remedies. These covered:

(a) costs associated with not being able to meet the demand of existing customers; and

(b) costs associated with scaling back the offer of value added products.

56. We consider each in turn below.

57. Hanson submitted that the divestiture of one of its cement plants would mean that it would not be able to service the demand of its existing customers (because of its reduced production capacity). We did not consider this to be a relevant cost of the remedies—the aim of a divestiture remedy would be to create a new entrant in the GB cement market who could credibly compete with Hanson and the other GB cement producers to supply cement to customers in GB. Consequently there is no reason to expect that Hanson or any other existing GB cement producer would necessarily retain their current customers or market share, which will depend on the outcome of an enhanced competitive process.

58. Lafarge Tarmac submitted that the divestiture of one of its cement plants would limit its ability to provide value added products (VAPs) to its customers throughout the country. It further submitted that the demand for these proprietary products was increasing and that these products provide significant customer benefits because they saved significant costs through reduced build time or labour requirements.[12]

59. We did not consider that this would be a relevant cost for our assessment. Most VAP innovation related to downstream RMX products, and a divestiture of a cement plant would not prevent Lafarge Tarmac from continuing to produce these products if they were in demand. In relation to the potential divestiture of RMX plants which Lafarge

[12] Lafarge Tarmac response to provisional findings and notice of possible remedies, paragraphs 254–256.

Tarmac may be required to make as part of a cement plant divestiture, we consider this when we assess RCBs in paragraphs 5.37 to 5.40.

Measures to reduce transparency in the GB cement markets

60. We have provisionally decided to take forward two remedy measures designed to reduce transparency in the GB cement markets as a way of contributing to remedying the Coordination AEC. These remedy measures which form part of our proposed package of remedies, are:

(a) a prohibition on GB cement suppliers sending generic cement price announcement letters to their customers; and

(b) restrictions on the publication of GB cement market data.

61. We set out below our assessment of the costs associated with each of these remedy measures.

Prohibition on sending generic cement price announcements

62. Several parties told us that generic price announcement letters were a helpful means for suppliers to provide information to customers about the starting basis for price negotiations (see paragraphs 3.238 to 3.247):

(a) Aggregate Industries considered that the use of price announcement letters in general was an efficient way of communicating forecast price increases to customers, and added that they enabled customers to plan ahead for increases in prices.[13]

(b) Cemex considered that a blanket prohibition on sending generalized price letters to customers would be disproportionate and would create transaction costs for both cement producers and customers.[14]

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[13] AI response to the Remedies Notice, paragraph 5.2.
[14] Cemex response to the Remedies Notice, paragraph 5.8.

(c) Hanson suggested that customers needed to have suitable advance notice of any price increases for business planning purposes (and that the current practice of sending out letters in advance to customers has arisen due to customer requirements).[15]

(d) CPV (Dragon Alfa) noted that generalized price announcement letters provided an indication of what the GB cement producers wanted to achieve and in turn, what it should be doing with its own prices. It added that it had used the generalized price announcement letters it received in its negotiations with its own customers.[16]

(e) Brett Group told us that it found generalized cement price announcement letters helpful and it expected to be written to by cement suppliers with regard to prices going forward.[17]

63. Lafarge Tarmac told us that price announcement letters were still in demand from customers who used them for budgetary and negotiating purposes, but did not oppose the prohibition of generalized letters. It considered that whilst the prohibition of generalized letters would result in some additional administration costs, it would be of benefit to the industry as it would focus cement companies on negotiating individually with their customers.[18]

64. However, the following parties did not believe that generalized letters provided a benefit to customers:

(a) Breedon Aggregates told us that it could not see the 'customer benefit' in receiving generalized price announcement letters and would prefer to receive a personalized letter from a particular cement supplier when it was a natural point

[15] Hanson response to the Remedies Notice, paragraph 7.10.2.
[16] CPV (Dragon Alfa) response hearing summary, paragraph 20.
[17] Brett Group response hearing summary, paragraph 19.
[18] Lafarge Tarmac response hearing summary, paragraph 38.

of the relationship to discuss price rather than receive a generalized price announcement letter along with every other purchaser of cement.[19]

(b) MI (HCM) told us that it could see the 'customer benefit' argument of receiving generalized price increase letters but considered the argument rather light.[20]

65. We did not consider that our proposed remedy would lead suppliers to stop providing information to existing and potential customers on prices that might form the basis for negotiations. As such, we did not expect that, following implementation of this remedy measure, the information provided by suppliers would be any less useful to customers than is currently the case.

66. There might be some minor one-off costs to GB cement suppliers of moving away from using generic price announcement letters as a means of communicating with their customers (eg in setting up systems to send out customer-specific letters). We have not received any estimates of these costs from parties and have no reason to expect them to be significant.

Restrictions on the disclosure of cement market data

67. Most parties, including GB cement producers and other stakeholders in the GB cement markets, told us that they found the cement market data that was currently being published to be of use for a number of reasons, including to assess the overall trend in the market and to support business planning. We were told that this data was also used by private and public entities to assess the UK economy and in particular the construction industry, its market conditions and activity levels, supporting appropriate policy developments, and enabling financial institutions to provide intelligence on the UK market conditions and investment opportunities (see

[19] Breedon Aggregates response hearing summary, paragraph 20.
[20] MI/HCM response hearing summary, paragraph 37.

paragraphs 3.191 to 3.2207 of PDR main text). We also consider this when we assess RCBs in paragraphs 5.48 and 5.49.

