

IN THE HIGH COURT OF JUSTICE
BUSINESS AND PROPERTY COURTS IN WALES
CIRCUIT COMMERCIAL COURT (QBD)

Cardiff Civil Justice Centre
2 Park Street, Cardiff, CF10 1ET

Date: 21 January 2021

Before:

HIS HONOUR JUDGE KEYSER Q.C.
sitting as a Judge of the High Court

Between:

BIOSOL RENEWABLES UK LIMITED

Claimant

- and -

(1) ROBERT NIGEL LOVERING
(2) DAVID FRANCIS PICKERING
(3) WAYNE PREECE

(trading as R & A PROPERTIES (a partnership))

Defendants

Steven Walker QC (instructed by **W. Parry & Co Solicitors**) for the **Claimant**
Laurence Emmett (instructed by **Hugh James**) for the **Defendants**

Hearing dates: 7, 8, 9, 10, 13, 14 July, and 24 August 2020
Written submissions: 24 July and 3 August 2020

Approved Judgment

I direct that pursuant to CPR PD 39A para 6.1 no official shorthand note shall be taken of this Judgment and that copies of this version as handed down may be treated as authentic.

.....
HIS HONOUR JUDGE KEYSER QC

Covid-19 Protocol: This judgment was handed down remotely by circulation to the parties' representatives by email and release to BAILII. The date and time for hand-down is deemed to be 10 a.m. on Thursday 21 January 2021.

JUDGE KEYSER QC:

Introduction

1. The claimant (“Biosol”) supplies biomass boiler systems and the fuel for use in them. The defendants carry on business in partnership together in the name R&A Properties (“R&A”) and own and operate Stradey Park Business Centre in Llanelli (“the Property”).
2. Between June 2016 and June 2017 Biosol supplied, installed and commissioned ten biomass boilers for R&A at the Property pursuant to a series of contracts. The boilers were supplied and commissioned in four groups: Boilers 1 and 2; Boilers 3 and 4; Boilers 5, 6 and 7; and Boilers 8, 9 and 10.
3. In these proceedings, Biosol makes three claims against R&A: first, £371,987.30 in respect of the balance of the price for the boilers; second, £310,602.74 for ancillary works to facilitate the installation of the boilers and for the supply of woodchip; third, damages for the loss of profit on a separate contract for maintenance of the boilers and the supply of woodchip; the lost profit is said to be £661,358.
4. R&A denies liability on the claims. As well as raising particular contractual disputes on the second and third claims, it contends more generally that it is entitled to exercise a right of abatement or set-off in respect of matters raised on its counterclaim. The counterclaim alleges that Biosol (a) induced R&A to enter the contracts for the supply, installation and commissioning of the boilers by misrepresentations as to their performance and capacity, (b) was in breach of a common law duty to exercise reasonable care in making recommendations as to the installation of the boilers, and (c) was in breach of various contractual obligations and warranties. R&A counterclaims damages in excess of £6,000,000. The counterclaim is denied in its entirety by Biosol.
5. The remainder of this judgment will be structured as follows. First, I shall set out the main facts in chronological order. For convenience, I shall divide up the narrative with sub-headings, with however the caveat that not all of the facts fit neatly into just one of these divisions. Second, I shall identify and consider the various heads of claim and cross-claim in turn.
6. I am grateful to Mr Steven Walker QC and Mr Laurence Emmett, counsel respectively for Biosol and for R&A, for their oral and written submissions.

The Facts

Background: Persons

7. Biosol was incorporated on 3 June 2014. The majority shareholder and, effectively, managing director is Neil Bundock; he is a retired police officer and has no background in engineering. The two other directors are his children, Benjamin (“Ben”) Bundock and Amber Bundock. Neil Bundock and Ben Bundock gave evidence. References to “Mr Bundock” will be to Neil Bundock.

8. The three defendants (I shall sometimes refer to them as “the partners”) formed R&A in 2008. Mr Lovering is an experienced businessman in several fields, including telecommunications, IT solutions and water purification, and he was the partner who had the main involvement in the matters with which the case is concerned. Mr Pickering is well known as a former rugby union player and administrator. He also had some involvement in the dealings with Biosol, though to a lesser extent than Mr Lovering. They both gave evidence at the trial. Mr Preece had no material involvement and did not give evidence. At the time in question, all three partners were also directors of a company called Hydro Industries Limited. That company is not directly concerned with the matter of the proceedings, but it occupied a unit at the Property and is sometimes referred to in that connection.
9. Two other people feature prominently in the narrative. Mr Ceri Golding was employed by Biosol until the summer of 2017. He was R&A’s initial point of contact with Biosol, and he was closely involved with most of the relevant discussions and agreements. When he left Biosol’s employment, he went onto R&A’s payroll, though he has not been in their employ since 2019. He did not give evidence. Mr James Partridge was the sole member and director of JBP Industries Limited (“JBPI”), which was incorporated in May 2014 and provides consultancy services for biomass heating systems. Mr Partridge was never employed by Biosol, though at one stage there was talk of forming a joint venture between JBPI and Biosol, but Biosol used him as a sub-contracting consultant in respect of some of the technical design and commissioning work for biomass systems. Mr Partridge was accredited by Fröling, the boiler manufacturer, as an approved engineer for its boilers; he says that it was only through him that Biosol was able to obtain Fröling products and even discounted prices on them, although Mr Bundock denies that. Mr Partridge gave evidence at trial on behalf of R&A.
10. In the course of hearing, reading and reviewing the evidence adduced at trial, I have reached conclusions regarding the various witnesses. These conclusions will become apparent from what follows. At this point I make only the briefest of comments on the main factual witnesses.
 - None of them were entirely convincing.
 - Neil Bundock’s evidence was marked by his display of a rather defensive attitude, which did not assist an assessment of his truthfulness. I formed the view, however, that he was an essentially honest witness.
 - Ben Bundock added little, though I regarded him as an honest witness.
 - Mr Lovering was in my view a dishonest witness. This is demonstrated by objective evidence, which in turn casts light on the remarkable extent to which Mr Lovering avoided answering questions that were put to him and instead sought to confuse matters by flannel or irrelevance. That is not to say that his evidence was not sometimes accurate, when his perceived self-interest coincided with the facts. But it does mean that Mr Lovering’s evidence cannot be relied on in respect of any significantly contentious issue in the absence of credible supporting evidence.

- Mr Pickering had relatively little material evidence to add to that of Mr Lovering and his recollections were very imperfect, probably because of the peripheral role he played in material events. His credibility is adversely affected by his willingness to align himself with Mr Lovering's evidence and by the evidence that he gave concerning the "whiteboard", discussed below.
 - Mr Partridge's recollections were very imperfect and sometimes inaccurate. Parts of his evidence were affected by manifest animosity to Mr Bundock, and I find that in at least one important respect his evidence was deliberately untruthful.
11. There were some notable absences from the cast of witnesses. Most importantly, Mr Golding did not give evidence, although he would have been a most material witness and might have been expected to be called by R&A.

Background: The Property

12. The Property comprises a 37-acre site, containing 22 detached units and office blocks, as well as boiler houses. Many of the buildings are let out on a commercial basis; some are used for offices, more are used for storage.
13. Only two of the buildings at the Property, namely Building 2 and Building 4 (both of which were occupied by the NHS for keeping records), had operational heating systems before the Biosol boilers were installed. Building 200, which was by far the largest building, had a gas heating system but it was non-operational; Mr Lovering's evidence was that the heating had been turned off when the previous tenants left in 2013 and had not been reconnected because the cost of gas was prohibitive. Half of Building 200 was occupied by the Ministry of Defence, Protec Fire Protection plc, and Hydro Industries Limited. The other half of the building was empty. Because part of Building 200 was occupied by Hydro Industries, it is sometimes referred to as the "Hydro" building or unit.
14. In summary, the Biosol boilers were eventually installed to heat the following buildings:
- Boilers 1 and 2 were for the upper part of Building 200 and for a nearby office cabin that was occupied by European Telecoms Solutions, a firm in which Mr Lovering was a partner. They were installed in an existing plant room that had previously housed gas-fired boilers.
 - Boiler 3 was for Building 2 and Building 17. The plant room housing the boiler and fuel store was built by Biosol.
 - Boiler 4 was for Building 3 and Building 4. The plant room housing the boiler and fuel store was built by Biosol.
 - Boiler 5 was for the northern half of Building 52 (the second-largest building at the Property, sometimes referred to as "the white building") and also for an adjacent office block. The plant room housing the boiler was a pre-existing building, but Biosol extended it to incorporate the fuel store.

- Boiler 6 was for Building 53 (which was also occupied by Hydro Industries) and an adjacent office block. Biosol's design drawings show that the boiler was originally to have served also Building 1, but it appears that in the event it was not connected to Building 1. The plant room housing the boiler and fuel store was a pre-existing building, which Biosol sub-divided internally.
- Boiler 7 was for Building 18 and Building 20. The plant room housing the boiler and fuel store was built by Biosol.

(I note that there is some confusion between Boilers 6 and 7; it may be that Boiler 6 heated Building 18 and Building 20, and that Boiler 7 heated Building 53 and the office block. As the boilers are materially identical, nothing turns on this.)

- Boiler 8 was for Building 19 (which was let to Fast Forward Limited) and Building 21. The plant room housing the boiler and fuel store was built by Biosol.
- Boiler 9 was for the lower part of Building 200, which was not heated by Boilers 1 and 2. The plant room housing the boiler and fuel store was built by Biosol.
- Boiler 10 was for the southern half of Building 52. The plant room housing the boiler and fuel store was built by Biosol, and part was sectioned off to form a fuel store.

(Again, there has been some confusion between Boilers 9 and 10, but they are identical.)

Background: RHI

15. A relevant part of the background is the Non-Domestic Renewable Heat Incentive (RHI) Scheme. The RHI Scheme was introduced in 2011 and is administered by Ofgem, whose website contains the following summary information:

“The Non-Domestic Renewable Heat Incentive (RHI) is a government environmental programme that provides financial incentives to increase the uptake of renewable heat by businesses, the public sector and non-profit organisations.

Eligible installations receive quarterly payments over 20 years based on the amount of heat generated. The scheme covers England, Scotland, and Wales. ...

Businesses, public sector and non-profit organisations can apply if equipment was installed in England, Scotland or Wales on or after 15 July 2009 (or later in some cases). Your installation must meet certain requirements. ...”

16. In summary, participants in the RHI Scheme who are owners of accredited installations receive payments for generating heat that is used to heat buildings or

water. At the time material to these proceedings the RHI Scheme operated pursuant to The Renewable Heat Incentive Scheme Regulations 2011, as amended, which were made pursuant to the Energy Act 2008 and came into force in November 2011. (The 2008 Regulations were revoked on 22 May 2018 by The Renewable Heat Incentive Scheme Regulations 2018. Nothing turns on this for present purposes.) The Regulations established eligibility criteria for various forms of installation, including biomass heating systems. Payments accrue from a “tariff start date” and are payable for a 20-year period in accordance with the applicable tariffs, which are liable to adjustment each year in accordance with the Retail Price Index for the previous calendar year. Tariff payments are categorised by the capacity of the installation and, subject to the annual adjustments, are fixed for the 20-year period. For installations in commercial use, the Regulations provide a tariff for “the initial heat” generated in a 12-month period (“Tier 1”) and a lower tariff for all further heat generated in that period (“Tier 2”). The “initial heat” means the heat in kWh generated by an accredited installation running at the equivalent of its installation capacity for 1,314 hours (so that, for example, a boiler running at half of its capacity would generate the “initial heat” in 2,628 hours). All of the systems supplied by Biosol to R&A were medium commercial biomass systems, being systems with a capacity of 200kW and above but less than 1MW. The applicable Tier 1 tariffs were 5.24p per kWh and 5.32p per kWh.

17. The RHI Scheme was not created to reward the production of heat pointlessly. This was spelled out very clearly in *Renewable Heat Incentive*, published by the Department of Energy & Climate Change in March 2011, at page 25:

“The Renewable Heat Incentive (RHI) will only support useful heat. It is not practical to provide an exhaustive list of all the acceptable heat uses which will be eligible. Instead, we can outline the broad principles of what we want to support:

- The utilisation of useful heat;
- The heat must be supplied to meet an economically justifiable heating requirement i.e. a heat load that would otherwise be met by an alternative form of heating e.g. a gas boiler;
- This heat load should be an existing or new heating requirement i.e. not created artificially, purely to claim the RHI; and
- Acceptable heat uses are space, water and process heating where the heat is used in fully enclosed structures.”

Page 63 of the same document addressed the risk of abuse of the Scheme:

“RHI support will be paid on the basis of multiplying the kWhth of metered renewable heat by the relevant tariff. Having considered the concerns with heat metering – cost of meters and a possible perverse incentive to over-generate

(useless) heat in order to maximise support – we now believe that these are manageable in most cases.

Commercial considerations should reduce the risk of a perverse incentive to waste heat and the large-scale RHI tariffs should, in the majority of cases, be lower than the cost of corresponding input fuels (such as the cost of the biomass fuel), avoiding a perverse incentive to generate more heat than needed.

...

We do, however, believe that the risk of a perverse incentive to over-generate remains in the small-commercial and medium-commercial biomass segment of the tariffs. Due to the complexity of building occupancy and usage, it is not feasible to establish a suitable methodology for estimating (“deeming”) heat demand in these sectors.

So, in the absence of a procedure for carrying out deeming assessments, we have adopted the suggestion raised by some stakeholders of linking the amount of energy that will be compensated with the full tariff each year to the capacity of the installation. We will apply a higher ‘tier 1’ tariff followed by a lower ‘tier 2’ tariff.”

Initial contact, and Boilers 1 and 2

18. The evidence of Mr Lovering and Mr Pickering was that by the summer of 2015 two matters of interest to R&A converged. First, the partners felt the need to address issues concerning the heating of units at the Property: the existing heating system was an old mains gas system, which was inefficient and expensive, and to make the units attractive to prospective tenants a more efficient and cost-effective method of heating was required. Second, the partners were looking for a new investment opportunity.
19. There is no doubt that the partners did want to find a new way of making money. That was overwhelmingly their primary concern. I also accept that they were interested in producing heat more cheaply than by gas, but I do not think that this was a major concern or the reason for their later interest in biomass heating. Most of the buildings at the Property were unheated; as they were mainly used for storage and warehousing, heating was generally not required. In the case of heated buildings, the tenants bore the heating costs. There is no documentary evidence to show either that existing tenants had major concerns over the heating costs or that prospective tenants were dissuaded from renting units at the Property because of either the lack of heating or the cost of such heating as was available.
20. Mr Lovering’s evidence was to the following effect. In August 2015 he was introduced by a mutual acquaintance to Mr Golding. Mr Golding told him that his background was in hydraulic engineering and that he had experience in running a renewable energy business before going to work for Biosol. Mr Lovering was impressed that Mr Golding was at the time a councillor on Neath Port Talbot Council.

Mr Golding told Mr Lovering about the environmental and financial advantages of biomass heating systems, including the RHI Scheme. Mr Golding told Mr Lovering that he personally was not an expert in biomass heating systems but that Neil Bundock, a director of Biosol, and his “associate” James Partridge “of JBP Industries” were experts and would be able to provide the necessary technical input.

21. However, I find that Mr Lovering knew Mr Golding before the summer of 2015. Neil Bundock’s evidence was that both Mr Golding and Mr Lovering told him that Mr Golding had previously worked for Mr Lovering. Mr Lovering’s evidence was that Mr Golding had not worked for him and that they had not known each other previously, and that he had not said anything to the contrary to Mr Bundock. However, I prefer Mr Bundock’s evidence as to what Mr Lovering told him and I accept Mr Bundock’s evidence that Mr Golding claimed to have worked previously for Mr Lovering. It is probable, therefore, that Mr Golding had indeed worked for Mr Lovering. Whether that work was as an employee or as a self-employed contractor or consultant, and whether Mr Bundock is right that the work was for Hydro Industries (as was his recollection) or for R&A (as he seemed to think possible in the alternative), is a matter of no importance in itself.
22. On Friday 18 September 2015 Mr Golding carried out a preliminary inspection at the Property and sent an email to Mr Lovering: “I have looked at the boiler house for your offices and it is feasible to develop a biomass system to supply heat. The other two workshops, I will have to revisit on Tuesday [22 September] to survey and will get a quotation back to you.” On the same day, Mr Golding informed Mr Bundock of his contact with Mr Lovering.
23. On 22 September 2015 Mr Lovering met Mr Bundock and Mr Golding at the Property. This was the first time Mr Lovering and Mr Bundock had met. I find that Mr Pickering was also present, at least for the formal part of the meeting, although his evidence was that he was not present. I find that Mr Partridge was not present and that he did not meet any of the partners before 2016. Mr Lovering showed Mr Bundock and Mr Golding around the Property. There is some conflict of evidence as to the nature of the interest expressed by R&A at the meeting: Mr Lovering says that he made clear that he was especially interested in the provision of a biomass system for Building 200; Neil Bundock, however, says that he was told that R&A wanted to put a biomass boiler into each of the 22 buildings at the Property and that he had to explain that this would not be feasible. I find that Mr Lovering did say that R&A wanted a heating solution for all 22 buildings (cf. para 25 of his first statement) but he emphasised Building 200 as a priority, and that Mr Bundock told him that it was not feasible to put a boiler into each building. Anyway, by the end of the meeting the focus was squarely on Building 200.
24. A more important issue concerns the expressed purposes for which R&A wanted to consider biomass heating. Mr Lovering’s evidence was that, from the initial meetings and throughout their discussions with Neil Bundock and Mr Golding, he and Mr Pickering made clear that their interest in a biomass system was due to their wish to heat the buildings at the Property efficiently; they were having problems with the existing system, and the cost of gas was proving prohibitive. He said that Neil Bundock assured him that the biomass system would be reliable and more efficient, heating the buildings at lower fuel costs, and that R&A would make “loads of money” out of the system. Mr Bundock’s evidence was that heating efficiency was not a

concern of R&A: the twin aims stated to him were to make money out of RHI payments and to reduce fuel costs.