68. Our proposal to restrict the disclosure of the data would impact on the benefit GB cement producers and other parties derive from the above uses of the data.

69. BIS indicated that the data it published was primarily used for market and economic information by Government and industry bodies, including construction trade associations,[21] and that its own investigations indicated that cement data was a good predictor of construction output.[22] It added that if the data was embargoed for longer than one month, no forecasting model would be able to use it,[23] and that it could not use cement data that was six months old for forecasting construction market performance.[24]

70. The MPA considered that restricting access to market data except via a Government source would stifle effective market analysis and innovation.[25] It believed that the generation of consistent, managed and transparent data was what the Government was trying to encourage and would relieve the administrative burden from government departments.[26] The MPA told us that through the enquiries it received as a trade association, from a wide range of stakeholders, journalists and the construction industry, there was demand for more data and a sense of where the market was going, in order to inform investment decisions and business planning.[27]

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[21] BIS response to the Remedies Notice, paragraph 9.
[22] ibid, paragraph 10.
[23] ibid, paragraph 11.
[24] BIS response hearing summary, paragraph 2.
[25] MPA response to the Remedies Notice, paragraph 1.4.
[26] MPA response hearing summary, paragraph 11.
[27] ibid, paragraph 12.

71. The MPA set out the following 'pro-competitive benefits' derived from the published MPA cement and cementitious data, stating that the data:[28]

(a) provided regular and consistent aggregated historic market data to support efficient business planning in the cement and cementitious industries;

(b) assisted potential new entrants to the industry and in the supply chain to assess the market;

(c) provided timely data to Government and its various agencies and organizations such as the Bank of England, to help assess UK economic and construction market conditions and activity levels to support policy developments;

(d) enabled financial institutions to provide intelligence on UK market conditions and investment opportunities; and

(e) helped the UK Government and the EU to assess carbon and other emissions against their targets in order to regulate the EU ETS and to monitor progress on a transition to a low carbon economy.

72. Cemex also told us that the publication of MPA and BIS data assisted it with planning its cement production volumes.[29]

73. Hanson told us that a time lag in the publication of MPA and BIS data of three months would not unduly affects its planning but a delay up to six months would be damaging to the industry's ability to allow efficient business and production planning.[30] It was also concerned that restricting regional coverage of data would prevent it from making informed decisions regarding logistics of its regional operations.[31]

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[28] MPA response to the Remedies Notice, paragraph 7.1.
[29] Cemex response hearing summary, paragraph 17.
[30] Hanson response hearing summary, 2 July 2013, paragraph 40.
[31] ibid, paragraph 42.

74. Brett Group considered that the publication of cement market data was an important part of its knowledge from a procurement perspective in relation to: [✂].[32]

75. We have considered the loss of the benefit associated with the proposed restrictions on the disclosure of cement market data. As outlined above, most GB cement producers and other parties in the GB cement markets told us that they considered that the time lag we proposed for the publication of the data did not compromise the benefit to them of using the data (see paragraphs 5.41 to 5.47).

76. We also considered the cost of this restriction on the other parties that are directly involved in the compilation and publication of the data, MPA and Bessler Hendrie. We saw no reason to expect that this restriction would result in any significant additional costs for either of these parties.

Measures to increase competition in the GGBS supply chain

77. We set out in Figure [3.4] our proposed remedy measures in relation to the GGBS supply chain. In summary, these cover:

(a) divestiture of two of Hanson's GGBS plants;

(b) divestiture of two of Lafarge Tarmac's GBS plants; and

(c) as a consequence of *(a)* and *(b)*, the effective cessation of current exclusivity arrangements between operators of GBS plants and of GGBS plants.

78. Below, we first set out what parties have told us regarding the costs associated with these remedies. We then discuss our assessment of the points made, and of other costs of these remedy measures that we consider potentially relevant.

[32] Brett Group response hearing summary, paragraph 20.

Parties' views on the costs of remedies

79. We have received comments on the costs associated with remedies in relation to the GGBS supply chain from Hanson and from Lafarge Tarmac.

80. Hanson submitted that the divestiture of one or several of its GGBS plants would involve the following costs:[33]

(a) Hanson would incur extreme impairment losses: it would impair and remove Hanson's ability to make any return on the investment it had made in the Civil and Marine business in 2006.

(b) It would undermine the rationale for the very high level of investment and risk taken by Hanson in the GGBS business: Hanson submitted that it had developed and invested heavily in the GGBS business over a number of years—including a significant capital investment in the establishment and construction of GGBS grinding operations (that represents considerable sunk costs), as well as substantial market investment in promoting GGBS as an alternative to cement in the concrete production process. Hanson submitted that it had made that investment on the basis of the long-term exclusivity granted under the GBS supply arrangements, in order to provide a basic security of supply for entering the cement substitution market. It told us that the exclusivity provided Hanson with the essential security that it could recover its investment. In its view, the long-term period was both required and appropriate in order for Hanson to make the investment, because of the following risks:

(i) The eventual operators of the GGBS plants would face significant raw material supply-side risks due to the operational uncertainty in the UK steel industry, with any further closures in the steel industry effectively resulting in the end of the national offering of GGBS currently facilitated by Hanson on the basis of the current contractual arrangements.

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[33] Hanson response to notice of possible remedies, paragraphs 6.30–6.40.

(ii) Demand-side risks faced in trying to promote a substitute to cement, given the relatively low level of acceptance of GGBS at the time of the investments, without risks of other producers free riding on the back of the efforts of Hanson in promoting GGBS.

(c) A portfolio of plants is essential to allow Hanson to rotate its supply of GGBS around the three plants, and continue a national offering to the market and to independents, where availability of granulates has been threatened. Hanson told us that this would cease upon any divestments as markets would become localized. Hanson submitted that the current arrangements allow for cost, logistical and environmental efficiencies. Hanson also argued that the quality of GBS produced varied across plants and that if the granulate is not of the correct quality, supply to customers can be made from an alternative plant. Hanson told us that it is essential to maintain the quality of the GGBS produced: Hanson mixes the various qualities of GBS available from different plants to ensure both its customers' quantity and quality requirements.

81. Lafarge Tarmac submitted to us that it may be difficult to attract buyers for the 'individual GBS facilities at each of the steelworks given the high levels of uncertainty facing the long term operation of these works'.[34] We set out below an assessment of the costs associated with the various measures we are considering taking in relation to the GGBS supply chain.

82. We take together the measure relating to the divestiture of two GGBS plants and the measure relating to the divestiture of two GBS plants and consider the cost of these first. We subsequently set out our assessment of the costs relating to the effective cessation of the current exclusivity arrangements between operators of GBS plants and of GGBS plants.

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[34] Lafarge Tarmac response to provisional findings and notice of possible remedies, paragraph 280.

Costs of divestiture of GGBS and GBS plants

83. As in our analysis of the costs associated with the divestiture of a cement plant, we distinguish here between:

(a) *One-off costs of divestiture:* costs which are likely to be linked to the running of the divestiture process as well as to the separation of GGBS and the GBS network in separate businesses.

(b) *Ongoing costs:* in particular any loss of the efficiencies associated with operating a network of GGBS plants, and of GBS plants, across GB.

One-off costs of divestiture

84. We considered that the categories of one-off cost that we outlined in our discussion of the divestiture of cement plants above were also categories that are relevant in our assessment of the one-off costs of divesting GGBS and GBS plants. These cover:

(a) one-off costs associated with running the divestiture process, eg cost of management time, legal fees, banking fees, cost of a monitoring trustee;

(b) one-off costs of physically separating the assets to be divested from the remaining network;

(c) one-off costs associated with the sale of a GGBS or GBS plant below fair value.

85. The costs associated with running the divestiture process itself include the costs of management time, the legal, banking fees, and the costs of a monitoring trustee. We have not received information from the parties on the magnitude or scale of these costs. Nor have we received estimates, or analysis, of the costs of physically separating the GGBS and the GBS facilities from Hanson's and Lafarge Tarmac's respective network of plants.

86. Compared to the costs associated with separating a cement plant from Lafarge Tarmac's network, we expect the cost of separating two GGBS and two GBS from

the remaining relevant network of assets to be significantly smaller as those divisions of the relevant parties are less integrated with the remaining company than is the case for cement production. Further, we understand that in the case of the GBS plants owned by Lafarge Tarmac, one of the GBS plants is operated by Tata, a steel producer. We would expect that separation costs of that GBS plant from Lafarge Tarmac would be smaller than would be the case for its other GBS plants or even immaterial.

87. Hanson submitted that a GGBS plant divestiture remedy would impair and remove Hanson's ability to make any return on the investment it made in the Civil and Marine business in 2006.[35] Essentially, Hanson's argument is that some of the price it paid for Civil and Marine's GGBS business remunerated the original investor for the risk it had taken in setting up the GGBS business, and that any change to the current arrangements would compromise Hanson's ability to recover this investment.

88. We note that Civil and Marine's GGBS business was well established at the time that Hanson purchased the business, and therefore the risks that may have been present at the time of the original investment in the business (such as growing demand for GGBS within GB) are likely to have been much less significant at the time that Hanson purchased the business in 2006. We also note that the technology for using GGBS as a cement replacement has been available since the 19th Century and that the use of GGBS for this purpose within GB dates back at least to the Second World War and that the specific innovation of grinding the slag separately to create GGBS first began in England in the 1970s.[36]

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[35] Hanson response to notice of possible remedies, paragraph 6.31.
[36] Donald W Lewis, PE, Chief Engineer, National Slag Association, History of Slag Cements, presented at University of Alabama Slag Cement Seminar, April 30 1981, p6: www.nationalslag.org/archive/legacy/nsa_181-6_history_of_slag_cements.pdf.

89. To the extent that Hanson had paid a high price for the business because it expected to be able to exercise significant market power as a result of the exclusive rights to produce GGBS in GB, we did not consider any reduction in GGBS profitability (and hence the expected price that could be achieved through divestiture) resulting from a more competitive supply change as being relevant costs for our assessment of remedies.