25. On this point I accept Mr Bundock's evidence. This is partly because he is a more reliable witness than Mr Lovering or Mr Pickering. It is mainly, however, because of what the other factual evidence shows, as regards both the position at the time of the initial contact and the events that transpired thereafter. The partners' interest in biomass originated not from any concern about heating in particular but from their desire to put money into an investment that would give them a good return. The acquisition of biomass boilers was one of two alternative (not cumulative) investment schemes they were considering; the other related to the possible acquisition of another business. The attraction of biomass heating systems was the opportunity it gave for a return under the RHI Scheme. An incidental advantage of biomass heating was that it would reduce the fuel costs as compared with the production of similar heat by means of fossil fuels. I accept that this incidental advantage was attractive to the partners—it was mentioned to Mr Bundock—but it was, as I say, incidental: the tenants bore the heating costs; cheaper heating costs might make the premises more attractive to prospective tenants, but there is little evidence to suggest that this was a major factor in the partners' thinking. The subsequent narrative shows that the most important factor was the prospect of generating income from the RHI Scheme: this runs through the later documentation, and there is plenty of evidence that the partners ran the boilers with a view to maximising the production of heat, regardless of efficiency (for example, they did not complete the insulation of the pipework after Biosol left the site) or of the requirements of the tenants who occupied the buildings. I am satisfied that the partners did not identify "the efficient heating of the buildings" as their purpose or concern. They were obviously not particularly interested in "efficiency" in a technical sense (such as: the units of heat generated per unit of fuel) or even in the sense of ensuring that just enough heat but no more than was necessary would be produced. They were interested in making money, primarily by maximising revenue through the RHI Scheme and secondarily by minimising expenditure (which would principally be a matter relating to the attractiveness of the units to prospective tenants). Obviously, however, as the installation of biomass heating was plainly intended as an investment, it is impossible that outlay on capital and finance costs was unimportant, because the expected RHI payments would have to be weighed against the costs necessary to achieve them: that is, there had to be an attractive return on the investment.
26. Mr Bundock denies that at the first meeting he said anything to the effect that R&A would make lots of money out of a biomass system; rather, he says, he assured Mr Lovering and Mr Pickering that the system would generate revenue from the RHI Scheme and would save them money in fuel costs. I think it unlikely that Mr Bundock offered any projections for a return on investment at this stage, though it is very likely that he emphasised the financial benefits of a biomass system, as any salesman would.
27. According to Mr Bundock, it was agreed at the first meeting that, if R&A took biomass boilers, Biosol would supply woodchip for them at a rate of £75 per tonne—a competitive rate, which Biosol could achieve by using its own drying floor to dry timber—and would provide maintenance and servicing of the boilers for twenty years. I doubt whether this was "agreed", in the sense of constituting from the outset a

unilateral contract, but I accept that this was the basis of discussions at this point and became the basis of future trade between the parties.

28. On 30 September 2015 Mr Golding and Mr Partridge carried out a survey at the Property with a view to putting forward a proposal. Mr Partridge later required some technical data to complete his work. On 5 October 2015, Daniel Davies of R&A sent an email to Mr Golding and Mr Partridge: “I have spoken with our engineer who says the size of the boilers is 3m btu [British Thermal Units] each ...” Mr Partridge replied that the calculation “return[ed] at approx 880KW per unit”. This gives at least some indication of the way in which Mr Partridge approached his sizing calculations when formulating his initial proposal.
29. On 8 October 2015 Mr Partridge sent an email to Mr Bundock and Mr Golding, attaching a 31-page Proposal for the installation of “a new Fröling biomass heating system to generate heat on site to heat 3 separate industrial units” at the Property. The attachment included a covering letter (misdated 8 September 2015) from Mr Partridge to Mr Lovering at “R&A Properties Ltd”. The letter began: “Thank you for considering JBP Industries Ltd for the supply of your biomass heating system. We are pleased to enclose our proposal based on our combined heating solutions for your consideration.” The letter showed only JBPI as the producer and sender, not Biosol, and it described Mr Partridge as “technical director”.
30. This Proposal (“Proposal 1”), although it was quickly superseded, formed the model of further iterations and proposals prepared subsequently and provided to R&A. The key points in Proposal 1 appear from the early parts of section 1:

“Having discussed your requirements in detail and information gathered from our survey and the drawings provided we outline here our energy solution that best suits your requirements.

1.1 Heating requirements

Requirement

- It is proposed to install a new Fröling biomass heating system to generate heat on site to heat 3 separate industrial units.
- The new biomass heating system and heat distribution network is to provide for the great majority of the heating requirements for the site in order to reduce fossil fuelled heating costs and CO₂ emissions and provide a sensible economic investment under the RHI.
- The system is to be fuelled from wood chip or pellets purchased and delivered to site, to support clean combustion.
- The existing fossil fuel boilers currently installed within the Main factory unit will be removed from the boiler room to make way for the new biomass system. The warehouse space heaters will stay as a back-up heat supply if required & the

offices / day care centre old gas boilers will be removed. These properties will be connected by heat mains from the central boiler house which will provide the primary heat supply to each industrial unit.

Heat loads

- The system is required to heat a number of properties, with loads estimated by JBP Industries Ltd as follows:
- We estimate the total design heat load as follows
- Main Factory c.1000 kw this is based on the existing gas boilers that are 850kw each
- Warehouse c. 250kw system utilising warm air ducting for the heating providing a constant background heat
- Offices / day care centre c.100kw load looking at the old systems and the size of the properties to heat

1.2 Boiler and thermal store sizing

- To ensure that the great majority of the heating load is met by the biomass boiler and to minimise start/stop cycles and ensure high seasonal boiler efficiency under variable loads we propose the installation of an (sic) 20,000 litre thermal store for the main factory, 5000 litres for the warehouse & 3000 litres for the offices / day care centre.
- This combination of automatic biomass boiler plant and thermal storage is expected to provide for 90%+ of the annual heating requirements under normal conditions.

Please note that prior to detailed design JBP Industries Ltd provides no warranty as to the extent to which the boiler plant proposed will meet the heating requirements of the site or the level of fuel consumption that may be expected.

1.3 Installation outline

Energy Centre

- Our proposal is based upon 1 x 1000kw system made up of two 500kw Froling TM boilers, 1 x 250kw Froling TX boiler & 1 x 100kw system Froling T4
- The boiler and thermal store will be installed within the existing boiler room (large industrial unit) new energy centre for the other two buildings

- Wood chip / pellets will be stored in an adjacent purpose built fuel pellet silo and connected directly to the boiler plant.”

31. The total cost of the proposed system, net of VAT, was £586,517; of this, the costs of the supply and delivery of the boilers were £136,256 for the Main Factory, £32,754 for the Warehouse, and £22,716 for the Offices. The Feasibility Summary in section 5 of Proposal 1 stated:

“RHI Non Domestic scheme payments

Assumes 9 hr/day at peak demand and a 1MW boiler

The current tariff for Biomass medium scale systems is 5.14p/kW as agreed by DEC

The total project cost is estimated to be £586,517 therefore we would estimate an average return on investment of 5.76 years. The RHI payments are assured for 20 years under current scheme rules. Once approved you are contracted at that rate for the life of the scheme.”

32. Shortly after receiving Mr Partridge’s email, Mr Golding sent the letter and Proposal 1, without alteration, to Mr Lovering by an email that read in part: “I have attached a breakdown for the Biomass systems for the three Hydro buildings at the Stradey Business Centre. Please see attached, the figures show a payback for the scheme in under five and a half years.” This is clearly a reference to the Feasibility Summary and the calculations supporting it, although the reference to payback in under five and a half years appears to be a mistake.
33. Mr Lovering’s written evidence was that he did not recall reading Proposal 1 in any detail and that he regarded it as being just a basis for discussion about the various options. That is barely credible in the circumstances, and in cross-examination Mr Lovering accepted that it was important for him to give careful consideration to documents relating to a potentially large investment and that he would have done so.
34. On 28 October 2015 Mr Golding gave a presentation to Mr Lovering and Mr Pickering at the Property. Mr Lovering had printed off copies of Proposal 1, which he brought with him to the meeting and which I find formed the basis of the presentation. But the presentation and ensuing discussion did not persuade the partners to place an order. On the following day Mr Golding sent an email to Mr Lovering and Mr Pickering, in which he listed five potential projects for the site and asked them to send him an email “outlining your preferred route”.
35. The option preferred by the partners involved installing a biomass system in the Hydro Industries building (Building 200) and the large white building (Building 52) as a unified project. On 2 November 2015 Mr Golding confirmed by email: “Biosol will be on site on Thursday [5 November] to design the Biomass system for the Hydro-Industries building and white building containing separate industrial units”.

36. On 10 November 2015 Mr Partridge on behalf of JPBI sent by email to Neil Bundock and Mr Golding a Proposal (“Proposal A2”) and covering letter, which were both in the sole name of JBPI and addressed to Mr Lovering at “R&A Properties Limited”.
37. On 11 November 2015 Mr Golding for Biosol sent by email a letter and Proposal (“Proposal 2”) to Mr Lovering and Mr Pickering. That letter and Proposal 2 were basically the same as the documents Biosol had received from JBPI, but now both the letter and Proposal 2 bore the names of both Biosol and JBPI. The letter was written in the names of Mr Bundock, Mr Partridge and Mr Golding, and beneath their names was the word “Directors”. Underneath that were email addresses for Mr Bundock and Mr Partridge; the former was a Biosol address and the latter was a JBPI address. Ben Bundock’s evidence was that it was he who made the alterations to the details of the signatories and that his intention was simply to identify the individuals who were involved in the project. Mr Lovering’s evidence was that he could not remember whether he paid any attention to the signatures; they were consistent with his existing understanding at the time.
38. The principal differences between Proposal 1 and Proposal 2 appear from a comparison of key parts of the text of section 1; I show the main changes by underlining, though parts of the earlier text were omitted as required:

“Having discussed your requirements in detail and information gathered from our survey and the drawings provided we outline here our energy solution that best suits your requirements.

1.1 Heating requirements

Requirement

- It is proposed to install a new Froling biomass heating system to generate heat on site to heat 2 large but separate industrial units (Hydro & the opposite unit)
- The new biomass heating system and heat distribution network is to provide for the great majority of the heating requirements for the site in order to reduce fossil fuelled heating costs and CO2 emissions and provide a sensible economic investment under the RHI.
- The system is to be fuelled from wood chip or pellets purchased and delivered to site, to support clean combustion.
- The existing fossil fuel boilers currently installed within the Main factory unit will be removed from the boiler room to make way for the new biomass system. The warehouse space heaters will stay as a back-up heat supply if required & the offices / day care centre old gas boilers will be removed. These properties will be connected by heat mains from the central boiler house which will provide the primary heat supply to each industrial unit.

Heat loads

- The system is required to heat a number of properties, with loads estimated by JBP Industries Ltd as follows:
- We estimate the total design heat load as follows
- Hydro Factory & opposite unit c.998 kw this is based on the existing gas boilers that are 330kw each total 660kw and new unit approximately 300kw

1.2 Boiler and thermal store sizing

- To ensure that the great majority of the heating load is met by the biomass boiler and to minimise start/stop cycles and ensure high seasonal boiler efficiency under variable loads we propose the installation of a 30,000 litre thermal store for the main factory.
- This combination of automatic biomass boiler plant and thermal storage is expected to provide 90%+ of the annual heating requirements under normal conditions.

1.3 Installation outline

Energy Centre

- Our proposal is based upon 1 x 998kw system made up of two 499kw Froling TM boilers
- The boiler and thermal store will be installed within the existing boiler room (large industrial unit) new energy centre for the other two buildings
- Wood chip / pellets will be stored in an adjacent purpose built fuel pellet silo and connected directly to the boiler plant.”

39. The total price, net of VAT, was £364,620, of which £136,200 was for the supply and delivery of the boilers, £11,690 was for “De-commission old boiler, Offload and position new plant hire Etc”, and £3,501 was for travel and accommodation.

40. The Feasibility Summary in section 5 stated:

“RHI Non Domestic scheme payments

Assumes 9 hr/day at peak demand and a 998kw boiler

The current tariff for Biomass medium scale systems is 5.14p/kW as agreed by DEC

The total project cost is estimated to be £364,620 therefore we would estimate an average return on investment of 2.5 years. The RHI payments are assured for 20 years under current scheme rules. Once approved you are contracted at that rate for the life of the scheme.”

41. The Feasibility Summary was backed up by a detailed Wood Fuel Calculator. At the top of the Wood Fuel Calculator was a box containing the following text in red print:

“Warning: This tool and all estimates are provided by JBP Industries Ltd without any warranty or guarantees.

The user employs this tool at their own risk.

Fossil fuel prices are indicative only and are highly variable in practice; always check competing fuel prices.”

The Summary Comparison showed estimated annual fuel savings (i.e. of using wood fuel as compared with natural gas) of £73,708, and a combined figure of £143,997 p.a. for the sum of the fuel savings and the RHI income, with a simple payback period of 2.5 years. The figures assumed that the boilers would operate at full load for 1,752 hours out of a total of 8,760 hours p.a. – that is, a load factor of 20%.

42. After the Wood Fuel Calculator, at the end of section 5, was the following text in bold blue print:

“Please note that this is very much an estimate and at this stage no historic fuel use and cost data is available to support boiler utilisation level assumption in particular. As such this estimate is for information Biosol Renewables UK Ltd / JBP Industries cannot provide guarantee as to the accuracy of these estimates and accept no financial liability for any error in this respect.

These figures are based on the minimum usage with the boilers running at a 20% full load factor.

This can double or even treble dependant (sic) on running demand and system requirements

We strongly advise a third party assessment is made as part of your due diligence for the project.”

43. Section 1.7 of Proposal 2 set out an “Indicative installation schedule”:

“We would typically expect the programme of works to be approximately as follows.

1. Biomass system design: 2 weeks, from order confirmation
2. Manufacture boiler: 5-7 weeks, TM 500 from design sign off
3. Manufacture Boiler 4-6 weeks, TX 250 from design sign off

4. Freight: 1-2 weeks, dependant (sic) on customs clearance
5. Planning: usually 4-6 weeks, client to make application
6. Construction of Energy Centre: 4-6 weeks, dependant on design
7. Boiler and fuel feed site assembly: 2 weeks, per unit from possession of clear site
8. Pipe and chimney installation: 3-4 weeks, per unit subject to contractor timings
9. Heat mains and interface works: TBC concurrent with energy centre
10. Electrical installation: 3 weeks, following completion of pipe work
11. Commissioning: 7 days, following completion of all other works

Following order confirmation a full contract programme will be developed and agreed with the client.”

44. On 13 November 2015 Mr Bundock and Mr Golding attended a meeting to discuss the proposed installation with Mr Lovering and Mr Pickering. The meeting was not very productive. After the meeting Mr Bundock came to the conclusion that Mr Lovering and Mr Pickering were focusing on Proposal 1, whereas he had been focusing on Proposal 2, and he sent them an email explaining that he thought they had been at cross-purposes and attaching Proposal 2 again. I am not persuaded that Mr Bundock’s conclusion was correct: if he had believed during the meeting that R&A were looking at the wrong Proposal, he would have been able to address the problem then. Mr Lovering accepted in cross-examination that he examined Proposal 2 carefully, and I see no reason to doubt that he did so when he first received it. At all events, the Proposals under consideration and discussion at that time were for 4 boilers serving 3 units (Proposal 1) and for 2 boilers for 2 units (Proposal 2).
45. Mr Lovering’s evidence was that, at around the time of this meeting, the partners had concerns over the scale of the investment required for the proposed biomass system and were doubtful whether the projected returns were realistic. Further meetings with Mr Bundock took place in the middle to later part of November 2015. According to Mr Lovering, in the face of reluctance to commit on the part of R&A, Neil Bundock became “more and more pushy” (a word used also by Mr Pickering) in his efforts to emphasise the benefits of the proposed system. That evidence comes from a particular perspective, but it may certainly be accepted that Mr Bundock was a salesman looking to make a sale.
46. On 25 November Mr Golding asked Mr Lovering to provide him with certain financial information pertaining to R&A; the purpose of the request was to put together proposals to finance companies to provide finance for the biomass heating

system. On the same day, Neil Bundock provided to Mr Lovering contact details for the finance companies that Biosol dealt with. He asked for Mr Lovering's permission to pass on his contact details to those companies. Mr Lovering duly gave his permission. There was at this stage no contractual commitment on the part of R&A to proceed; clearly, however, the partners were actively looking for finance for a biomass system.

47. In December 2015 a meeting took place at R&A's offices. Those present were Mr Lovering, Mr Pickering, Mr Bundock, Mr Golding, and Mr Mark Batty, R&A's accountant. Mr Bundock gave a full and detailed presentation and explanation of what was proposed, and it is common ground that he discussed the figures in Proposal 2.
48. Mr Lovering's evidence was that at the meeting in December 2015 Mr Bundock told him and Mr Pickering that each boiler would earn £120,000 for R&A from the RHI Scheme, and that he had said the same thing in meetings in November. Mr Pickering's evidence was that this statement was made in at least one meeting, in November or December 2015. Both Mr Lovering and Mr Pickering said that they considered the oral statement to be consistent with and backed up by the figures contained in a document that has been referred to as the Summary and that they relied on the Summary and the assurance as to the income to be produced when deciding to order Boilers 1 and 2 in or about early 2016 and Boilers 3 and 4 in April 2016.
49. Mr Lovering's evidence is that Mr Bundock provided the Summary to him at a meeting in late 2015, though he was unable to specify a date. If that evidence be taken on its face, the most likely date for the production of the document will in my view have been one of the later November meetings rather than the December meeting. The Summary is a one-page document headed by the Biosol name and logo. Beneath the heading is a table setting out projected annual income and savings from the use of different sizes of biomass boiler. For a 250kW boiler the income from RHI payments is shown as £59,533.95 and the total financial benefit, after taking into account savings on the cost of fuel, is shown as £128,270.45. The corresponding figures for a 500kW boiler are £119,067.90 (pointed to by Mr Lovering as corresponding to the figure of £120,000 mentioned orally by Mr Bundock) and £255,688.90. The corresponding figures for a 998kW boiler are shown as £237,659.52 and £510,375.74. The text underneath the table is as follows:

“1 unit at 250kW boiler for offices will give a minimum return of £52,075 taking into account fuel costs.

22 units at 500kW boiler for commercial units will give a return of £102,504.90 [*I remark: this is the figure for each boiler*] taking into account fuel costs.

1 unit at 998kW boiler for industrial unit will give a return of £204,598.52 taking into account fuel costs.