90. A separate point relates to the risk that Hanson and Lafarge Tarmac may not be able to sell their GGBS and GBS assets respectively for a fair price.

91. Relevant to this consideration is [✂].[37] It would follow from this that a potential purchaser of an individual GGBS plant may view the acquisition as carrying a greater business risk compared with Hanson. If so, this might create a gap between the price a purchaser would be willing to pay for the plant and the value to Hanson of that plant.

92. The relevance of this cost depends on the extent to which there is a risk of closure of a GB steelworks. We assessed the risks associated with closure of a GB steel plant in [paragraphs 3.343 to 3.364, and found that the risk of steel production scaling back in GB did not appear significant.

93. As we discussed in the context of examining the costs relating to the divestiture of a cement plant, there are a number of factors that contribute to this cost:

(a) *Consideration of the number, and type, of potential purchasers*. We are excluding GB cement producers as a purchaser of any of the GGBS or GBS plants that will be divested. In relation to the divestiture of the two GBS plants, there may potentially be a further filter for interested buyers: the purchase needs to be

[37] Hanson response to notice of possible remedies.

approved by the operator of the steelworks to which the GBS facility is located, ie Tata for the GBS plants at Scunthorpe and Port Talbot, and SSI for the GBS plant at Teesside. In this respect, Tata told us that it would not agree that a GBS plant located at one of its steelworks be sold to a party that was involved in the steel industry.[38] Lafarge Tarmac suggested to us that the steel producers were the more likely purchasers of a GBS plant located on their sites,[39] although Tata told us at the hearing that [✂].[40]

(b) Consideration of time allowed for divestiture to complete. We are proposing a divestiture period of [✂] months for the GGBS plant divestitures and [✂] months for the GBS plant divestitures. We considered that this was a sufficiently long period to attract sufficient potential buyers and thereby generate sufficient competitive tension for the plant to enable fair price to be achieved.

Ongoing costs of divestiture

94. Potential ongoing costs associated with the divestiture of GGBS and GBS plants relate to the potential loss in efficiencies that Hanson and Lafarge Tarmac currently enjoy as a result of the existing structure. To assess the potential loss in these efficiencies due to divestiture, it is helpful to distinguish between:

(a) the loss of efficiencies which are associated with there being a single producer (Hanson) of GGBS in GB;

(b) the loss of efficiencies which are associated with there being a single producer (Lafarge Tarmac) of GBS in GB; and

(c) any loss of efficiencies associated with the effective cessation of current exclusivity arrangements between operators of GBS and of GGBS plants.

[38] Summary of response hearing with Tata Steel UK held on 18 July 2013, paragraph 34.
[39] Summary of response hearing with Lafarge Tarmac held on 3 July 2013, paragraph 34.
[40] Summary of response hearing with Tata Steel UK held on 18 July 2013, paragraph 32.

Loss of efficiencies associated with the existence of a single GGBS producer

95. Hanson has submitted that there are a number of significant relevant customer benefits created by efficiencies because it is the sole producer of GGBS in GB:[41]

(a) Hanson submitted that a portfolio of plants allowed it to rotate its supply of GGBS around its three plants, where availability of granulates (GBS) had been threatened. Hanson told us that any divestment or other form of interference would end the current offering of national supply to independents, resulting in smaller localized offerings with less efficiency and higher risk and cost, and an end to the national market. Hanson also argued that the quality of GBS produced varied according to each particular plant and that if the granulate was not of sufficient quality, it currently blended the GBS from across plants, as well as blended with high-quality GBS imported from abroad, to produce GGBS of the requisite quality. Hanson submitted that this allowed for cost, quality and environmental advantages.

(b) Hanson submitted that a single supplier of GB-produced GGBS was required in order to undertake the investment, and make the commitment necessary, to promote the benefits of GGBS such as its environmental advantages. Hanson told us that it was only the experience gained by Hanson from years of investment that made GGBS a viable product for cement substitution.

96. We consider each of these points in turn.

97. Customers are currently able to switch cement between providers, and we considered that customers would be equally able to switch from one GGBS supplier to another if more than one GGBS supplier operated in the market and if one particular GGBS supplier faced difficulties in supplying GGBS. We therefore did not consider that there were any benefits to customers from Hanson being able to swap

[41] Hanson response to notice of possible remedies, paragraph 6.39.

production from one GGBS plant to another to remedy potential shortages in the supply of GBS at a particular plant. We would note that these are precisely the benefits which can be obtained through the normal process of competition between suppliers of a given product. We also consider this when we assess RCBs in paragraphs 5.24 to 5.27.

98. A separate point raised by Hanson was that the access to more than one source of GBS allowed Hanson to blend GBS across plants. Hanson has told us that this allowed it to blend lower quality GBS from a steelworks with high quality GBS from another plant, or imported from Mittal Ghent abroad, to ensure that the resulting GGBS is of the requisite quality. We did not consider this to be relevant for our assessment of the remedies as we found no reason why, following the implementation of the remedies, the GGBS producers—including potentially Hanson—would not be able to continue procuring the required quantities and qualities of GBS from the relevant suppliers which would ensure that the resulting GGBS was of the required quality.

99. Hanson also raised the point that holding a portfolio of GGBS plants allowed Hanson to benefit from cost, logistical and environmental efficiencies, and that these would be lost if two of its plants were divested. Other than the considerations about the rotation of production to deal with security of supply of GBS—discussed above—and about the impact on the commitment to invest in promoting the benefits of GGBS—discussed below—Hanson did not provide evidence on the nature of the 'cost, logistical or environmental efficiencies' that would be lost.

100. We envisage there could potentially be some efficiency losses with respect to:

(a) obtaining worse conditions from suppliers on the purchase of raw materials, energy, fuel and freight as a consequence of its reduced purchase of these goods and services; and

(b) a reduction in Hanson's flexibility to plan production across a larger number of GGBS plants, including possible increased maintenance costs.

101. We consider that the worsening of terms and conditions obtained from suppliers, point *(a)*, is unlikely to be significant. Around [✂] per cent of the variable costs associated with Hanson's GGBS activities at Purfleet are for the purchase of GBS whilst at Scunthorpe and Port Talbot, purchases of GBS account for around [✂] per cent of variable costs (see Table 1 in Annex L of Appendix 6) and we would see no reason for these costs to rise particularly given the changes that we propose to introduce for the supply of GBS. We have no evidence to suggest that costs of other inputs—namely of energy and of other raw materials—would materially increase following divestiture.

102. We recognize that, following divestiture of two of its GGBS plants there may be some loss of efficiencies associated with Hanson having less flexibility to manage production across its plants, for example to interrupt production at one plant for maintenance purposes.

103. In considering the potential loss of efficiencies derived from operating a network of GGBS plants, we note that Hanson currently has five GGBS plants in total, of which three are currently active. As stated in our discussion of the GGBS remedy measure in paragraphs 3.400 to 3.404, there may be a realistic prospect for its mothballed GGBS plants at Teesport and Llanwern to be reactivated, such that Hanson would be able to retain a network of three GGBS plants should it wish to do so following the divestiture of two of its GGBS plants. However, we note that GBS supply

considerations may introduce complexity in relation to how Hanson manages its remaining network of GGBS plants, in particular given the co-location of two GGBS plants with their respective local GBS plants. Our proposed GGBS plant divestiture remedy would result in Hanson not being able to supply customers with GGBS from two plants, but it would not prevent the new owner or owners of these two divested GGBS plants from supplying these customers with GGBS. Therefore, we expect that the scenario described by Hanson could result in encouraging GGBS customers to source GGBS from multiple providers in order to mitigate any perceived risks in relation to the ability of the GGBS provider to supply GGBS. Similarly, GGBS producers may seek to source their GBS from multiple sources in order to mitigate such perceived risks. We also considered that a greater prevalence among GGBS customers of multi-sourcing their GGBS would encourage GGBS producers to offer keener and more competitive prices. Therefore, from a customer perspective, we concluded that this argument might highlight a potential cost for Hanson, but its effect on GGBS customers is likely to be neutral or beneficial.

104. [✂] We did not consider that this represented a significant cost. GGBS is now well established as a cement substitute in GB. To the extent that the different operators of the GGBS plants intend to promote GGBS in general, we see no reason why they would not be able to do so just as effectively. In any event, the figures from the Profit and Loss information for Hanson's GGBS operations showed that expenditure on marketing accounted for at most [✂] per cent of total costs in 2007 but accounted for less than [✂] per cent of total costs since, dropping below [✂] per cent in 2011 and 2012.[42]

[42] The figures are the share of total costs accounted for by the cost item labelled 'Divisional General and Administration costs and sales and marketing' of GGBS profit and loss account. This item includes marketing as well as non-marketing costs, so that the figures given are an overestimate of the share of total costs that correspond to promotional activities.

105. Overall, we have not seen evidence of significant efficiencies that would be lost if the production of GGBS were to be carried out by more than one party.

Loss of efficiencies associated with the existence of a single GBS producer

106. As part of our remedy measures, we propose that Lafarge Tarmac should divest two of its GBS plants.

107. We have seen no evidence that there would be significant efficiency losses were the GBS plants not to be operated all by a single party. We note Lafarge Tarmac's submission to us that it would be possible for three separate and independent firms to each operate a GBS plant (subject to the longevity of the steelworks operations themselves).

Costs associated with the effective cessation of GBS agreements

108. We considered that the most significant costs associated with effectively ending the current exclusivity arrangements between GBS and GGBS producers related to security of supply of GBS.

109. GBS can only be supplied from a limited number of sources: from the GBS plants that are co-located at the steelworks, and from imports from abroad. With the exception of Hanson's Purfleet GGBS plant (and its mothballed Teesport and Llanwern GGBS plants), Hanson's two other active GGBS plants are co-located at the steelworks from which they procure their GBS. There is a high degree of interdependence between GBS production and GGBS production. We found in Annex N of Appendix 6 that GBS ground at the GGBS plants at Port Talbot and Scunthorpe was sourced primarily from their respective GBS plants at the Port Talbot and Scunthorpe steelworks.