[I remark: each of these figures represents the total of RHI payments less the total projected fuel costs.]

This project will give a return based on above figures of £2,511,785.00 inclusive of fuel costs.

If Gas is used as a fuel in any of these commercial units i.e. NHS buildings or other associated buildings the returns would be for example the NHS Building: £255,688.90.

Over the 20 year period there will be a return of £50,235,700.00 for a capital expenditure of £3,560,000 inclusive of fuel costs.”

50. Mr Lovering and Mr Pickering say that Mr Bundock talked them through the Summary and that, although they made clear that there was no question of them committing at that stage to buying anything like twenty boilers, the calculations and projections it contained were of central importance in persuading them to go ahead and place an initial order: Mr Lovering said that the figures on the Summary “caught [their] eye” and “turned [their] heads”. Neil Bundock denies either preparing the Summary or providing it to R&A. His evidence was that the document was not in the format of documents produced by Biosol and that the figures it contained, though possible, were extremely high and the absolute maximum that could be achieved; and he had already told Mr Lovering and Mr Pickering that it was not feasible to place a boiler in each building. He also stated that he could not have made the projections contained in the Summary without knowing R&A’s fuel costs. Mr Bundock said that it was possible that the document had been produced by Mr Golding for internal purposes, but he said that he had no recollection of it and would certainly not have passed it to R&A. Ben Bundock also denied having prepared the Summary or having any knowledge of it prior to the commencement of the proceedings.
51. The Summary gives rise to a number of problems.
- 1) The document was probably created within Biosol, as it appears to have been. However, Neil Bundock and Ben Bundock deny having created it and I accept their evidence.
 - 2) At least initially, there was a surprising conflict of evidence as to whose handwriting appeared on the only known copy of the Summary. Mr Lovering said that it was his handwriting, but Neil Bundock said that it was his own. I find that it was Mr Bundock’s handwriting, not that of Mr Lovering; indeed, this now seems to be common ground. It follows that the Summary was at one time in Mr Bundock’s possession. The manuscript writing on the document might indicate that Mr Bundock had it with him when he was meeting, or speaking by telephone to, Mr Lovering, as it relates to the contact details of a mutual acquaintance. But that inference is not secure.
 - 3) However, there appears to be no unmarked copy of the Summary, and the copy that has been produced—the copy bearing Mr Bundock’s handwriting—was produced by R&A’s solicitors (this was put to Mr Bundock by Mr Emmett in cross-examination). It is unlikely that Mr Bundock would have given the document to R&A on the occasion when he wrote a third party’s contact details on it; there is no suggestion that he was providing the contact details to Mr Lovering.

- 4) The Summary does not cohere with Proposal 1 or Proposal 2. They were both concerned with modest installations, as were the discussions in November and December 2015, whereas the Summary was concerned with the installation of 24 boilers. This indicates that the Summary was probably not produced or discussed in November or December 2015. In this regard, I reject the evidence of Mr Lovering and Mr Pickering.
 - 5) Further, the Summary works on different figures from those in Proposal 1 or Proposal 2 or, significantly, Proposal 3 (see below), which was the Proposal on which the order for Boilers 1 and 2 was based: for example, the estimated cost of gas is different, as is the estimated cost of woodchip. Mr Lovering and Mr Pickering do not claim to have queried these differences when Mr Bundock went through the figures in the Summary. This indicates that he probably did not go through those figures. On this point also, I accept Mr Bundock's evidence in preference to that of Mr Lovering and Mr Pickering.
 - 6) Additionally, the figures in the Summary regarding fuel costs appear to be unrealistic and unsustainable. This itself makes it unlikely, though not of course impossible, that the figures were advanced by Biosol as the basis of discussions with R&A.
 - 7) If the Summary was produced to and discussed with Mr Lovering in late 2015, it must have been examined and considered in detail by Mr Batty, who was present at the December meeting and whose involvement was for the purpose of examining the financial viability of the proposals. However, there is no evidence to suggest that Mr Batty ever addressed the figures in the Summary. He was not called to give evidence, and an email from him that was included in the trial bundle seems to show that the documents he was working from comprised a Proposal from Biosol and internal financial information from R&A. Further, as it is common ground that the figures in Proposal 2 were discussed at the December 2015 meeting, it is unlikely that the figures in the Summary were discussed.
 - 8) The lengthy letters from R&A's solicitors dated 24 November 2017 and 21 February 2018, in which R&A's responses to Biosol's claim for payment and R&A's cross-claims were set out in considerable detail, do not refer to the Summary, although other documents are referred to.
 - 9) As I shall mention further below, there is an internal tension in R&A's claims as to assurances given by Mr Bundock, because it asserts that in November/December 2015 he gave an assurance that a single boiler would generate £120,000 p.a. in RHI payments but goes on to say that in respect of Boilers 5 to 10 it relied on his assurance given in January 2017 that a single boiler would generate at least £65,000 p.a. in RHI payments. Although this could in theory be true, it is unlikely that R&A would have relied on the latter representation if it had been disappointed as to the former.
52. In conclusion, I find that Mr Bundock did not produce the Summary to R&A and did not discuss it with them. Mr Bundock is probably correct in his surmise that Mr Golding created the document at some stage; although it is impossible to be sure, I think it most likely that it was created in or around April 2016, when another

problematic document (“Proposal 4”; see below) was produced. I consider it probable that R&A acquired its copy of the Summary at some point through Mr Golding.

53. I find, on the balance of probabilities, that Mr Bundock did not give an assurance that each boiler would generate income of £120,000 per annum. The alleged assurance is not minuted and not supported by any reliable documentary evidence and is quite different from the figures set out in the Proposals, which themselves were expressly stated not to be guaranteed figures. Further, although R&A’s primary case has been that Mr Bundock gave an assurance that Boilers 1 and 2 would each generate RHI income of £120,000, Mr Lovering’s evidence on day two of the trial, when dealing with the alleged later assurance that ten boilers would generate £650,000, was to the effect that Mr Bundock had mentioned £120,000 as the maximum income that a single boiler could generate if running constantly at full capacity. As for the Summary, for reasons appearing above I find that it did not constitute, or form the basis of, representations made by Neil Bundock and that neither it nor its contents were relied on by R&A.
54. On 19 January 2016 Mr Pickering sent an email to Mr Lovering and Mr Preece concerning a number of enquiries by potential tenants who were interested in humidity-controlled or temperature-controlled storage. The email ended: “We need to push on the financials for biomass plant asap—let’s discuss Thursday at the board meeting.” Mr Lovering replied with some comments the following day. His email remarked: “All looks positive. We should be in a position by the end of next week to place an order. My understanding is six weeks lead time.” However, it also said: “I have put in a call to graham to see what he has done on the system re pricing and getting other quotes.” The reference to “graham” is to Graham Jones, who was Head of Development Projects at Hydro Industries. In cross-examination Mr Lovering confirmed that he had asked Mr Jones to obtain alternative quotations for boilers. He said that he could not remember whether any alternative quotations were produced; none have been disclosed. I infer from this that either no alternative quotations were produced or they were less favourable than those produced by Biosol. Mr Jones was not called to give evidence.
55. Discussions between Biosol and R&A were continuing, and on 28 January 2016 Neil Bundock sent an email to Graham Jones and to Mr Lovering, attaching detailed Fuel Calculators. There was a summary in the body of the email:

“500kw boiler x 1314 [burn hours] x 5.18p [tier 1 RHI payments] = £34,032.60

500kw x 7440 [burn hours] x 2.24p [tier 2 RHI payments] = £83,328.00

These returns would be doubled for a megawatt boiler system and with cheaper fuel then returns would also increase.”

Mr Bundock commented:

“[T]hese [returns] are solely based on the 1314 burn hours tier 1 of which equates to 3.5 hours heating per day. It therefore allows for a further 7440 burn hours at tier 2 = 2.24p which

could give a greater return especially from let out units. i.e. NHS and other units that would use heating 24/7 would be a massive income.”

56. Further discussions led to the suggestion that the works to decommission the existing heating system might be carried out by R&A rather than Biosol, resulting in a saving of the costs attributable to that part of the works (£11,690 for decommissioning and £3,501 for associated travel and accommodation). This was documented in Proposal 3, which was produced by Biosol under cover of a letter dated 9 February 2016. Proposal 3 was essentially identical to Proposal 2, save for changes to reflect the removal of the decommissioning works. (Presumably by oversight, this alteration was not reflected in the Feasibility Summary or the Wood Fuel Calculator, which still showed the total cost as £364,620.) There was some consequential change to the “Indicative installation schedule”, which now read:

“We would typically expect the programme of works to be approximately as follows.

1. Biomass system design: 2 weeks, from order confirmation
2. Manufacture boiler: 5-7 weeks, TM 500 from design sign off
3. Freight: 1-2 weeks, dependant (sic) on customs clearance
4. Planning: usually 4-6 weeks, client to make application
5. Removal of existing redundant system: 2-3 weeks, dependant on working site hrs
6. Boiler and fuel feed site assembly: 2 weeks, per unit from possession of clear site
7. Pipe and chimney installation: 3-4 weeks, per unit subject to contractor timings
8. Heat mains and interface works: TBC concurrent with energy centre [*This item previously tied in with the earlier item 6, ‘Construction of Energy Centre’, which was now omitted from the schedule.*]
9. Electrical installation: 3 weeks, following completion of pipe work
10. Commissioning: 7 days, following completion of all other works

Following order confirmation a full contract programme will be developed and agreed with the client.”

57. Shortly after the receipt of Proposal 3, R&A placed an order for the supply of two Fröling 499kW boilers (Boilers 1 and 2) for £349,429 exclusive of VAT. The signed

order form bears the date 15 December 2015, but I find that the sales order was in fact signed on 12 February 2016 and was backdated. The order form was signed by Mr Lovering for R&A and Mr Golding for Biosol.

58. Mr Lovering's evidence was that he was not shown or told of any terms and conditions on the reverse of the order form and was not given an original document for his own records but merely (at some point) a photocopy. He said that he understood that there would be a six-week lead-time on the order, and he believed that the boilers would be installed within two months of the placing of the order. Ben Bundock gave evidence that he was present when the sales order was signed (he says this was on 15 December 2015, but on that I think he is mistaken), that he talked Mr Lovering through the sales order, brought the terms and conditions to Mr Lovering's attention, and gave Mr Lovering the customer's white copy, retaining the pink and yellow copies for Biosol's records.
59. I accept Ben Bundock's evidence. Mr Lovering's evidence that he did not receive a copy of the document on this or any of the occasions when sales orders were signed is, in my view, implausible; it is probable that he would have had the customer copy from the order book. Also implausible, in my view, is Mr Lovering's insistence that he never saw that there were terms and conditions on the sales orders; that would be plausible only if he had received only a photocopy of the front of the document on each occasion. He was also evasive as to his knowledge that there were terms and conditions on the order forms. (It may well be, of course, that he did not read the terms and conditions.) Further, as I have stated already, I do not regard Mr Lovering as a truthful witness on whom I can place reliance in respect of significant disputed matters.
60. It was intended that R&A would take the boilers under a hire-purchase agreement. The HP agreement was signed on 26 February 2016. After taking account of the cash deposit, R&A were liable for 60 monthly payments of £6,618.38. The authorised distributors of Fröling boilers in the UK required a deposit of £49,230.81 upon the placing of the order. R&A paid the initial deposit to Biosol on 26 February and 1 March 2016. On 22 March 2016 Biosol placed an order for the boilers and advanced the required deposit. R&A points to the period between 12 February and 22 March 2016 as being a delay on Biosol's part, but Mr Bundock points to the need to receive the deposit from R&A and to prepare schematic drawings.
61. Despite the revision contained in Proposal 3 and reflected in the reduction of the price, on or about 1 April 2016 R&A informed Biosol that it would not be able to decommission and remove the existing heating system. Accordingly, that work was done by contractors engaged by Biosol. On 2 April 2016, in an email to Mr Golding, Mr Pickering queried the raising of an extra charge in this respect: "You quoted labour and materials to extract the boilers and generators." In response, Mr Golding pointed out: "the decommissioning was removed from the contract and R&A where (sic) supposed to carry out that works, as stated in good faith Biosol have stepped in to carry out the decommissioning works ..." On 3 October 2016 Mr Golding sent an email to Alison Davies: "Decommissioning of the original boiler in April 2016 is £25,000 (has not been paid). Taken out of original quotation." It does not appear that R&A disputed that email.

62. I am satisfied that Biosol did not agree to carry out the decommissioning works without charge and that it is entitled to be paid for the work. Biosol's invoice for £25,000 plus VAT is dated 17 July 2017.
63. Boilers 1 and 2 were delivered to the site on or about 11 April 2016.
64. Boilers 1 and 2 were commissioned on 22 June 2016 and, on Biosol's instructions, were recommissioned by Mr Partridge in late November 2016.
65. On 21 October 2016 Alison Davies, a manager at R&A, signed an order for the extension of the heating to a portacabin for a price of £8,000 plus VAT. It appears that the works had been carried out by the end of 2016. The invoice for the amount of the order was dated 17 July 2017 and has not been paid.

Boilers 3 and 4

66. In early April 2016 Mr Lovering and Mr Pickering had a further meeting with Mr Bundock and Mr Golding, at which there was discussion of the possibility of installing two further boilers, each of which would heat two buildings considerably smaller than building B200: one boiler (Boiler 3) would heat buildings B2 and B17; the other (Boiler 4) would heat buildings B3 and B4. Buildings 2 and 4 were already heated by gas boilers; they were occupied by the NHS for the purpose of the storage of paper records, which required a warm and dry atmosphere. The advantages to R&A of installing biomass boilers were considered to be, first, that RHI payments could be obtained and, second, that the high cost of heating the buildings could be reduced.
67. Within the documents are contained a further Proposal ("Proposal 4") and a covering letter, in the usual form, dated 22 April 2016. Section 1 of Proposal 4 contained the following text:

"Having discussed your requirements in detail and information gathered from our survey and the drawings provided we outline here our energy solution that best suits your requirements.

1.1 Heating requirements

Requirement

- It is proposed to install new Froling biomass heating system to generate heat on site to heat large but separate industrial units (as highlighted)
- The new biomass heating system and heat distribution network is to provide the heating requirements for the site in order to reduce fossil fuelled heating costs and CO2 emissions and provide a sensible economic investment under the RHI.
- The system is fuelled from wood chip or pellets purchased and delivered to site, to support clean combustion.

- The existing fossil fuel boilers currently installed (sic). *[It seems that text such as that contained in corresponding positions within earlier Proposals has been omitted by mistake.]* The warehouse space heaters will stay as a back-up heat supply if required & the offices / day care centre old gas boilers will be removed. These properties will be connected by heat mains from a plant room which will provide the primary heat supply to each industrial unit.

Heat loads

- The system is required to heat individual properties, with loads estimated by JBP Industries Ltd as follows:
- We estimate the total design heat load as follows
- Factory units c.500 kw this is based on the load required to heat the units to a constant temperature regulated by customer.

1.2 Boiler and thermal store sizing

- To ensure that the heating load is met by the biomass boiler and to minimise start/stop cycles and ensure high seasonal boiler efficiency under variable loads we propose the installation of a 10,000 litre thermal store per unit.
- This combination of automatic biomass boiler plant and thermal storage is expected to provide 90%+ of the annual heating requirements under normal conditions.

1.3 Installation outline

Energy Centre

- Our proposal is based upon 22 x 500kw system made up of Froling TM boilers.
- The boiler and thermal store will be installed within containerised units.
- Wood chip / pellets will be stored in an adjacent purpose built fuel pellet silo and connected directly to the boiler plant.”

68. The total price, excluding VAT, was £230,570; the cost was not broken down, but it appears that this was a costing for a single Froling boiler. The Feasibility Summary “estimate[d] an average return on investment of 2.5 years.” The Wood Fuel Calculator contained the same disclaimers as were found in Proposal 2 and Proposal 3, save that in Proposal 4 the second disclaimer stated: “These figures are based on the minimum usage with the boilers running at a 35% full load factor”: in the earlier Proposals the reference was to a 20% full load factor. The “Indicative installation

schedule” was identical to that in Proposal 3, save for the omission of what there had been item 5, the removal of the redundant existing system.

69. At the end of Proposal 4 was the following text, printed in red ink:

“Joint Venture Biosol renewables UK LTD and R and A properties

It is proposed that an agreement is entered that the maintenance and contract for running the proposed site is conducted by Biosol Renewables and as a result Biosol renewable (sic) will subsidise the cost of the supply of wood chip due to RHI subsidised production and pass this saving onto R and A properties (sic) in exchange for an agreed term of contract.

The following proposed statement of return is an indication of the returns achievable if the running of the proposed site is efficient and effectively run using all available resources.

In addition, supply of heat to currently unheated units could be charged at the current rate of 4.25p which will enhance the main returns.

In addition under the Energy act (sic) 2011 which comes into force in April 2018, commercially let properties will have to achieve a minimum performance standard (MEPS) in order to be let ...”

70. Proposal 4 is accompanied by a one-page document, headed with the Biosol logo, which set out in a table the possible financial benefits to be achieved with the use of biomass boilers. The document indicated that a 250kW boiler could generate RHI payments of £55,869.27 in a year and could result in fuel-cost savings of £32,624.50 in the same period: a total gain of £88,493.77. The corresponding figures for a 500kW boiler were payments of £111,738.55, savings of £63,594, and a total gain of £175,332.55. There was an explanation that boilers were “assumed at 94% efficient.” The page concluded with the statement:

“Over a twenty year period there is a potential return of £42,845,547.40 from installing 22 x 500kw boilers and 1 x 250[kw] boiler. This does not account for savings on gas.”

71. Proposal 4 is a strange document. It is poorly edited and internally incoherent. There is no documentary trail to show how it was produced or provided. It does not appear to relate to any matter that was subject of live consideration in the spring of 2016, either earlier in April or immediately after the date borne by the document. It had no discernible consequences. It is not relied on in the statements of case. It was disclosed by R&A but did not feature in the written evidence of Mr Lovering (who does refer to the covering letter, but only for its description of Mr Partridge as a director of Biosol) or Mr Pickering. Neil Bundock and Ben Bundock both say that they had no knowledge of the document before disclosure in these proceedings. Neil Bundock observes that the calculations in the document are inconsistent and says,

plausibly, that the concluding text of the Proposal is not something that he or anyone in the company would produce. Clearly, someone produced Proposal 4. The most likely conclusion is that, as Neil Bundock speculates, Mr Golding produced it and did so without his (Mr Bundock's) knowledge or approval. It is harder to know what the purpose of its production was and I think it neither necessary nor profitable to speculate.