110. The GBS agreements that currently govern the supply of GBS between GBS and GGBS producers give both sides some security that neither side will behave opportunistically, eg the GBS producer increasing prices of the GBS supplied to the nearby GGBS plant, knowing that that GGBS producer has limited, if any, alternative sources from which to purchase GBS economically. In principle, the risk of such behaviour could make the purchase of GBS plants and of GGBS plants—especially those GGBS plants located at or near steelworks—less attractive to potential buyers than would otherwise be the case. This could reduce the ability of Hanson, in respect of GGBS plants, and of Lafarge Tarmac, in relation to GBS plants, to secure a fair value for their divested assets.

111. However, we did not consider that it was necessary to retain exclusive long-term arrangements between GBS and GGBS producers in their current form to mitigate the risk of the opportunistic behaviour described. We considered that such risk could be adequately addressed a variety of other ways—eg through the inclusion of long-term bilateral contracts between the relevant GBS and GGBS producers, with guarantees of minimum volumes of GBS traded—which would not produce the adverse effects associated with the current arrangements.

Conclusions on the costs of divestiture of GGBS and GBS plants

112. We have received little information on the costs that the relevant parties, Hanson and Lafarge Tarmac, might incur from a divestiture of their GGBS and GBS plants respectively.

113. Based on the evidence to date, we have not identified any significant ongoing costs associated with this remedy we are proposing in relation to the GGBS supply chain. We have seen no evidence of loss of efficiencies associated with there being a single GB producer of GGBS or GBS. Nor have we been persuaded that efficiencies would

be lost if the current exclusivity arrangements between GBS and GGBS producers were to effectively end.

114. There are likely to be some one-off costs associated with running the divestiture process itself. On the basis of the evidence available, we considered that these one-off costs were unlikely to exceed the one-off costs associated with the cement plant divestiture remedy (which we estimated could be in the region of £10–20 million (see paragraph 32)). In reaching this view we had regard to the limited extent of integration between Lafarge Tarmac's individual GBS sites, and between Hanson's individual GGBS sites and between these operations and the rest of their business.

NPV calculations for cement plant divestiture and transparency reduction measures

1. This appendix sets out analysis on the potential NPV of the costs and benefits associated with our proposed cement plant divestiture and transparency reduction measures.

2. It sets out a base case scenario and then examines the sensitivity of our estimate of the net benefit to the assumptions or estimates made with regard to:
   (a) the estimate of the one-off and of the ongoing costs of the remedy;
   (b) the estimate of the ongoing benefit of the remedy; and
   (c) the time horizon we are considering.

3. The appendix is structured as follows:
   (a) First, we detail the set of estimates and assumptions that define our base case scenario.
   (b) Second, we present the results of our analysis on how the estimated net benefit of the remedy varies when we depart from that base case scenario.

Base case scenario

4. We compute the NPV of the costs and benefit associated with our proposed remedy by setting an estimate of the discounted flow of the annual costs of the remedies against an estimate of the discounted flow of annual benefits.

5. In Appendix 8, we identified the one-off costs and the annual ongoing costs associated with the divestment of one cement plant from Lafarge Tarmac. Based on the evidence currently available, this suggested that:

(a) one-off costs of a cement divestiture could be in the region of £10–£20 million; and

(b) ongoing costs of a cement divestiture are unlikely to exceed £5 million a year.

6. We do not expect one-off or ongoing costs of the transparency reduction measures to be material.

7. In paragraph 6.86 we set out our provisional view that a figure of around £30 million a year would represent a conservative estimate of the potential benefits of implementing these measures.

8. To calculate the NPV associated with our remedies, we have made a number of other assumptions, concerning the timing of the flow of costs and benefits and the discount rate to use:

(a) *Timing of one-off costs*. We assume that the one-off costs are incurred over the first two years from when our final report is published, split equally between the two years.

(b) *Timing of ongoing costs*. For the purposes of this exercise, we assume that the ongoing annual costs of the remedies are incurred in full each year from two years after our final report is published. We take £5 million as our current estimate of these costs, on a conservative basis, as we do not expect these costs to exceed this amount.

(c) *Timing of benefits*. We assume there is a glide path for the benefits of our remedy to materialize:

(i) no benefit in the first three years after our report is published. This is conservative, as we would expect some benefits of these remedies to accrue before this;

(ii) one-third of our estimate of the annual benefit in the fourth year after our report is published (ie £10 million based on our base case estimate of £30 million);

(iii) two-thirds of our estimate of the annual benefit in the fifth year (ie £20 million based on our base case estimate of £30 million); and

(iv) all of our estimate of the annual benefit in each year after that (ie £30 million).

(d) Time horizon. We have used a 30-year time horizon for our analysis.

(e) Discount rate. We assume a 3.5 per cent real discount rate, in line with the Green Book.

9. Our estimates of the annual benefit and of the ongoing costs (£30 million and £5 million respectively in our base case) are based on current values. We consider that these benefits and costs would likely change over time in line with inflation. As such, we consider it reasonable to treat those figures as if in real terms. Accordingly, our estimate of the NPV of the net benefit should be interpreted in real terms too, and hence there is no need to adjust value for inflation and to use nominal discount rates rather than a real discount rate.

10. Based on the estimates and assumptions described above, Table 1 sets out our base case estimate of the NPV of the net benefit associated with these measures. We present the calculation for the case where the one-off costs are £10 million, and for the case where the one-off costs are £20 million; this is the range of values we consider to be in our base case scenario.

TABLE 1 **NPV of estimated benefits and costs of proposed measures: 30-year time horizon**

	One-off costs £ million	
	10	*20*
NPV of benefits	457	457
NPV of costs	95	105
NPV of net benefits	362	352

Source: CC analysis.

Note: Assumes ongoing annual costs of £5 million and ongoing annual benefits of £30 million.

Sensitivity analysis

11. We next examined the sensitivity of our estimate of the NPV of the net benefits of our proposed remedy to variations in our estimates of costs and benefits and to variations in the assumption made on other elements of the calculation.

12. To carry this out we considered three possible values for the estimate of the one-off costs, of the ongoing costs and of the ongoing benefits:

    (a) One-off costs: £10 million or £20 million, as in our base case.

    (b) Ongoing costs: £0, £5 million or £10 million. We considered higher and lower values of ongoing costs than the £5 million figure used in our base case scenario.

    (c) Annual benefit: £30 million or £45 million. As we judged the £30 million figure was a conservative estimate of benefits, we considered a higher sensitivity to reflect the possibility that prices and profits—and hence the detriment arising from coordination—would rise further in the event of a sustained economic recovery.[1]

13. We constructed 12 different scenarios, reflecting the 12 possible ways in which the different possible assumptions about the one-off costs, ongoing costs and annual benefits can be combined (2*3*2=12).

14. We computed the NPV of the net benefit for each of those 12 scenarios. We repeated these calculations three times, considering different time horizons each time: a 10-year, a 20-year and a 30-year time horizon.

15. For the purpose of the analysis, the estimates were not particularly sensitive to the assumption we made about the discount rate.

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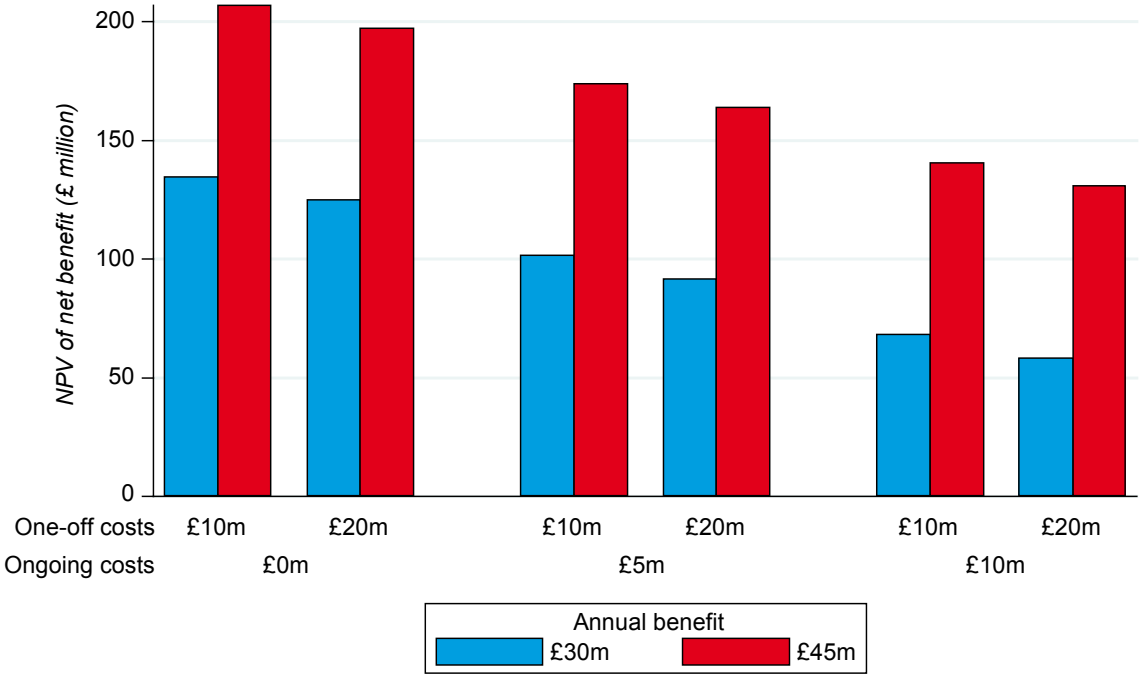
[1] We consider that, if the sector moves forward towards recovery, it is reasonable to examine a scenario where the GB cement producers enjoy profit levels that are 10 per cent higher than the average over 2007–2012. On the basis of the average value of net assets from 2007–2012, this would imply a ROCE of around 13.7 per cent, or 3.7 per cent over our estimated cost of capital; this level of ROCE is well within the levels in the industry over the last three years. The level of excess profit associated with the excess 3.7 per cent return would be around £44.3 million, rounded to £45 million in our sensitivity analysis.