72. On 24 April 2016 Biosol produced a written quotation in the sum of £470,000 exclusive of VAT for two further boilers (Boilers 3 and 4) and all ancillary works, including a fuel store. The written quotation, which was prepared by Ben Bundock, annexes terms and conditions. Mr Lovering's evidence was that he had no recollection of such a document, and that he was not shown and did not receive any terms and conditions with or on the reverse of the order form. Neil Bundock's evidence was he provided the quotation to Mr Lovering and that Biosol's terms and conditions were contained on the back of the quotation as well as on the back of the sales orders. I accept Neil Bundock's evidence on the point.
73. On the same day, Mr Lovering on behalf of R&A signed an order form for two Fröling TM 500 biomass boilers for a price of £470,000 (£235,000 each) exclusive of VAT. The order form stated that the required deposit was £141,000, comprising 10% of the net price plus the entire VAT. Mr Lovering says that the stated price was a mistake, although it is stated both on the order form and, as I find, on the written quotation provided at the time. When Biosol invoiced the finance company that would be providing finance for the boilers under a hire-purchase agreement, the invoice showed the price as £460,000.
74. Boilers 1 and 2 were commissioned on 22 June 2016 by Mr Partridge.
75. Biosol submitted an application on behalf of R&H for RHI accreditation of the boilers, and on 30 August 2016 Ofgem confirmed that accreditation had been granted and backdated to 30 June 2016. Biosol then commenced the provision of fuel for the boilers and maintenance of them.
76. In late November 2016 Boilers 1 and 2 were recommissioned by Mr Partridge on Biosol's instructions. Mr Partridge's evidence was that this was because Biosol had begun supplying R&A with heavily contaminated low-grade woodchip fuel; when initially commissioned, the boilers had been set up to burn Grade A fuel, but now (according to Mr Partridge) they had to be re-set to burn the contaminated low-grade fuel. Neil Bundock disputed that version of events: he said that the boilers were initially set up to burn virgin fuel and were subsequently re-set, on Biosol's instructions, to burn Grade A fuel, which was perfectly acceptable for the boilers. I shall come back to this point later.
77. Meanwhile, as a result of commercial difficulties affecting the manufacturer in Austria, the delivery of Boilers 3 and 4 was delayed. They were eventually delivered to the Property on 31 August and 1 September 2016, and installation commenced. There were further delays "with accreditations and in relation to building of the housing of the systems" (Ben Bundock's witness, para 29); Ben Bundock's evidence was that "these delays were beyond the control of Biosol" (ibid).
78. Boilers 3 and 4 were commissioned on 30 January 2017 by Mr Partridge.

Boilers 5–10

79. According to Mr Lovering, by late 2016 R&A had two sources of dissatisfaction with the biomass system provided by Biosol. First, the first quarter's readings for Boilers 1 and 2 indicated that the annual income would be of the order of only £80,000 rather than the £120,000 that had been expected. Second, Boilers 3 and 4 had still not been installed, although Biosol had led the partners to believe that they would be commissioned by the end of June 2016.
80. Despite this alleged dissatisfaction, however, R&A was considering the installation of further biomass boilers. In cross-examination, Mr Lovering accepted that the decision to buy further boilers was made in consequence of the performance of Boilers 1 and 2.
81. According to Mr Lovering, R&A had in mind one boiler for building 65; one for building 52; one for building 24; one for buildings 17, 18 and 20; one for buildings 19, 21 and 68; and an additional one for building 200. The evidence of Neil Bundock and Ben Bundock, by contrast, is that R&A wanted more boilers before they had any clear idea where they would be situated: the concern was to maximise receipts from the RHI Scheme rather than to benefit specific buildings. I accept the Bundocks' evidence on the point.
82. At all events, R&A did subsequently place orders for the supply of a further six boilers (Boilers 5 to 10), this time Swebo Ecofire 499kW boilers. The chronology is difficult to unravel and remains obscure in some respects.
83. The evidence of Neil Bundock, which I accept, was that in October 2016 R&A had already made a payment to Biosol of £200,000, which as well as clearing the debt owed in respect of Boilers 1 to 4 provided money towards the deposit for further boilers.
84. On 15 November 2016 R&A paid Biosol a further £100,000. In cross-examination, Mr Lovering said that this was by way of deposit on Boilers 5 and 6 because R&A told Biosol that in the new year it would buy several more boilers.
85. The date of the sales invoices for all six boilers, Boilers 5 to 10, is 11 November 2016. Each invoice was for £220,000 exclusive of VAT and stated that the deposit due on the order was "10% plus total VAT". Ben Bundock's evidence was that this is also the date on which they were produced. In my view, that evidence, though honestly given, is probably mistaken; the invoices were produced in 2017 and were backdated at R&A's request.
86. On 18 November 2016, Biosol placed an order with Swebo for three Ecofire 499kW boilers and paid Swebo a deposit of £40,326.65.
87. Those three boilers (Boilers 5, 6 and 7) were delivered to the Property immediately after Christmas in 2016.
88. In the light of the evidence, I find that by the end of November 2016 R&A had agreed to acquire three further boilers—that is why Biosol ordered three at that time: Ben Bundock's evidence was that Biosol never kept boilers "in stock", but ordered them

only when it received a customer's order with money for a deposit—and had indicated an intention to acquire a further three later.

89. However, R&A's case, advanced on the basis of the evidence of Mr Lovering and Mr Pickering, is that in 2016 it had made no commitment to acquire any further boilers (that is, other than Boilers 1 to 4), and that its agreement to acquire Boilers 5, 6 and 7 and subsequently Boilers 8, 9 and 10 (for which the sales orders were signed on 14 March 2017) was induced by assurances given and representations made to them by Neil Bundock at a meeting that took place on 5 January 2017.
90. As to the meeting on 5 January 2017:
- 1) It is common ground that Mr Lovering and Mr Pickering raised issues concerning problems that had been experienced with Boilers 1 and 2 and that Neil Bundock assured them that such problems as there had been had been rectified quickly and that Boilers 1 and 2 were operating well. I find that they accepted his assurances. This, taken with Mr Lovering's acceptance in cross-examination that the decision to buy more boilers was based on the performance of Boilers 1 and 2 and with R&A's subsequent willingness to order Boilers 8, 9 and 10, indicates that such problems as had been experienced with Boilers 1 and 2 were minor.
 - 2) The evidence of Mr Lovering and Mr Pickering was that Neil Bundock assured them that with a total of ten boilers at the Property R&A would receive an annual income of at least £650,000 from the RHI Scheme, based on the modest assumption that the boilers would run at only 55% of their capacity. Neil Bundock denies having given any such assurances and observes that, if (as R&A alleges) he had previously given assurances that each boiler would generate income of £120,000 per annum, an assurance in January 2017 that the true figure was £65,000 would not have engendered confidence to order further boilers.
 - 3) Mr Lovering and Mr Pickering allege that at the meeting Neil Bundock agreed that, on the assumption that RHI receipts would be £650,000 per annum, Biosol would provide fuel and maintenance indefinitely at a cost of £120,000 per annum. Neil Bundock denies that such an agreement was made.
 - 4) The evidence of Mr Lovering and Mr Pickering was that at the meeting Neil Bundock gave them promises and assurances regarding timescales: (a) he told them that he was confident that Boilers 3 and 4, which had been delayed, would be installed and commissioned by 14 January 2017; (b) he promised that Boilers 5, 6 and 7 would be delivered by 14 January and commissioned by 7 February 2017—he said he could guarantee this, because he already had the boilers in stock and there were no existing gas systems to be decommissioned; (c) he promised that Boilers 8, 9 and 10 would be commissioned by 31 March 2017. Mr Lovering says that he and Mr Pickering were persuaded that the timescales mentioned by Neil Bundock were realistic and that this was a factor in their decision to acquire a further six boilers.
 - 5) Neil Bundock denies that he gave the alleged promises and assurances: (a) he says that Boilers 3 and 4 had already been installed by 5 January 2017 and

simply needed to be commissioned, which they were on 30 January 2017; (b) he says that he did not promise that Boilers 5, 6 and 7 would be delivered by 14 January 2017, because they had been delivered in December 2016 and were already on site; and he did not promise that they would be commissioned by 7 February 2017, because that would not be a realistic timescale; (c) he says that he told Mr Lovering that Boilers 5-10 could be commissioned by the end of June 2017.

91. In support of its case as to what was said at the meeting on 5 January 2017, R&A has sought to rely on two pieces of documentary evidence: first, a photograph of a whiteboard on which (it is said) Neil Bundock's assurances were written down during the course of the meeting; second, a document (I shall call it the Memorandum) that is said to contain Mr Bundock's own confirmation of what was said and agreed at the meeting. These two pieces of evidence are a matter of considerable concern to me, and I shall discuss them in turn.
92. As for the whiteboard, Mr Pickering identified the writing on it as his own. He said that he had written down what Mr Bundock said during the meeting on 5 January 2017 and that he had taken a photograph of it on that date. This evidence was confirmed by Mr Lovering. I do not accept their evidence, and I find that the whiteboard does not represent a true record of the meeting on 5 January 2017.
- 1) Although it was initially said that the photograph that has been produced was taken on 5 January 2017, it is now known that it was taken in January 2018, and not by Mr Pickering but by R&A's solicitors. Mr Pickering insisted that he had taken his own photograph, but it has not been produced.
 - 2) The explanation given for the origins of the text on the whiteboard—namely, that Mr Pickering wrote it as Mr Bundock was speaking—is unconvincing. This is a very peculiar way to record detailed information that one is being given orally; one would be much more likely to make notes on paper. If anyone would be likely to write on a whiteboard, it would be the person providing the information.
 - 3) It is not clear why the writing on a whiteboard should have been preserved for one year after the meeting at which it had been written, especially if as is claimed a photograph had been taken at the time. Mr Lovering's explanation was that the partners wanted to be able to remind Neil Bundock of what he had agreed. That is a very unconvincing explanation: first, if a record were felt to be necessary, the obvious way of achieving the record would be to reduce the salient details to writing and put them in an agreement or a letter or email, not by preserving a whiteboard that was by its nature designed for repeated use; second, Mr Lovering said that the reason why no formal agreement or record of what was said on 5 January 2017 was prepared was that there was "mutual trust", and if that is so it becomes unclear why he felt the need of keeping the whiteboard as a way of reminding Mr Bundock of what he had agreed.
 - 4) The assurances and commitments said to have been given by Mr Bundock, and in respect of which the whiteboard is said to be evidence, are dubitable; see below.

- 5) R&A's reliance on the Memorandum justifies caution in accepting the rest of its evidence regarding the meeting on 5 January 2017.

93. The Memorandum is a one-page document, headed with the Biosol name and logo and containing the following text:

“Biosol Renewables UK Ltd have agreed a project to install 10 Biomass systems at R&A Properties. First two Boilers installed and commissioned by 22/06/2017 (sic). A meeting between both parties to discuss the development of a further 8 Boilers and the financial outcome of the project, details as follows.

Discussed and agreed

1. R&A Properties would receive a minimum RHI return of £650,000 per annum from the installation of 10 biomass systems.
2. Biosol to manage the site would receive £120,000 for Fuel and maintenance of all 10 biomass projects.
3. All 10 Boilers to be installed and commissioned by 31st March 2017.
4. The Mapping of the site was discussed and Boilers locations agreed.

Points 1, 2, 3 and 4 agreed with Neil Bundock and Nigel Lovering / David Pickering.

Kind regards

Neil Bundock”

94. According to Mr Lovering, the Memorandum was handed to him by Mr Bundock in the summer of 2017 after R&A had been pressing for some time for written confirmation of what had been agreed in January 2017. There are numerous reasons for concluding, as I do, that this explanation is a lie and that the document was fabricated by R&A for its own advantage.

- 1) The explanation is inherently implausible and lacks documentary support. If R&A were concerned to have a record of what had been said and agreed at the meeting, it could simply have sent an email just as short as the Memorandum, setting out the relevant points and asking for confirmation that they were accurately recorded. Or it could have sent an email simply asking for the points to be put in writing. The notion that it waited for at least six months (see below) without doing either, but nevertheless pressing—presumably orally—for something in writing makes little sense.
- 2) At a different point of his cross-examination, before he was questioned about this document, Mr Lovering explained that there was no record of the

discussion on 5 January 2017 because the relationship between the parties was one of “mutual trust”.

- 3) The explanation given by Mr Lovering for the Memorandum was not forthcoming until about a week before trial.
- 4) The Memorandum does not identify the date of the meeting to which it refers, but it is relied on as a record of what was agreed on 5 January 2017. However, the internal evidence is enough to show that the document was not contemporaneous, because in January 2017 what was under discussion was the supply of at most a further six boilers, and probably only a further three: R&A had already concluded the contractual arrangements for four boilers, and it had paid a deposit for a further three boilers. By itself this suggests one or more or all of the following conclusions: first, that the document was written long after the events it purports to describe; second, that its contents are not merely inaccurate but, in at least certain respects, fictitious; third, that it seeks to put the matters alleged at an early stage of the parties’ relationship.
- 5) Quite apart from the matters mentioned above and below, the explanation of the origin of the document would be implausible. If Mr Bundock were providing documentary confirmation in hard copy at a face-to-face meeting, he would be likely to produce a signed copy, and to sign it if it were unsigned; his name would not just be typed. The name might just be typed if the document were sent by email. But there is no email chain for the Memorandum itself, and it is not said to have been sent by email.
- 6) In fact, there is evidence that renders it certain that the Memorandum is a fabrication. The relevant events are as follows.
 - a) On 1 June 2017 Mr Golding requested and obtained Biosol’s letterhead in Word format.
 - b) By mid-June 2017 Mr Golding, though still employed by Biosol, was drafting a letter for Alison Davies to send to Biosol in respect of what were said to be Biosol’s contractual delays (see paragraph 103 below).
 - c) On 17 July 2017 Mr Golding sent an email to Mr Pickering and Mr Lovering from his personal Hotmail account, not from his Biosol account. The attachment, “Agreement with R&A Properties”, was identical to the Memorandum, except that (i) it included as point 3 “Fuel price of £65 per tonne for wood chip agreed”, and (ii) it ended “Kind regards, Ceri Golding, Biosol”.
 - d) A few hours later on the same day, Mr Golding sent another email to Mr Pickering and Mr Lovering from the same Hotmail account. The Subject line read: “amendment as discussed”. The attachment was a revision of the original attachment, so as to remove point 3. It was thus identical to the Memorandum, save that it ended with Mr Golding’s name instead of Mr Bundock’s.

- e) Although Mr Golding was employed by Biosol in July 2017, he left that employment in August 2017 and took up formal employment with R&A. There is evidence, however, that he was working for R&A, though not on its books, as early as mid-June 2017; see above.
- f) The first known appearance of the Memorandum (i.e. with Mr Bundock's name on it) was when Mr Lovering handed it to Mr Bundock in the course of a pre-arranged meeting in the car park of the David Lloyd Centre at Llandarcy in November 2017, shortly after Biosol had served statutory demands on R&A for moneys said to be outstanding for the supply of woodchip fuel. (Mr Bundock angrily denounced the document as a fabrication and said that the meeting was at an end.)

95. Accordingly, I find that the Memorandum was a fabrication and doubly fraudulent, in that (a) it purported to be from Mr Bundock and (b) it gave, no doubt deliberately, the appearance of being a contemporaneous record of an earlier meeting. I find that the evidence given by Mr Lovering concerning it was deliberately false. My findings concerning the Memorandum significantly affect the credibility of R&A's case as to what occurred on 5 January 2017.

96. I make the following findings of fact.

- 1) Before 5 January 2017 R&A had already agreed to take a further three boilers (Boilers 5, 6 and 7); see above.
- 2) Nothing said at the meeting on 5 January 2017 played any part in the decision to take Boilers 5, 6 and 7.
- 3) R&A had not at that stage committed itself to taking Boilers 8, 9 and 10, although it had already formed and intimated an intention to do so.
- 4) On 5 January 2017 Neil Bundock did not give any assurance that the income generated by ten boilers would be at least £650,000. Indeed, R&A would not have been willing to rely any such assurance, if as they maintain Mr Bundock had previously given an assurance that the income generated by a single boiler would be £120,000; the Partners would rather have made their own assessment based on the performance of the boilers already in operation. Further, Mr Bundock could hardly have given a credible assurance as to the income that the boilers would generate, because he could not guarantee the heat demand at the Property, which was a matter controlled by the tenants of the various units.
- 5) Neil Bundock did not promise that Biosol would provide fuel and maintenance at a total cost of £120,000 per annum, whether indefinitely or at all: he is a more trustworthy witness than Mr Lovering or Mr Pickering; and the alleged agreement is not supported by any credible document and is relatively implausible, both because Biosol could not control the demand for heat and because the total price alleged by R&A would probably have been uneconomic for Biosol, having regard to the cost at which fuel could be acquired.

- 6) Neil Bundock said that he expected Boilers 3 and 4 to be commissioned by the end of January 2017.
 - 7) As for Boilers 5, 6 and 7, I find that on 5 January 2017 Mr Bundock did not say that they would be commissioned by 7 February 2017; that is implausible, because it would leave only 4 ½ weeks for installation and commissioning; it is also inconsistent with the case advanced by R&A in early solicitors' correspondence, which was that the agreed date was 31 March 2017. Equally, however, I do not think it likely that Mr Bundock said specifically on that occasion that it would take until June 2017 before Boilers 5, 6 and 7 would be commissioned. An email exchange on 11 and 12 January 2017 between Mr Golding and Messrs Lovering and Pickering suggests that a target date of 31 March 2017 had been mentioned but that Biosol was awaiting confirmation from R&A of its acceptance of its costings for the works associated with installation and commissioning, and that R&A did not provide confirmation as requested.
 - 8) As Biosol had not ordered Boilers 8, 9 and 10 and did not do so until mid-February 2017 (the sales orders being signed only on 14 March 2017), it is unlikely that Neil Bundock promised that they would be commissioned by the end of March 2017. Indeed, in cross-examination Mr Lovering accepted that Boilers 8, 9 and 10 were not expected by that date. I think it likely that Mr Bundock indicated that, if the further three boilers were ordered promptly, it should be possible to commission them by the end of June 2017.
 - 9) All of these timescales were indicative; none were by way of promise and none created contractual obligations.
 - 10) The whiteboard does not provide any evidence of the discussions at the meeting on 5 January 2017.
97. On 11 January 2017 Mr Lovering and Mr Pickering met with Mr Golding, who after the meeting sent to them an email setting out a twelve-point "Project Guideline and costs as to the start to finish of the installation". The total cost of each "project" (i.e. boiler installation) was £220,300. The email ended:

"Currently we have received delivery of 3 (three) SWEBO ECOFIRE 499 KW Boilers and we need to understand for the employment of labour implemented by BIOSOL to deliver this project by the 31st March 2017, that this project is signed off as soon as possible so we don't have any delays in reaching these targets.