16. The results of this work are shown in the figures below.

FIGURE 1

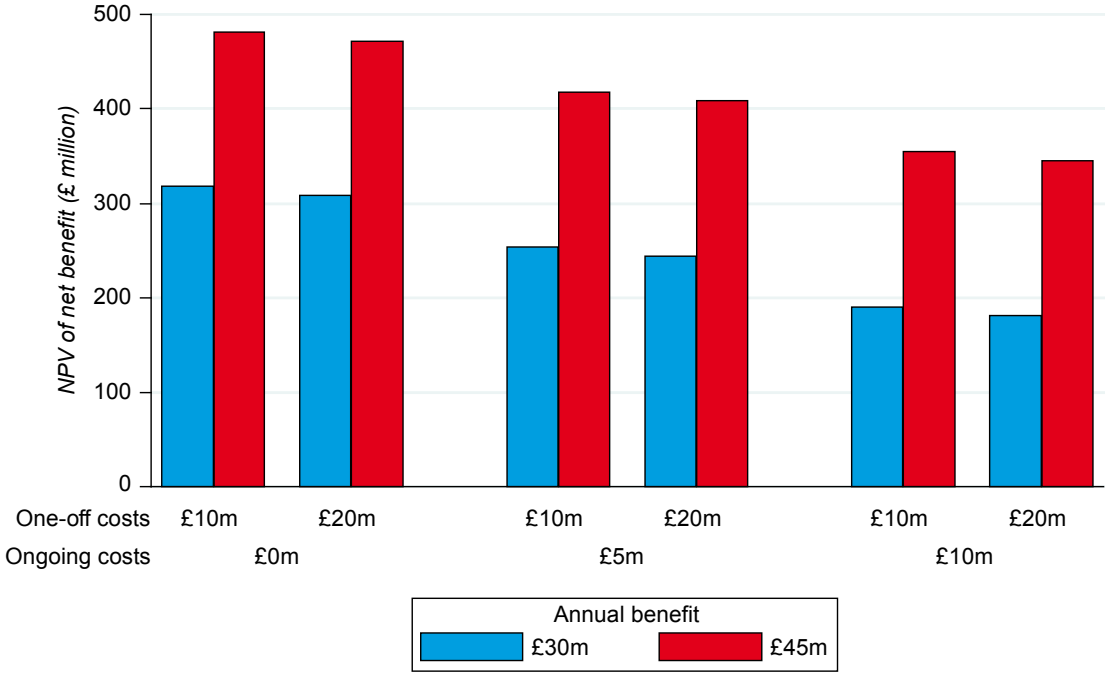
NPV of estimated net benefits: 10-year horizon



Source: CC calculations.

FIGURE 2

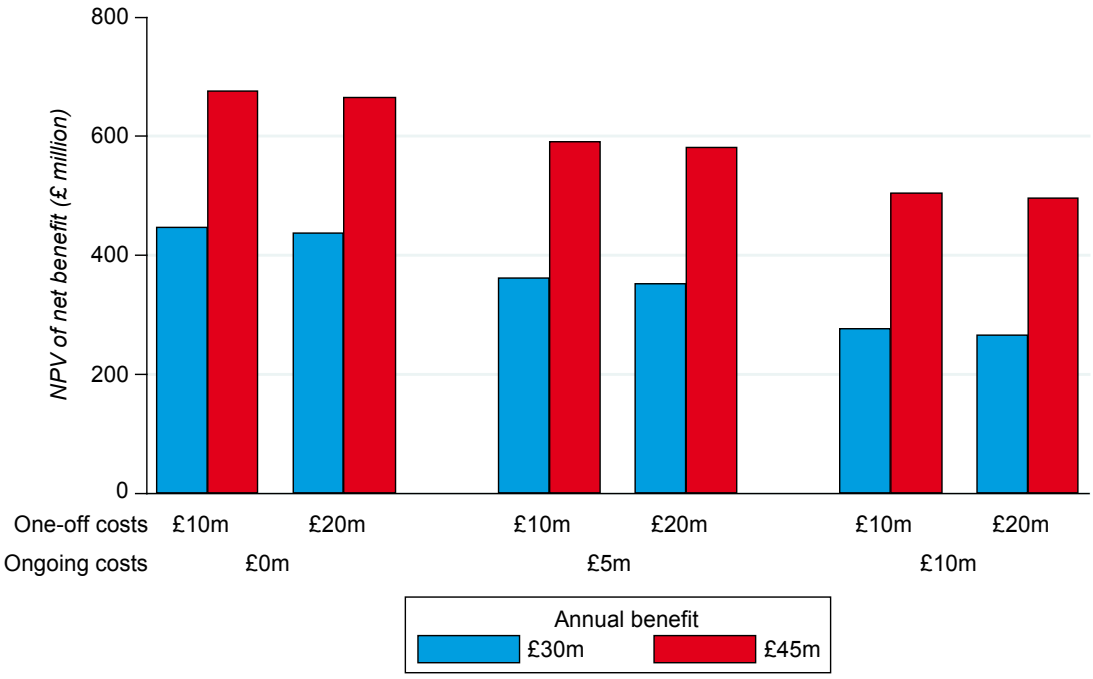
NPV of estimated net benefits: 20-year horizon



Source: CC calculations.

FIGURE 3

NPV of estimated net benefits: 30-year horizon



Source: CC calculations.

17. The figures above show that the NPV of the estimated net benefits are positive and substantial in all of the scenarios we considered.