Can we understand that this project can be signed off with Premier asset finance as soon as possible please.

Serial Numbers: For SWEBO ECOFIRE 499 KW Boilers on Site ... *[three serial numbers were set out]*

1. Purchase the next 3 (three) Boilers

2. Maintain cash flow for the project.

On site tomorrow to discuss 9am.”

Taken in context, I interpret this email to indicate not that R&A had not yet agreed to buy Boilers 5, 6 and 7 but that the installation could not proceed until R&A had finalised its finance arrangements. As for “the next 3 (three) Boilers”, namely Boilers 8, 9 and 10, there was as yet no concluded agreement but there was an expectation that R&A would proceed.

98. Boilers 3 and 4 were commissioned on 30 January 2017 by Mr Partridge.
99. On or around that date, Neil Bundock and Ben Bundock met with Mr Pickering; Mr Lovering was on holiday and could not be present. The meeting was arranged because Biosol was concerned about matters of payment: Boilers 5, 6 and 7 had been delivered by Swebo and paid for and were ready to be installed, but R&A had not completed the necessary arrangements with the finance company that would enable Biosol to be paid. Sums were also outstanding in respect of woodchip. No particular progress was made at that meeting, but further meetings took place during February, when Mr Lovering was back. The finance for Boilers 5, 6 and 7 was arranged, Biosol was paid for them, and on 15 February 2016 Biosol ordered Boilers 8, 9 and 10 from Swebo. I accept Biosol’s evidence that this was when it was agreed where Boilers 5, 6 and 7 would be sited.
100. On 14 March 2017 Mr Lovering signed the sales orders for Boilers 8, 9 and 10. I find, however, that R&A had already committed itself to the acquisition of the boilers in February, prior to the order that Biosol placed for them with Swebo.
101. Boilers 5 and 6 were commissioned on 10 May 2017 by Biosol.
102. Boiler 7 was commissioned on 11 May 2017 by Biosol.
103. On 15 June 2017 Alison Davies sent an email to Mr Bundock in respect, primarily, of delays in commissioning Boiler 9. There are two particularly interesting features of the email. First, it appears that the substance of the text was actually provided to Ms Davies by Mr Golding, who was still an employee of Biosol. Second, the email notes with concern that the NHS had turned off the heating in Building 4, which it occupied, with the result that RHI income from the biomass boiler was reduced. Mr Lovering acknowledged in cross-examination that it was not surprising that a tenant should turn the heating off in the summer. The incident serves to highlight the obvious fact that any projected figures could only be indicative, if for no other reason than that a third party obviously could not dictate the use made by the tenants of the heating. It also indicates, as Mr Walker submitted, that R&A was interested not so much in the ability to meet tenants’ heating requirements as in its opportunity to maximise RHI income. (This latter point is graphically illustrated by communications between R&A and the NHS in April 2018, which show that an agreement was reached that the heating would run constantly but that temperatures would be controlled by enhanced ventilation and heating costs would be controlled by a price cap.)
104. Boilers 8, 9 and 10 were commissioned by Biosol on 29 June 2017.

The Maintenance and Woodchip Agreement

105. From the outset of the project it had been agreed orally that Biosol would provide woodchip fuel and maintenance services for the boilers it installed. Accordingly, until the relationship between the parties broke down in November 2017, Biosol delivered to the Property the woodchip required to run the boilers and placed an employee, Elliot Cole, on site from Monday to Friday to deal with fuelling, maintenance and repair of the boilers. It also checked the Property at the weekends to ensure that there was sufficient woodchip and that the boilers were working. (Issues concerning the quality of the fuel and the adequacy of the maintenance services are addressed below.)
106. In June 2017 the parties signed a written agreement (“the Maintenance and Woodchip Agreement”) for the repair and maintenance of the boilers by Biosol and for the supply of fuel. The document was probably prepared by Mr Golding and took the form of a letter addressed by Biosol to R&A in the following terms:

“We have installed at your property a multiple 500kw Biomass renewable energy system.

In consideration of our installing the renewable energy system under the specific term of doing so, you agree that for a period of 3 years from the date of completion of the installation you will and will procure that any successors in title will:-

1. Require and allow us to carry out all maintenance and any necessary repairs to the said Biomass renewable energy system at such intervals and at such cost as we shall advise for a period of 3 years.
2. Not permit anyone other than us to undertake maintenance or repairs to the Biomass renewable energy system.
3. Purchase from us all wood chip required to supply a 500kw boiler for the purposes of maintaining its output at maximum capacity for a period of 3 years where applicable.
4. Not to purchase or acquire by any means wood chip or other fuel from any source other than us.

This letter agreement may be amended only by written agreement signed by or on behalf [of] you and us.

This letter agreement is governed by English law and the English Courts will have jurisdiction in the event of any dispute.

Please sign the enclosed copy of this letter to signify your acceptance of the terms.”

The document was signed by Mr Golding for Biosol and was counter-signed by Mr Lovering for R&A.

107. Mr Lovering's evidence was that from as early as December 2015 the terms of the agreement between R&A and Biosol regarding the supply of fuel were clear and settled. Biosol would supply sufficient woodchip fuel of the required standard, namely Grade A, at a price not exceeding £16,563 per annum for each boiler. From the time when Boilers 5 to 10 were ordered, the agreement was that Biosol would provide all necessary fuel and maintenance for a price not to exceed £120,000 per annum in total. Mr Lovering stated that he did not understand that the document he was signing was intended to alter the deal already struck, and he would not have wanted to change it. Mr Pickering's evidence as to the oral agreement was to the same effect, and he said that he had not known of the written document and had never understood that the terms for the supply of woodchip and of maintenance services had been altered.
108. Mr Bundock's evidence was that the Maintenance and Woodchip Agreement was essentially just a written record of the oral agreement he had reached with Mr Lovering; that Biosol would supply all of R&A's woodchip requirements for a period of three years at an agreed price of £75 per tonne and would carry out all necessary maintenance and repairs of the boilers. He says that the document did not alter the agreement between the parties.
109. I accept the evidence of Mr Bundock and reject that of Mr Lovering and Mr Pickering. Mr Lovering would not have signed the Maintenance and Woodchip Agreement if there were pre-existing agreements between the parties such as he claims. The Memorandum illustrates Mr Lovering's readiness to give a false account of the discussions and agreements between the parties.

Subsequent events

110. From June 2016 (when Boilers 1 and 2 were commissioned) until 24 November 2017 (when the relationship between the parties was terminated), Biosol had supplied all of the fuel for the biomass boilers at the Property. The woodchip was stored primarily in Building 65, to which Biosol had the key and exclusive access. The refuelling of the boilers was carried out by Biosol. Similarly, as I find, Biosol continued to be responsible for maintenance of the boilers until 24 November 2017. R&A made no payments for fuel and maintenance during this period, and no invoices in that regard were submitted by Biosol until July 2017.
111. On 17 July 2017 Biosol invoiced R&A for £25,000 for the cost of decommissioning works and £8,000 for connecting offices to the heating system. Numerous other invoices were submitted on the same date; most of these related to the supply of woodchip. Mr Bundock explained that he had delayed submitting the invoices in an attempt to assist R&A and that, when he pressed for payment, he was told that the invoices would be paid when a certain level of income was achieved from the RHI. None of the invoices were challenged when they were submitted. Mr Lovering's evidence was that the invoices, though dated in July 2017, were not submitted until October 2017, but I reject that evidence.

112. It was also on 17 July 2017 that Mr Golding sent to Mr Lovering and Mr Pickering, from his personal email account not his Biosol account, the emails attaching the original sources of the Memorandum, as discussed above.
113. In August 2017, Mr Golding took up employment with R&A, though he had been covertly assisting R&A in its dealings vis-à-vis Biosol since at least June 2017, in breach of his obligation of loyalty and good faith to his employers.
114. On 26 September 2017 Mr Lovering signed an instruction to the finance company to release to Biosol the retention of £19,800 under the hire-purchase agreement. As Mr Walker observes, this indicates that at that time R&A cannot have had any serious complaint about the boilers.
115. Similarly, by the end of September 2017 no issue had arisen between the parties as to the suitability of the fuel being supplied by Biosol.
116. However, in September 2017 R&A was already making arrangements to replace Biosol for the provision of fuel and maintenance services at the Property. It was in discussions with the Log Depot, with a view to leasing to it Building 65. It also bought a weighbridge and a wood/pallet-chipping machine (and, later, a drying floor) for the Property. In cross-examination, Mr Lovering confirmed that by the time of the email exchanges the following month (see below) R&A had decided to part company with Biosol, but it is clear to me that the decision had already been reached by September 2017. The reason given by Mr Lovering for the decision was that R&A “just couldn’t allow Biosol to walk off site leaving nothing in place. If they walked off site or – or we terminated the contract, we had to have something potentially in place”.
117. On 18 October 2017 Mr John Worsfold, who had commenced employment with Biosol as an engineer and project manager in September 2017, sent an email to Alison Davies, copied to Mr Lovering, in which among several points he raised concerns that members of R&A’s staff had been gaining access to the boiler houses; he continued: “as a whole this is not a problem, however it has become apparent that members of your staff are accessing the running of the systems of the boilers and this now renders the warranty to the boilers void.” The email also said that Biosol was “more than happy to continue with the management of the meter readings as an ongoing service as initially agreed together with fuel management and servicing.”
118. Also on 18 October, in an email to Mr Lovering, Mr Bundock set out the moneys (in excess of £900,000) said to be owed by R&A in respect of the supply and installation of the boilers and the Maintenance and Woodchip Agreement and said that Biosol could wait for payment no longer and had referred the matter to its solicitor.
119. Mr Lovering replied to that email on 26 October 2017. He complained that “the system you sold us is currently completely unfit for purpose, made worse by the fact that the fuel has been consistently substandard”, and he mentioned without elaboration “wider concerns in connection with the manner in which the system has been operated by you.” Mr Lovering did not take issue with the figures presented by Mr Bundock, and he did not explain how the system—in respect of which he had sanctioned release of the retention one month previously—was unfit for its purpose.

120. The email of 26 October 2017 appears to be the first intimation by R&A to Biosol of a complaint regarding the quality of the fuel supplied to the Property. It is necessary to explore the evidence on this point further.
121. Mr Lovering's written evidence was that it was in October 2017 that Mr Golding began expressing concerns about the way in which Biosol had been running the boilers; in particular, he revealed that Biosol had not been using Grade A, nor even Grade B, woodchip but instead had been providing rough woodchip, which contained contaminants such as glue, metal, glass and plastics and which thereby caused the boilers to run inefficiently and to break down. Mr Lovering's evidence was that Mr Golding took him to inspect the hangar at the Property where Biosol stored the woodchip for use in the boilers, and found it to be contaminated with various foreign bodies. In cross-examination he said that, before Mr Golding brought these matters to his attention, he had not had any concerns that the fuel being used was unsuitable, although the partners had "massive concerns" about the performance of the boilers. Mr Pickering's evidence supported that of Mr Lovering.
122. That evidence is problematic. As Mr Golding had started working for R&A at least two months previously, it is unlikely that, if he expressed concerns of this sort, he first did so in October 2017, especially if (a), as is implied by Mr Lovering's evidence (first statement, para 129), the disclosure was of matters known to Mr Golding by reason of his former employment by Biosol and those matters were at least part of the reason why Mr Golding had been unhappy working for Biosol, (b) Mr Golding had been giving covert assistance to R&A for at least two months before he took up formal employment, (c) R&A was already facing large claims for payment from Biosol, and (d) R&A had for at least a month been looking to end its relationship with Biosol. It is clear that Mr Golding had not told R&A of problems with the quality of the fuel prior to October 2017, and this means that he was almost certainly not aware of any such problems. Some of the documents cast light on how the situation developed after 18 October 2017.
123. Upon receipt of Mr Worsfold's email of 18 October, Mr Golding forwarded it to Mr Partridge for his comments. Mr Lovering's written evidence was that Mr Golding said that Mr Partridge "had fallen out with Biosol and would be happy to assist [R&A] by providing his professional opinion on the quality of the fuel being used in the boilers." The comments sought by Mr Golding at this stage did not, however, concern the quality of fuel.
124. On 19 October 2017 Mr Partridge did provide comments on Mr Worsfold's email. The copy in evidence has comments on the original email in both red and blue ink; I think that the comments in red are Mr Golding's and the comments in blue are Mr Partridge's, though it is conceivable that it is the other way around. There are two places where the comments in blue advise that Biosol should be asked for confirmation as to the classification of fuel that has been provided; neither of them positively asserts that the fuel is of the wrong classification, though the second of them, which is neither grammatical nor wholly intelligible, might suggest that the classifications of fuel supplied had been variable, though not substandard. None of the comments in red say anything about the fuel. There is nothing in the annotations to suggest that as at 19 October 2017 Mr Golding had knowledge that Biosol had been supplying substandard fuel.

125. However, at this point R&A and Mr Partridge started making enquiries about the fuel supplied. On 23 October 2017 the authorised supplier of Fröling biomass boilers sent an email to Mr Golding and Mr Partridge, presumably in response to their enquiry:
- “The TM 500 boiler has been approved for use with Grade A and Grade B waste wood, which generally do not contain glues and plastic. Should you require further details as to the specification of Grade A and Grade B wood, please refer to the British Standard document BSI PAS 111 (see attached link) ...”
126. Also on 23 October 2017 Mr Partridge walked around the Property for the purpose of inspecting the system. That morning he sent two photographs to Mr Golding by email, with the subject line, “ash Auger blocked Master boiler heavy clinker”, but with no further comments and with no suggestion that the “heavy clinker” was indicative of substandard fuel.
127. At midday on 23 October 2017 Alison Davies sent an email to Mr Bundock, which said among other things that two boilers were “down due to fuel”. The email does not explain what that means and there is no evidence to show what it was intended to mean, or (if the intention was to refer to quality of fuel rather than, say, absence of fuel) whether the diagnosis was correct.
128. On the morning of 24 October Mr Partridge sent two further emails to Mr Golding. The first made some detailed comments on boiler operation, but it contained no indication that the boilers were being fuelled with substandard woodchip. The second attached documentation relating to the fuel classifications, but it did not contain any factual information relating to the fuel actually supplied by Biosol.
129. Also on the morning of 24 October, Alison Davies sent an email to John Worsfold: “Please can I order 100 tonne of virgin wood chip and can you confirm that the moisture content is maximum 20% +/- 10%”.
130. On 24 October Mr Golding met a representative of another supplier of fuel. That evening the representative sent Mr Golding an email setting out the terms on which his firm would supply virgin woodchip to R&A on a month’s trial, at a cost that worked out at £72 per tonne.
131. On 25 October Mr Golding forwarded the representative’s proposal to Mr Lovering, Mr Pickering and Ms Davies. As to the price, he explained that the representative “would prefer to quote £80 per tonne, but he feels that once we use his product we will improve our calorific value and hence increase RHI return.”
132. Two hours later, Ms Davies sent an email to Ben Bundock: “Sorry but I will have to cancel my wood chip order.”
133. It appears from the documents that on that same morning, 25 October, Mr Golding contacted Wood Fuel Testing Ltd, which sent him an order form to be returned with a 20 litre sample of fuel for testing. Mr Golding sent the order form to Mr Pickering on 31 October.

134. On the afternoon of 25 October Ms Davies met a representative from a second supplier of fuel and ordered 200 tonnes of virgin woodchip at a price of £86 per tonne.
135. On 26 October Mr Lovering sent his response to Mr Bundock's email of 18 October (see above). Although that response complained that "the fuel supplied has been consistently substandard", the documents do not show that R&A had identified consistently substandard fuel supplied by Biosol. What the documents show is that R&A was putting in hand (a) fuel testing and (b) alternative suppliers.
136. On 1 November 2017 Mr Golding contacted Euro Forest for a quote for "developing a drying floor application" at the Property in January 2018.

137. On 6 November Alison Davies sent an email to Mr Bundock:

"All boilers were down this morning with numerous complaints from tenants, we have fuel here but it appears that they were not filled enough on Friday.

Also, the pile of contaminated wood chip in building 65 and under the canopy needs to be removed as we have had an inspector visit and he has said that it cannot touch the virgin wood chip.

Please advise."

The reference to an "inspector" is to a visit by Mr Oliver Matthews, an Environmental Health Practitioner with Carmarthenshire County Council. (His comments are dealt with below in the context of his subsequent email to Alison Davies.) Mr Matthews' visit is said by R&A to have been occasioned by complaints by nearby residents about odours being emitted from the Premises—by implication, as a result of the operation of the biomass heating systems.

138. Mr Bundock replied later that day:

"Apologies for delay, and not aware that boilers were down this morning. Will establish cause and get back to you.

With regards Grade A fuel in 65 I will find out and arrange for it to be moved."

139. Emails on 7 November show that Biosol found a buyer for the Grade A fuel being held at Building 65 at a price of £36 per tonne. Biosol confirmed that "the Grade A [was] fully traceable via BSL". The buyer confirmed that he could not take delivery until the week commencing 20 November 2017.
140. On 8 November Oliver Matthews sent an email to Ms Davies (not copied to Biosol) in respect of his observations when he visited the Property:

"I have described the wood waste as 'contaminated' due to there being evidence that it contains metal, glass and plastic debris throughout. The material may have been processed in

accordance with the PAS111 code however it is not suitable for use in your biomass boilers. Firstly it is likely to result in damage to the boilers and secondly you would require an environmental permit to burn the material, which you do not have. ...

If you wish to remove the material from site, which I strongly recommend, it would have to be removed as a waste and therefore would have to be transported in accordance with the regulations ...

I have tried to find a route for you to pass the material on but as yet have been unsuccessful. My suggested use for animal bedding is unlikely to be an option due to the contaminants. The material could be screened to remove metal but this still leaves glass, plastic and any other non-metallic contaminant which are likely to mean the material is not suitable. If I hear of any potential outlets in the near future I will let you know.”

141. On 9 November Mr Bundock sent an email to Ms Davies: “I will forward to Nigel [Lovering] today the name address and BSL[Biomass Suppliers List] numbers of the suppliers of the Grade A fuel in 65 as discussed.”
142. On 10 November 2017 Biosol served statutory demands on R&A in respect of the non-payment of the moneys said to be outstanding to it for the supply of woodchip.
143. On 12 November Mr Golding sent to Mr Lovering and Mr Pickering a series of annotated slides, which included photographs of what was said to be metal and other debris found in the ash box of Boiler 1 and, apparently, other boilers, which had been “mixed with wood fuel and burnt in the Biomass boiler”.
144. On 13 November Mr Golding submitted a request for fuel testing to Wood Fuel Testing Limited. The sample for testing was selected by R&A; Biosol was not informed.
145. On 14 November Mr Bundock spoke to Mr Matthews and followed up the conversation with an email, which was copied to Alison Davies:

“Thank you for our earlier conversation and the clarity that you have shed on the current situation.

Just to confirm that fuel supplied to R and A properties has been procured from legitimate vendors accredited by Ofgem on the Biomass suppliers list, reference numbers ...

To add as per conversation the internal wood chip will be removed from site over the forthcoming weeks and delivered to Western Wood energy Biomass 1 at Margam for use.

The wood chip housed externally in the lean to will be collected by ourselves and conveyed by tractor and trailer to my home address for use for animal bedding on the farm.”

146. On 15 November Mr Matthews replied to Mr Bundock. He advised that Biosol check that use of the fuel at Margam would be compliant with the relevant permit conditions, and that Mr Bundock take care to remove as much contaminant as possible before using the externally stored fuel for animal bedding. He wrote:

“I appreciate that you have relevant paperwork and certificates for the material, but as explained, the whole accreditation and grading protocols are under review at national UK level due to inconsistencies in the interpretation of the regulations by various stakeholders.”

147. On 20 November Wood Fuel Testing Limited carried out a test on the sample provided by R&A for moisture content. The certificate provided on or about that date shows that the sample complied with the required standard.

148. Mr Lovering’s written evidence was that Wood Fuel Testing Limited confirmed to him that the woodchip could not be classified as Grade A fuel and should not have been used as a biomass fuel (first statement, para 138). In cross-examination Mr Lovering said that Wood Fuel Testing Limited had not spoken to him personally and that he did not know how they communicated that opinion. I have seen no document in which Wood Fuel Testing Limited expressed the opinion attributed to them by Mr Lovering.

149. On 21 November Shaun Eglington of Taurus GE Limited wrote to the partners of R&A after his “initial brief survey of the site’s biomass boiler installations”. Among the points he raised were:

“The boilers have been operating on fuel that they are not designed for nor are permitted to use as per the Environment Agency guidelines and manufacturer’s instructions.

There is a good likelihood that significant wear or damage has occurred to them as a result of the incorrect fuel used and in addition to that warranties will have been invalidated if no written consent has been provided directly from the manufacturer for allowance of that fuel.”

The basis on which Mr Eglington concluded that the boilers had been operating on inappropriate fuel is not stated.

150. On 23 November Alison Davies notified Mr Worsfold of a boiler malfunction. He replied on his return to the office on the following day, commenting: “Due to the current financial situation we are unable to supply you with the priority response that you have become accustomed to.”

151. On a date in November 2017, precisely when is unclear, Mr Bundock and Mr Lovering met by arrangement in the car park of the David Lloyd Centre at Llandarcy.

At this meeting, Mr Lovering gave to Mr Bundock a copy of the Memorandum, and Mr Bundock angrily denounced it as a fabrication and said that the meeting was over.

152. On 24 November 2017 Hugh James, solicitors instructed by R&A, wrote to W. Parry Solicitors, acting for Biosol, to oppose the statutory demands and to intimate “a very significant claim in damages arising from fraudulent misrepresentation, negligence and breach of contract.” The letter quoted at length from the comments of Taurus GE Limited and set out substantially the same case as R&A now advance. As regards fuel, the letter said that the parties had agreed that the fuel to be supplied would be Grade A fuel in accordance with PAS 111:2012, and it relied on the “photographs of the boiler’s ash traps which confirm the presence of rocks, nails, screws, door hinges, glass and painted wood” and on the observations of Oliver Matthews. It said that test results were awaited from Wood Fuel Testing Limited. The last substantive paragraph of the letter read:

“Finally, it perhaps goes without saying that our client terminates is (sic) contractual relations with your client immediately. Our client has lost all confidence in your client. It is clear that the installed system is not of a satisfactory quality and it appears self-evident that your client is not capable of remediation.”

153. The first of a number of annexes to the letter of 24 November 2017 was a copy of the Memorandum. This document was described by Hugh James as “a letter produced by Mr Bundock following the meeting on 5 January 2017” and was relied on as evidencing the agreement reached in that meeting.
154. Biosol had no further access to the Premises after 24 November 2017. It is common ground that at that time Biosol had not completed the snagging list in respect of the installations and had not removed all of the contaminated fuel from Building 65.
155. On 28 November 2017 Wood Fuel Testing Limited provided to R&A the remainder of the test results in respect of the sample that had been sent to them earlier in the month. I have not been referred to the certificates in respect of those results. Anyway, it seems that the partners of R&A were unsure of their significance. On 3 January 2018 Mr Golding sent an email to Wood Fuel Testing Limited, asking whether the sample supplied could be classified as Grade A woodchip, whether it should be used as a biomass fuel, and whether it was a waste material. I have not located the response to that enquiry.
156. Proceedings were commenced by the issue of a claim form on 6 July 2018. It is unnecessary to recite the history of the litigation thereafter.

Expert Evidence

157. The parties were given permission to rely on expert evidence in respect of a number of issues arising on the counterclaim, concerning the installation and commissioning of the boilers, the suitability and fitness for purpose of the boilers, possible alternative boilers, and the fitness for purpose of the fuel supplied by Biosol. Biosol adduced

evidence from Mr Norrie Crawford, a chartered engineer, of IFIC Forensics Limited. R&A adduced evidence from Mr Mark Crowther, a chemical engineer, of Kiwa Limited. After reports had been exchanged and responses had been given to Part 35 questions, the experts signed a joint memorandum on 3 April 2020 and thereafter prepared short supplementary reports. I am grateful to Mr Crawford and Mr Crowther for their assistance.

158. In due course, I shall consider the evidence given by the two experts as it pertains to the various issues to be discussed below. For convenience, I here summarise very shortly the different opinions of the experts on the main issues.

- 1) Mr Crowther said that the boilers were oversized for the buildings in which they were installed. Mr Crawford disagreed.
- 2) Both experts agreed that an oversized boiler would be inefficient and would lead to greater expenditure on fuel. Mr Crowther said that oversized boilers resulted in increased maintenance costs. However, both experts said that they had insufficient information to enable them to say whether the maintenance costs incurred by the Partnership were greater or less than would have been expected.
- 3) Mr Crowther considered that it ought to have been possible to complete the installation of the boilers within a six- to ten-week period. Mr Crawford considered that neither expert had been given sufficient information to permit any conclusion that works could have been programmed so as to achieve such an outcome.
- 4) The experts agreed that the use of inappropriate fuel in boilers could result in damage to the boilers and inefficient operation. Mr Crowther expressed some adverse opinions on the quality of some fuel that he saw in January 2018. Mr Crawford did not inspect any fuel. Neither expert was able to give evidence pertaining to the central factual issues regarding fuel.

R&A's Counterclaim

159. R&A's numerous cross-claims may be grouped according to various methods of taxonomy. The method I shall use gives the following groups:

- A. Claims for misrepresentations that induced R&A to contract with Biosol;
- B. Claims for breach of warranty in respect of the performance of the boilers;
- C. Claims in contract or in tort relating to the unsuitability of the boilers;
- D. Claims in contract relating to delays in installing the boilers;
- E. Claims in contract relating to defects in the installation of the boilers;
- F. Claims for breach of warranty in respect of fuel.

A1: Misrepresentation – the Directors Representation

160. The “Directors Representation” is alleged to be a representation “that both Mr Golding and Mr Partridge (who was held out to be an expert in biomass heating systems) were directors of Biosol”. This representation is said to have been made by Mr Golding and Neil Bundock in the course of the discussions in late 2015 and also in the letters covering Proposals 1 and 2. It is alleged that R&A entered into each of the boiler contracts “in reasonable reliance” on the Directors Representation; that the Directors Representation was false, because neither Mr Golding nor Mr Partridge had ever been a director of Biosol; and that Biosol did not have reasonable grounds for believing that they had ever been directors. See the defence and counterclaim, paras 7, 8 and 54.
161. Biosol denies that the Directors Representation was made. It denies that the partners would have relied on any representation by Mr Golding that he was a director of Biosol, and it avers that it would have been unreasonable to rely on such a representation in view of what is said to be the partners’ prior knowledge of him. See the reply and defence to counterclaim, paras 3, 4, 5 and 6.
162. I regard this head of cross-claim as an opportunistic and unmeritorious attempt to create a case out of matters of no true relevance at all.
163. First, I find as a fact that Mr Golding did not hold himself out as a director in Biosol. Such evidence as there is that he did so comes from Mr Lovering, but I do not accept it. Mr Lovering is not a reliable witness. Mr Golding was not called to give evidence, although the circumstances are such that R&A might have been expected to call him. There is evidence that Mr Golding was capable of telling untruths about himself, but it is inherently unlikely that he held himself out as being a director when (a) there was no reason for him to do so and (b) the matter could so easily be checked.
164. Second, I find as a fact that Neil Bundock did not say to R&A that Mr Golding or Mr Partridge was a director of Biosol. Mr Partridge’s evidence was that Mr Bundock always introduced him as either a partner or a director and that, in his presence, Mr Bundock introduced him to Mr Lovering and Mr Pickering as a director. That is not even the case advanced in the defence and counterclaim (see para 6) and I do not accept it. I think it reflects the degree of animus towards Mr Bundock that was sometimes evident in Mr Partridge’s evidence. In agreement with Mr Bundock’s evidence, I find that Mr Partridge did not attend meetings at which Mr Bundock and the partners were present. Mr Bundock might well have described Mr Partridge as Biosol’s “partner”, because he appears to have used that word for anyone with whom there was a collaborative relationship. He said that he would not have called him a director, because he was not a director and because any good businessman could easily ascertain the identity of the directors by a quick check at Companies House.
165. Third, and strikingly, Mr Emmett’s submissions were put on the basis that in the discussions Mr Golding and Mr Partridge were held out as being Biosol’s “team” (written submissions, para 44); the relevant section of his written submissions was under the heading, “Biosol’s representation as to the identity of its core ‘team’”. This

way of putting the case has more of an air of reality, but neither the pleaded representation nor the pleaded falsehood is about the core team.

166. Fourth, I do not consider that Mr Emmett gets the support for the pleaded case that he seeks from the letter of 11 November 2015 covering Proposal 2 or the letter of 9 February 2016 covering Proposal 3, which he said on an objective construction held out Mr Golding and Mr Partridge as directors of Biosol.
- a) The letter covering Proposal 1 (wrongly dated 8 September 2015) had already been sent to R&A, and it was reasonably clear from that that Mr Partridge was a director of JBPI.
 - b) The letters of 11 November 2015 and 9 February 2016 were in the names of two companies, Biosol and JBPI, and did not state who was a director of which company. Therefore they were on their face ambiguous. As Mr Partridge was known to be a director of JBPI and as his email address was shown as a JBPI email address, the letters can hardly amount to representations that he was a director of Biosol. As Mr Golding's name came third on the list and no email address was stated for him, the letters can hardly amount to representations as to which company he was a director of.
 - c) Even if Mr Emmett were correct that an "objective construction" of the letters meant that Mr Partridge and Mr Golding were directors of Biosol, I should not regard it as a material representation, in the sense of a representation that would influence the judgment of a reasonable person, save to the extent that, despite its objective construction, it represented that Mr Partridge and Mr Golding were involved on the Biosol side; which was true. As a representation that, more than being involved, they were company directors, it was not material, for two reasons.
 - (i) Representations *qua* representations are not like terms of a contract, even if the same principles of construction are to be applied to them. Once something is a term of a contract, it regulates the conduct of the parties to the contract, regardless of how unclear its meaning might be. No matter how arguable may be different interpretations of the term, English law insists that only one interpretation is "correct". Representations, not forming terms of any contract, do not regulate the parties' relationship prior to the making of a contract; if they are ambiguous, there is no reason why they should do so. The representee can seek clarification, if the point is important. This is not to say, incorrectly, that a representee who would otherwise have a claim for damages for misrepresentation is disqualified if he failed to take an opportunity to ascertain the truth. It is to say that an ambiguous statement may by reason of its ambiguity and the ease with which it can be clarified, not amount to a material representation. In my judgment it does not so amount in the present case.
 - (ii) Although there are no doubt circumstances where a representation as to the composition of the board of directors is material, this is not one of them. What may, possibly, have been material is the involvement of particular persons, as giving confidence that a person with such-and-such

expertise, or a person known to R&A, was involved at Biosol's end. This is why Mr Emmett re-casts his submission in terms of identification of the "core team". (Another point, about "control" of a company, is remarked on below.)

167. Fifth, I am satisfied that the status of Mr Golding and Mr Partridge as directors of Biosol and the composition of Biosol's board were not matters that in any way at all influenced R&A to contract with Biosol. The partners were not induced to contract by any belief that either man was a director; in particular, they were not induced to contract by the description of Mr Golding and Mr Partridge as directors on the letters of 11 November 2015 and 9 February 2016.

- a) Mr Lovering and Mr Pickering may have been interested that Mr Golding and Mr Partridge were involved, but I am sure that they had no interest in whether they were directors. Further, Mr Lovering's own evidence is that Mr Golding told him at the outset that he was not an expert in biomass heating systems and that Mr Partridge was "an associate" and "of JPB Industries".
- b) Mr Lovering's evidence was that he was concerned to know who controlled the companies he dealt with. If that had been so, he would have checked the position at Companies House, which he claims not to have done. Being a director does not give one control of a company; control lies with the members. Nor does it give one control of the management of a company; management lies with the board, and one would want to know the composition of the board, not that this or that person was a member of the board. I doubt whether any of these things were of any concern to Mr Lovering, but if they were he will probably have satisfied himself by a quick search at Companies House.
- c) Mr Pickering's evidence was that he understood Biosol to be a family company and that this understanding was not affected by the involvement of Mr Golding and Mr Partridge.

A2: Misrepresentation – the Income Assurance

168. Analysis of R&A's case as to the "Income Assurance" is made difficult by two related matters. The first is the diffuse and discursive nature of the defence and counterclaim, including its introduction of an allegation of a "Profitability Assurance" (an assurance allegedly given by Mr Bundock that R&A would "make a load of money" and would not be "out of pocket"), which does not however function as an actionable misrepresentation in the defence and counterclaim. The second is the way in which Mr Emmett's submissions alter the nature of the alleged misrepresentations: these are now characterised as (1) a representation that the boilers could operate constantly at full capacity (paragraphs 52 – 59) and (2) a representation that the purchase of the boilers would be profitable (paragraphs 70 – 78). In the defence and counterclaim, however, the constant operation of the boilers is not relied on as a substantive misrepresentation but as the necessary premise of the representation actually pleaded, namely the assurance that each boiler would generate RHI income of £120,000 per annum and (by implication) that Biosol had reasonable grounds for believing that it

would generate that level of income. As for the “Profitability Assurance”, this now appears to have transformed from its original role as the precursor to the “Income Assurance” into a “representation” (or promise) that R&A would have no obligation to pay for fuel and maintenance until R&A was making a profit from the boilers. Neither of these so-called representations is pleaded.

169. R&A’s pleaded case as to the “Income Assurance” is as follows (defence and counterclaim, paras 11, 12, 13, and 55 – 57):
- a) Biosol gave an assurance in respect of Boilers 1 to 4 “that the Partnership would earn gross income of £120,000 per year per boiler pursuant to the RHI”.
 - b) This assurance was given orally by Neil Bundock in or by December 2015 and was repeated and particularised in the Summary.
 - c) The assurance implied the representation that Biosol had reasonable grounds for the expectation that each of Boilers 1 to 4 would generate gross revenue of £120,000 per year pursuant to the RHI; cf. *Smith v Land and House Property Corp* (1884) 28 ChD 7, per Bowen LJ at 15.
 - d) The implied representation was untrue and Biosol did not have reasonable grounds for believing it to be true, “because each of Boilers 1 to 4 could only generate gross revenue of £120,000 per year if it were to operate constantly and at full capacity, which is not reasonably possible as would be known to any person with reasonable knowledge of the operation of biomass burning boilers”.
 - e) R&A entered into the contracts for Boilers 1 and 2 and for Boilers 3 and 4 in reliance on the representation.
 - f) If the representation had not been made, R&A would not have entered into the contracts for Boilers 1 and 2 and for Boilers 3 and 4, but it would instead have entered into different contracts for suitable boilers at a lesser cost.
170. Biosol denies that the Income Assurance was given or that any such implied representation as is alleged was made, and it relies on the disclaimers that accompanied such feasibility summaries as were provided (reply and defence to counterclaim, paras 9 to 13).
171. For reasons already given, I do not accept R&A’s evidence that Mr Bundock gave the alleged assurance as to income.
172. That finding is sufficient to dispose of R&A’s pleaded case on misrepresentation.
173. If I had accepted that Biosol made the representations alleged, I should have rejected the claim for damages on the basis: (1) that no loss on the tortious measure (that is, loss caused by entry into the contract, as opposed to loss caused by the contract not living up to expectations) had been proved; (2) that the disclaimers in the Proposals precluded reliance on projected performance; insofar as the disclaimers might be said strictly to relate only to projections within the Proposals themselves, I should regard them as being sufficient to preclude reasonable reliance on oral projections, because

those could not reasonably be expected to stand on any different footing; (3) that R&A entered into the contracts for Boilers 5-10 on the strength of the performance of Boilers 1 and 2, not in reliance on any representations made by Mr Bundock.

174. I shall not permit R&A to rely on allegations of misrepresentation that have not been properly pleaded and for which no permission to amend has been sought. However, I shall comment very briefly on the alternative ways in which Mr Emmett sought to advance the case on misrepresentation.
175. As for constant operation of the boilers:
- 1) I repeat that the defence and counterclaim did not allege that Biosol represented that the boilers could operate constantly at full capacity. Rather it alleged that Biosol did not have reasonable grounds for giving the Income Assurance, because the Income Assurance could only have been true if the boilers could operate constantly at full capacity. I have found that the Income Assurance was not given.
 - 2) R&A relies principally on the Summary, which I have already discussed.
 - 3) The other documents relied on by R&A (an “RHI worked example” sent by Ben Bundock to Mr Golding on 20 January 2016, and the email of 28 January 2016 from Mr Bundock to Graham Jones) are not mentioned in the defence and counterclaim (because, of course, this alleged misrepresentation is not contained in the defence and counterclaim) and the evidence does not support a finding that the partners relied on them. There does not appear to be any evidence that the former document was even provided to R&A.
 - 4) The central documents were in fact the Proposals, on which R&A does not rely—understandably, because (a) it is not said that the projections in them were incorrect or unreasonable and (b) they contained disclaimers.
176. As for the current variant of the “Profitability Assurance”, I find that Biosol gave no assurance that R&A would not have to pay for fuel and maintenance until it began to generate a profit from the RHI payments. All that happened, and of which R&A has taken opportunistic advantage, was that Biosol refrained from issuing invoices until July 2017 in an effort to assist R&A and thereby foster a long-term commercial relationship.
177. If I had accepted that R&A was induced to contract by the alleged representations, I should not have accepted its damages claim. R&A contends that it would be entitled to be placed in the position in which it would have been if it had not entered into the contracts with Biosol for Boilers 1 and 2 and Boilers 3 and 4, and that this would have involved it buying different and appropriate boilers at a lower cost. This is unconvincing, given that it was the actual performance of Boilers 1 and 2 and not the representation complained of that persuaded R&A to contract for the acquisition of Boilers 5 to 10.

178. On the basis of the Income Assurance and the Summary, R&A alleges that Biosol warranted that each Boilers 1 to 4 would generate gross income of £120,000 in RHI payments, and/or that the cost of purchasing fuel for each of Boilers 1 to 4 “would not exceed £16,563 as set out in the Summary” (defence and counterclaim, paras 16(6) and 24(6)).
179. On the basis of the allegation that at the meeting on 5 January 2017 Mr Bundock “repeated the Profitability Assurance”, “assured [the Partners] that the total of ten boilers would make £650,000 per annum in gross payments pursuant to the RHI” and “further stated that Biosol would provide fuel and any necessary maintenance ... for £120,000 per year”, R&A alleges that “Biosol warranted that in respect of the ten boilers taken together the Partnership would receive a gross income of £650,000 per year pursuant to the RHI, and/or that the total cost of purchasing fuel and maintenance for the 10 boilers would not exceed £120,000 per year”; and it alleges a contract whereby Biosol would provide fuel and maintenance for the boilers for a reasonable price, which would not exceed £120,000 per annum (defence and counterclaim, paras 32 and 33).
180. These various claims fail, in the light of my findings of fact as previously set out.
181. If I had taken a different view of the facts, I should not have considered what is alleged to have been said as amounting to a contractual warranty; rather I should have considered it to be an implied representation that Mr Bundock had reasonable grounds for the projections he was making. Thus I should have rejected the contractual claim.

C: Claims relating to the unsuitability of the boilers

182. The third group of claims consists of different ways of making the same complaint: that the boilers were oversized. I shall therefore proceed by identifying the different claims and then addressing the question of oversizing.

C1: Breach of implied term as to fitness for purpose

183. R&A allege: (a) that each time R&A placed an order for boilers—first for Boilers 1 and 2, then for Boilers 3 and 4, then for Boilers 5 to 10—it concluded a contract with Biosol for the supply, installation and commissioning of the boilers; (b) that each such contract contained an implied term that the boilers would be reasonably fit for the purpose of efficiently heating the locations at which they were to be installed; (c) that in breach of the implied terms the boilers were not reasonably fit for the purpose for which they were purchased “because their capacity was too high to heat efficiently the buildings for which they were purchased.” See defence and counterclaim, paras 9, 16, 24, 33, and 45.
184. Biosol accepts that there were concluded contracts between the parties, but it denies that there was an implied term such as is alleged. It says that the purpose made known to it was for “revenue generation from the RHI scheme and cost saving on the

fossil fuelled heating costs which were being incurred” (reply and defence to counterclaim, paras 19, 34 and 72).

185. The legal basis of the implied term is said by R&A to be section 14(3) of the Sale of Goods Act 1979, which provides, so far as material:

“Where the seller sells goods in the course of a business and the buyer, expressly or by implication, makes known—

(a) to the seller ...

any particular purpose for which the goods are being bought, there is an implied term that the goods supplied under the contract are reasonably fit for that purpose, whether or not that is a purpose for which such goods are commonly supplied, except where the circumstances show that the buyer does not rely, or that it is unreasonable for him to rely, on the skill or judgment of the seller ...”

In fact, Mr Walker may well be correct in submitting that the appropriate provision is, rather, section 4 of the Supply of Goods and Services Act 1982, which so far as material provides as follows:

“(4) Subsection (5) below applies where, under a relevant contract for the transfer of goods, the transferor transfers the property in goods in the course of a business and the transferee, expressly or by implication, makes known—

(a) to the transferor ...

any particular purpose for which the goods are being acquired.

(5) In that case there is ... an implied condition that the goods supplied under the contract are reasonably fit for that purpose, whether or not that is a purpose for which such goods are commonly supplied.”

186. At all events, no issue has been taken concerning the appropriateness of reliance on the statutorily implied term in circumstances where the initial agreement to acquire the boilers was in each case followed by entry into a hire-purchase agreement with a finance company. The issue between the parties concerns the particular purpose made known to Biosol.
187. The first and most obvious purpose communicated to Biosol was that the boilers should heat the buildings into which they were put. However, the primary purpose for which that heating was required, both in fact and as communicated to Biosol, was to generate income from the RHI scheme. A subsidiary purpose of acquisition of biomass boilers was to save on fuel costs.
188. As I have already found (see paragraphs 24 and 25 above), R&A said nothing about efficiency of heating and had no interest in efficiency in any normal signification of the word in such a context.

189. “Efficiency” is, obviously, a word that could be used in several senses. For example, the Chartered Institution of Building Services Engineers’ Application Manual No. 15, *Biomass Heating*, (October 2014), (hereafter, “CIBSE AM15”), states at section 6.5.3:

“The most commonly used measure of biomass boiler efficiency is the direct efficiency, defined as:

Direct efficiency = Heat output from the biomass boiler ÷
Energy input to the biomass boiler”.

Again, a distinction can be drawn between the efficiency of a boiler, in the sense of “direct efficiency”, and the efficiency of the heating system of which it forms a part. As to the latter, Cirell and Luker, *A Guide to Biomass Projects for Local Government and the Public Sector* (2015), remark at p. 86:

“The performance of a biomass heating system can be measured by its efficiency in converting the energy stored in wood fuel into useful heat at the point of use. The point of use is defined as the place where the heat enters the heating system - generally in an existing plant room and often at the end of large runs of district heating pipes. The three main measurable factors that determine the efficiency of biomass-fired systems are:

- Boiler/combustion related losses
- Plant room losses
- Outside the plant room losses (including district heating networks).”

190. R&A’s case in respect of the alleged implied term confuses by its use of the word “efficiently”. The facts and matters set out in the defence and counterclaim and the breach of the implied term alleged in paragraph 45 all relate to oversizing of the boilers. The point to which R&A’s talk of efficiency is directed is that, insofar as the adoption of biomass heating is motivated by a desire to make money from an investment, one does not want to be incurring unnecessary capital costs that nullify the potential gains. Thus, in identifying the principles relevant to the sizing of biomass boilers, CIBSE AM15 (see below) says at section 6.1:

“The capital cost of a biomass boiler system is, typically, ten times that of a fossil fuelled boiler system. Furthermore, the low turndown ratio of biomass boilers, typically between 2:1 and 3.5:1, means that most biomass systems will be significantly mismatched with respect to summer loads. Hence, it is very important not to oversize a biomass boiler system.”

And at section 5.5.3, in the context of a discussion of the space requirements for thermal stores, it notes: “A crucial trade-off is that between the capital cost of a biomass boiler and thermal storage against the annual percentage of energy obtainable from biomass.” The point is that the financial advantages of a biomass system are

reduced or nullified if the biomass boilers are larger, and therefore more expensive, than they need to be.

191. On the facts that are common ground to the parties on the statements of case, there was an implied term that the boilers were reasonably fit for the purpose of heating the buildings for which they were installed and of providing financial advantage to R&A by generating RHI income and saving on fuel costs. That is the proper scope of any implied term and establishes the manner in which “efficiently” is to be interpreted. In my view, this limitation is not mere nit-picking but has some importance.

C2: Breach of contractual duty of care

192. R&A alleges that each boiler contract contained an implied term that Biosol would carry out the supply, installation and commissioning of the boilers with reasonable care and skill (defence and counterclaim, paras 16, 24 and 33); and that Biosol was in breach of that implied term because: “All of the biomass systems installed are oversized for the application in which they have been installed. The effect of oversizing is to cause cycling, where the boiler must turn on and off frequently rather than operating for continuous periods. Such frequent cycling causes damage to the boilers” (defence and counterclaim, para 40(1)). R&A say that the term in question was implied by section 13 of the Supply of Goods and Services Act 1982:

“In a relevant contract for the supply of a service where the supplier is acting in the course of a business, there is an implied term that the supplier will carry out the service with reasonable care and skill.”

Alternatively, R&A contends that the implication of the term is necessary to give business efficacy to the contract.

193. Biosol denies that it breached any implied term of the contracts. The reply and defence to counterclaim does not directly address the allegation that the alleged term was to be implied into the contracts; it is arguable that its terms are sufficient to put the existence of the term in issue, and I shall proceed on the basis that they are so sufficient.
194. In my judgment, the alleged term was implied into the contracts but is irrelevant for present purposes. (In principle, it might be relevant to different aspects of the counterclaim; see below.) The complaint about oversizing has nothing to do with the installation or commissioning services supplied by Biosol. It has to do with the suitability of what was installed or commissioned; this is the province of the implied term as to fitness for purpose. If R&A is correct in saying that the boilers were oversized, it could perhaps be said that Biosol failed to exercise reasonable care and skill in designing systems appropriate to the buildings for which they were intended. However, R&A has not relied on the contracts as contracts for the supply of design services. This seems right, because Biosol contracted to supply boilers of a certain specification; the contracts themselves specified the size of the boiler, and any design carried out under the contract can only have related to such matters as precise location

and mode of fitting, not to the boilers' size. This leads to the next way in which R&A puts the same substantive point.

C3: Breach of common law duty of care: recommending the boilers

195. R&A alleges that, having held itself out as having expertise in the supply and installation of biomass boilers, Biosol was under a duty at common law to exercise reasonable care in recommending only boilers that were reasonably fit for the purpose of efficiently heating the locations at which they were to be installed (defence and counterclaim, para 58); and that Biosol was in breach of that duty because the boilers were not reasonably fit for that purpose (defence and counterclaim, para 59). This is accordingly a re-framing in tort of the contractual case on fitness for purpose.
196. Biosol denies that it was under any such duty of care. It also denies that the purpose of the purchase and installation of the boilers was as alleged by R&A (reply and defence to counterclaim, para 82); I have dealt with this earlier.
197. In my judgment, Biosol owed a duty of care at common law in advising R&A concerning the suitability of the boilers for R&A's purposes. The duty was owed pursuant to the principles established in *Hedley Byrne & Co Ltd v Heller & Partners Ltd* [1964] AC 465. Biosol held itself out as being a specialist in biomass heating systems; its Proposals were recommendations of the boilers as being suitable for R&A's purposes; and it was reasonable for R&A to rely on Biosol's expertise and recommendations.

C1-3: The oversizing of the boilers

198. This issue produced a substantial conflict of expert opinion. I shall summarise the main points made by each expert, first in writing and then orally, and then proceed to a discussion of the issue. First, however, it is convenient to say something about three documents produced by the Chartered Institution of Building Services Engineers (CIBSE), all of which were referred to in the course of the expert evidence.

CIBSE AM15

199. CIBSE AM15 has already been mentioned. It was produced in October 2014. It is a significant document, because, although it cannot be said to constitute a professional standard, it provides professional guidance from a reputable source relating specifically to the sizing of biomass boilers.

200. Section 1.2.1 explains:

“[The purpose of the document is] to enable the competent performance-in-use of a wide variety of biomass boiler installations by providing a detailed design process and technical guidance. It is based on many years' worth of accumulated experience in the field by some of the UK's most experienced biomass heating system designers, and from

detailed analysis of biomass systems in use. It has been written to ... [h]elp designers select the most appropriate biomass system for a given application.”

201. The document distinguishes between a “buffer vessel” and a “thermal store”, though it notes with regret that the terminological distinction is often disregarded. In the present case, Mr Crawford used “buffer vessel” to refer to what CIBSE AM15 calls a “thermal store” and what Mr Crowther calls an “accumulator”. The definitions used in CIBSE AM15 were as follows:

“Buffer vessel: Used to improve biomass system efficiency by capturing residual heat from a biomass boiler on shutdown, and to provide start and stop signals to automatic ignition boilers to ensure efficient and stable boiler operation”

“Thermal store: Used to enable a relatively small boiler to provide a large proportion of the annual energy demand from biomass. Typically a thermal store is much larger than a buffer vessel and often incorporates the functions of a buffer vessel within it. A thermal store also provides start and stop signals to automatic ignition boilers to ensure efficient and stable boiler operation.”

202. The practical distinction between buffer vessels and thermal stores, properly so called, is explained in the following passages from section 5.2.2 and section 5.3 respectively:

“A biomass boiler configured with a buffer vessel is unable to meet a load greater than the output of the boiler. If the system pump was to be sized for a duty greater than the biomass boiler output, once the buffer vessel has been depleted flow temperature dilution will occur. The buffer vessel would fill with water at system return temperature and cooler water from the buffer vessel would mix with the flow from the biomass boiler resulting in a reduced system flow temperature.

When using a biomass boiler and buffer vessel configuration, either the biomass boiler must be sized to provide 100% of the load (a practice not advocated in this Applications Manual) or an auxiliary, usually fossil fuel, boiler is required to meet loads greater than can be supplied by the biomass boiler alone.”

“The use of thermal stores is strongly recommended. Thermal stores: allow biomass boilers to operate continuously for long periods; improve the operating efficiency and utilisation factor of biomass boilers; can incorporate a buffer vessel at the bottom of a thermal store if the biomass boiler ‘stop’ temperature sensor is appropriately positioned; enable a biomass boiler to be reduced in size while meeting up to 100% of the load from biomass at external temperatures down to the design winter temperature.”

The use of thermal stores to eliminate the need for an auxiliary gas-fuelled system is also illustrated in Table 5.2 in the document.

203. Chapter 6 of CIBSE AM15 is headed, *Sizing a biomass boiler and suitability of biomass*. It contains much detail that cannot reasonably be reproduced here. Section 6.1, “The principles of sizing a biomass boiler and thermal store”, contains the following text:

“The capital cost of a biomass boiler system is, typically, ten times that of a fossil fuelled boiler system. Furthermore, the low turndown ratio of biomass boilers, typically between 2:1 and 3.5:1, means that most biomass systems will be significantly mismatched with respect to summer loads. Hence, it is very important not to oversize a biomass boiler system. The key principle of sizing a biomass boiler and thermal store combination is to design the system using a small boiler in relation to the peak load while operating it continuously, and hence at high efficiency, to charge a thermal store: energy is stored overnight to meet peak loads the following day. The extent to which the boiler size can be reduced in relation to peak load is wholly dependent on the shape and duration of the daily load profile.

A thermal store, in combination with a biomass boiler, should be designed to meet the desired percentage of energy from biomass (when an auxiliary boiler is incorporated) or 100% of the annual energy requirement if a biomass system only is to be installed. A thermal store collects energy from the biomass boiler when the demand from the load is less than the boiler’s output and releases it, in combination with the biomass boiler, when the load demand is greater than the boiler’s output it served as a peak lopping and load smoothing device.”

Figures 1 and 2 (not reproduced here) show load profiles for, respectively, a building heated during normal working hours and a continuously heated building. The text continues:

“It is self-evident that a small biomass boiler in combination with a large thermal store could meet the demand shown in figure 6.1 (operating overnight to charge the thermal store) while there is little scope for using a thermal store with the relatively flat profile of a continuously heated building which would require a boiler sized at the average load of the profile in Figure 6.2.”

204. Section 6.2 explains the process of sizing a biomass boiler and thermal store through a worked example. Again, I shall not give the particulars of the example, but I shall identify the suggested steps of the design process.

1) *Step 1: create the design winter day load profile*

The purpose of this step is “to create a load profile for the building or load system for the design winter day, i.e. the day on which the average outside temperature equals the design winter temperature for the geographical location of the building.”

- 2) *Step 2: adjust the profile by moving DHW [domestic hot water] calorifier charging to avoid the start-up peak, and stagger the start-up for other loads*

The idea here is to reduce the heat required at the beginning by delaying calorifier charging. “When sizing a boiler and thermal store this reduction in peak load results in a significant reduction in biomass boiler size.”

- 3) *Step 3: examine boiler / thermal store combinations*

“The modified load profile is used to examine combinations of biomass boiler and thermal storage to identify a pragmatic system taking into account capital costs, space requirements and the desired percentage of annual energy from biomass. If 100% of the annual energy is required from biomass, the boiler/thermal store must be able to supply 100% of the energy on the design winter day. The optimum combination of boiler and thermal store from an energy storage perspective occurs at the point where the energy stored by the boiler overnight ... meets the demand above the boiler output the following day”.

- 4) *Step 4: consider adding an auxiliary boiler*

This lets the biomass boiler do nearly everything required of it, but the auxiliary boiler—gas, probably—will do the remainder when necessary. This will lead to “significantly reduced capital costs”.

- 5) *Step 5: matching summer loads*

“It is essential that the performance of a biomass system is checked against the summer load profile to determine to what degree the biomass boiler may be mismatched because of its low turndown ratio. ... While [a biomass boiler sized at or close to the peak load] would have matched the peak load it would have been significantly oversized for much of the year. ... Significant cost and efficiency penalties would result.”

- 6) *Step 6: estimation of the percentage of annual energy produced by a biomass system*

This stage is relevant where the system is designed for use with an auxiliary fossil-fuel boiler. The “rule of thumb” for giving an indication of the likely performance of a hybrid biomass and fossil-fuelled system is: “For a system using a thermal store a biomass boiler rated at 30% of the peak load is likely to be able to supply 95% or more of the annual energy from biomass”. The text continues: “[F]or many typical existing buildings, a biomass boiler rated at 30% of peak load with a thermal store and auxiliary boiler(s) is probably not too far from the optimum solution and should achieve efficient biomass boiler operation and enable the system to be effectively controlled.” The Guide

emphasises the importance of proper calculations and recommends reference to the Carbon Trust's Sizing Tool.

CIBSE Guide A: Environmental Design

205. This publication (CIBSE Guide A; 8th edition, March 2015; amended, September 2015) is described in the publisher's note as "the premier technical/reference source for designers and installers of building services, especially low energy and environmentally sustainable buildings". It is not itself concerned with the design of biomass heating systems and is therefore less significant for present purposes.
206. Section 0.4, *Sources of uncertainty*, concerns the role of uncertainty in the calculation of energy and environmental performance of buildings. Among the given examples of sources of uncertainty, the most relevant for present purposes is the first:

"imperfect knowledge of the building as built and consequent use of assumptions (e.g. thermal/optical properties of materials, build quality and associated leakage, equipment used and their characteristics, etc.)".

The text refers to the need to be aware of the importance of uncertainties and of "ways of handling them by using appropriate design margins."

CIBSE Guide B: Heating

207. This publication (May 2016; amended November 2016) was written to provide "guidance on the practical design of heating, ventilation and air conditioning systems."
208. For present purposes, I need refer only to two sections of the document. The first, which has a bearing on the "margin of uncertainty" (see below), is section 1.5.8, *Design Margins*, which contains the following text:

"Design margins are intended to make provision for uncertainties inherent in determining peak heating demand. ...

Where design margins are included to allow for such uncertainties, these are often cumulative. In addition, plant and equipment will inevitably be selected as 'the next size up'. This can result in unnecessary oversizing and as a consequence: increased capital costs; increased plant space requirements; reduced efficiency and increased running costs.

In their investigation of oversizing of HVAC systems in existing buildings in the UK, BSRIA (Crozier, 2000) found that 80% of heating systems were oversized, some by as much as 400%, with oversizing by 50% to 100% common. Design margins must therefore be used with caution. Nevertheless, the designer must be able to deal appropriately with the risk of heating systems not performing as required. A key uncertainty in the determination of peak heating demand is building

performance, particularly for refurbishment projects. This applies to both U-values and infiltration rates.

In many cases when dealing with existing buildings, there will be little or no documentary evidence of U-values. The actual U-values will depend upon the standard of construction and this can vary throughout the building. In particular, insulation may be partially missing or damaged.

...

Where there are uncertainties regarding design criteria and future requirements, these should be agreed with the client and the implications made clear in terms of risk and increased costs. The agreed design criteria should then be used to determine heating demand.

...

CIBSE made the following recommendations in their research paper:

- design margins should not be added unless there are valid design reasons
- where design margins are added, they should be clearly identified within the calculations
- where appropriate, design margins should be approved by the client
- avoid cumulative design margins
- specify assumptions made as part of the design
- specify the operating limits of the design”

209. Section 1.5.9, *Choice of number and duties of heat generators*, provides in part:

“In non-domestic buildings, it is common practice to install multiple heat generators. It is also common practice to provide additional capacity to allow for breakdown or maintenance. ...

The choice of how much, if any, additional capacity to install depends upon the estimated risk of sufficient heat not being available and the seriousness of the consequences. In reality, the calculated peak heating demand rarely occurs as: for most of the time, actual outdoors temperatures are greater than the design value; there are likely to be some internal heat gains; design margins may have been incorporated.

As a result, for most of the heating season full heating capacity will not be required to achieve indoor design temperature.

The consequences of failing to achieve indoor design temperature will depend upon the building use and the degree of underheating. ...

Multiple heat generators, properly controlled, can lead to improvements in overall seasonal efficiency. In some cases, it may be advantageous to install different sizes of heat generator, particularly if the heating load during summer or weekends perhaps is very small so that the smallest of the heat generators can meet demand at such times. ... The choice of how many heat generators and of what output ideally requires a careful assessment by the designer of risk, capital costs and energy savings.”

Mr Crowther’s written evidence

210. The key point underlying Mr Crowther’s opinion regarding the ten boilers supplied by Biosol is set out in the following paragraphs of his first report:

“36. It is known in the biomass industry that for biomass installations to work effectively they should not be oversized. In simple terms an oversized biomass boiler has a maximum heat output that is much greater than the maximum heat demand. To work effectively biomass boiler[s] should be undersized, that is to say their heat output should be equal to or slightly less than the maximum heat demand. This is because unlike traditional heating technologies biomass boilers are designed to run for long periods and at high output[,] only turning on and off infrequently. At full output a continuously running biomass boiler is at its most efficient, it is much less efficient during periods of start-up and shut down. These start-up and shut down periods are mechanically intensive. Excessive start-ups and shutdowns will decrease the efficiency, increase pollutant emissions and increase wear and tear on the firing system and ancillary equipment. These in turn can create error faults ... This is why most biomass boilers include accumulators (thermal stores) to increase thermal mass to reduce cycling.”

“38. ... Whereas a gas or oil heating boiler will turn on and off frequently without much impact, a biomass boiler can’t turn on and off quickly due to the mass of fuel required to be ignited or burnt out. Gas boilers typically take less than 15 seconds to start up and shut down. Therefore, to operate as designed biomass boilers must run for extended periods with very few shutdowns. If they are oversized they will switch on and off quickly in an operation called boiler cycling.”

“39. ... [A]ll boilers cycle to a degree but the skill of the biomass system designer is to minimise this cycling. This is done by correctly matching the boiler to the heating load.”

211. Mr Crowther said that a boiler should be sized by reference to its annual load factor (also called its annual utilisation factor), which is a measure of actual heat output divided by maximum potential heat output. The bigger the boiler, the smaller the annual load factor. CIBSE AM15 shows a typical utilisation factor of 20%, which reflects typical operation for 1,750 hours p.a. (7 hours x 250 heating days) as compared with a total of 8,760 hours in the year. The RHI Scheme requires an annual utilisation factor of greater than 15%. A factor above 20% risks underheating of the building on the coldest days. A key tool in boiler sizing was the use of accumulators, which store large amounts of heated water for use in meeting the heating requirements during periods of low heating loads without the need to start up the boiler. The reservoir of heat also allows the boilers to be undersized but still meet heating requirements during highest demand.
212. Mr Crowther said that when he first attended the Premises in January 2018 he formed the view that the boilers were oversized for the heating loads, as they showed behaviour characteristic of oversized boilers. The designs of the systems of the six Swebo boilers were practically identical to each other, as are the designs of the systems for Boilers 3 and 4 (Fröling boilers); only Boilers 1 and 2 have a different piping installation. This would only be expected if the buildings they were heating, and the associated heat loads, were identical. This “suggests that the design work may only have been carried out once and that the design has been copied each time” and “explains why the eight boilers installed with the same output and piping configurations are having the same issues with low heat output and mechanical breakdowns as they have not been sized for the heat demand” (first report, para 33).
213. Mr Crowther assessed the boiler sizes at the Premises by reference to two matters: gas billing data, and the Carbon Trust Biomass Boiler Sizing Tool (the “CT Tool”).
214. The first method showed that the heating capacity of the boilers was 10 times the previous capacity of the gas heating system. A direct comparison was possible in the case of Building 2 and Building 4 (both occupied by the NHS and previously heated by gas, and both requiring a constant internal temperature of 21°C); in both cases Biosol assumed a load factor that indicated very substantially increased heating demands for the buildings. Mr Crowther said: “I would not expect a biomass boiler to have a higher rated output than a gas boiler it was replacing” (first report, para 50). Mr Crowther cross-checked this preliminary conclusion by reference to the heat loss coefficient (U-value) for the various buildings, as calculated by DC2 Engineering Limited, an engineering firm retained by R&A to restructure the biomass boiler installation. Mr Crowther said that the U-value for Building 4, for example, would indicate a boiler size of 130 kW and that historical gas data indicated a boiler size of 140kW.
215. The second method, use of the CT Tool, also showed very substantial oversizing, as set out in Mr Crowther’s Table 1:

Boiler	Building	Installed Capacity	Theoretical Boiler Requirement	Oversizing Ratio
4	B4+B3	500kW	130kW + 145kW	1.82
3	B2+B17	500kW	130kW + 145kW	1.82
1+2+9	B200	1.5MW	760Kw	1.97
5+10	B52	1MW	280kW	3.64
7	B53	500kW	145kW	3.85
6	B20+B18	500kW	145kW + 145kW	1.72
8	B21+B19	500kW	145kW + 145kW	1.72

216. Mr Crowther that the extent of

said

oversizing of the boilers would make it difficult for them to run for extended periods, as they would be cycling on and off repeatedly as they quickly satisfied the heat demand. He considered that the fault logs for five of the six Swebo boilers showed evidence of oversizing, because one of the most common recorded faults was overheating of the boiler, indicating that the boilers were oversized and could not control their heat output. (In answers to Part 35 questions, Mr Crowther acknowledged that nearly all of the faults in question had occurred after Biosol left the site in November 2017, but he maintained his opinion that the likely cause was oversizing of the boilers.)

217. In the conclusion section of his first report, Mr Crowther considered “whether there would be any commercial reason for Biosol to have installed the capacity of boilers that they did.” He concluded that there was no such reason:

“RHI income depends on measured heat use and not on installed boiler capacity and so there would not be benefit to R&A Properties from installation of more boiler capacity than needed to meet heat demand. Supply of boilers beyond the needed capacity contributes to cost of installation without a commensurate benefit to the purchaser.”

218. In his supplemental report, Mr Crowther referred to the design steps in CIBSE AM15 and in particular to the suggestion that a biomass boiler might be designed at roughly 52% of peak load, which with a large thermal store would enable almost all of the annual heating requirements to be met from biomass, with the use of a small ancillary fossil-fuel boiler to meet any shortfall. This would avoid both the excess capital costs and the performance issues resulting from the use of an oversized boiler. Mr Crowther offered an example.

“If we take Stradey Park buildings 17-21, these have a peak demand (-1°C outside, 15°C inside) of 207kW (Mr Crowther) or 205kW (Mr Crawford), i.e. essentially the same value.

Biosol offered a 500kW boiler to heat two of these buildings. This could have been offered by way of example:

- In my expert witness report as a single biomass boiler sized at 70% of capacity, or
- Taking the CIBSE Guide value of 52% this could have been 108kW biomass boiler plus an oil boiler.

The biomass boiler would have still provided over 95% of the heat energy demanded by the building. For two buildings this would be a boiler house containing a single 216kW biomass boiler (£216,000) plus a 400kW oil boiler (£40,000) i.e. a capital cost of £256,000. This compares with Biosol offering a 500kW boiler at roughly twice the cost and with all attendant problems of a grossly oversized boiler, i.e. reduced annual thermal efficiency, more atmospheric emissions, and generally increased OPEX.

Mr Crowther concluded with the observation: “Increasing biomass boiler size will not increase annual demand and will therefore not increase the annual RHI income.”

219. Mr Crowther identified three adverse consequences of excessive cycling: higher atmospheric emissions; increased wear and failure of mechanical parts; and degrading of components by reason of overheating.

Mr Crowther’s oral evidence

220. Mr Crowther acknowledged that he and his company did not directly engage in the design of biomass heating systems, but he insisted that they “very much specialise[d] in understanding the principles behind such designs.” In particular he had been actively involved in a consortium led by Kiwa Limited, which from 2015 to 2018 carried out an investigation and analysis on behalf of the Department of Business, Energy and Industrial Strategy (BEIS) in respect of the performance of solid biomass boiler installations (Report No. 30663-P3-2, 11 December 2018). One of the key findings of the Report was that the efficiency of biomass boiler installations was significantly compromised by rapid cycling, which in turn resulted from a number of causes, one of which was that boilers were frequently significantly oversized for demand.
221. Mr Crowther accepted that there is a distinction between (i) the demand for heat and (ii) boiler sizing, and that it is necessary to determine the peak load (measured in kilowatts) before the boiler can be sized. He did not accept that the size of the boiler ought to be determined by the peak load, because he said that this resulted in oversizing. For the same reason, he said that the capacity of the existing gas- or oil-based system did not provide a reasonable basis for assessing peak load, because there was no downside to oversizing fossil-fuel boilers, but there were big environmental and cost downsides to oversizing biomass boilers. When it was pointed out to him that in paragraph 50 of his first report he had said that “the previous heat load and previous installed heating capacity is a good indicator of how large to size a biomass

boiler when replacing a heating system”, he responded that, as the same paragraph went on to say, it was a “rough guide”. With reference to the exchange of emails between Mr Partridge and Daniel Davies on 5 October 2015 and to the “Heat Loads” section of Proposal 1 (cf. paragraph 30 above), Mr Crowther said that, if (as appears to have been the case) Mr Partridge was using the capacity of the existing gas boilers to size the proposed biomass boilers, he was wrong to do so; it was such a practice that resulted in so many biomass boilers being oversized, as identified in the BEIS Report, though he accepted that the Report tended to indicate that in practice it was common for biomass boilers to be sized by reference to the capacity of the systems they were replacing.

222. As regards the calculation of the peak load, Mr Crowther accepted that the calculation of U-values for buildings such as those on the Premises was attended by a great deal of uncertainty and was an approximate exercise. The inherent uncertainties in the exercise were evident in Figure 10 to the experts’ joint statement, which showed the experts’ heat loss calculations and the assumptions on which they were based. Despite this, the experts had arrived at very similar outcomes in their heat-loss calculations, resulting in a peak heat demand of roughly 200kW. The main difference between them was that Mr Crawford had incorporated a margin for uncertainty. Mr Crowther considered this appropriate only for fossil-fuel boilers but not for biomass boilers: the former should be sized for a peak load because there is no disadvantage in them being oversized, whereas the latter should be undersized, so that they work nearly all the time. It was put to him that this was inconsistent with the opinion expressed in paragraph 51 of his first report; he replied that the peak load was an important factor but not the be all and end all when sizing a biomass boiler. He summarised his opinion:

“There is no risk to oversizing oil or gas boilers. There is a large risk to oversizing biomass boilers. Therefore you should make your own best estimate as to what you think the heat loss coefficient of that building should be, built up from first principles, and not add the 20% uncertainty factor that Mr Crawford does, but then reduce that by an appropriate factor to 70% or 80% or whatever the client might find suitable; and then either the client accepts the modest amount of underheating, or you use a back-up gas boiler for those few days a year where the biomass boiler maybe can’t quite fulfil its requirements.”

223. Mr Crowther said that ideally the size of a biomass boiler would be calculated by reference to (i) theoretical heat loss calculations, (ii) data regarding historic fuel usage, and (iii) the capacity of the existing system. Of these factors, the third was the least reliable, for reasons already stated. (Mr Crowther acknowledged that he had not recorded the sizes of the old gas systems.) In theory, heat loss calculations provided the best criterion; however, in buildings such as those under consideration the uncertainties inherent in the calculations meant that, where there was evidence that the building in question was subject of a stable letting and that the tenant was content with the level of heating being provided, historic gas use would be a better guide to boiler sizing than would heat loss calculations.

224. Mr Crowther acknowledged that in the present case the total gas consumption for the entire site for the year from 28 April 2015 was very low at 708,000 kilowatt hours of gas (a cost of £30,000 to £35,000). He was asked why he had not considered the data in respect of the heat actually produced by the biomass boilers, although he had been provided with the meter readings. He accepted that those data showed that the actual demand on the biomass boilers far exceeded the historical usage of the gas boilers, but he said that he had been asked to comment on the original design of the boilers, not on their subsequent usage. With reference to a schedule of RHI payments received (page 6853 of the trial bundle), he accepted that the heat consumption of the Building 2 and Building 4 (which he understood to be the buildings with the highest heat consumption) with the biomass boilers in 2017 was substantially higher than it had been with the gas boilers in the year from 28 April 2015: for the earlier period, it had been a total of 426,612kWh; by contrast, in the later period the single biomass boiler serving Building 4 and the substantially similar Building 3 provided in excess of 1.5m kWh, and the single biomass boiler serving Building 2 and Building 17 provided in excess of 2.1m kWh. Mr Crowther said that this was because “there [was] obviously something wrong with the system as it is currently operating”, as it was “generating too much heat”, which indicated “poor control” as recorded on the Energy Performance Certificates.
225. Mr Crowther accepted that his preferred method of design would lead to a risk that for some days of the year the boilers could not meet the entirety of the buildings’ heat requirements, but he thought that the risk was preferable to oversizing the boilers, particularly in light of the risk of boilers breaking down. He was referred to section 6.1 of CIBSE AM15 (paragraph 203 above), and it was put to him that the advice there given was precisely contrary to his opinion:

“Q. The advice given in this document is that where you have a continuously heat-heated building, you will require a boiler size at the average load of the profile, correct?”

A. If you were going to heat the premises entirely with biomass and you were going to pay the additional capital cost, yes.

...

Q. So you reject the advice given by CIBSE in section 6.1, do you?”

A. I would much prefer to interpret that in terms of page 507, Step 6. And I would also say that ... there should be a gas boiler there or an oil boiler there, if so required, to make up the additional shortfall on those very days. ... Because biomass boilers are typically 10 times per kilowatt more expensive than oil or gas boilers, I would have recommended ... maybe a 50 % biomass boiler and to retain one of the existing gas boilers. I could have then worked my biomass boiler hard, burnt 99-95% of the energy on the biomass boiler, and retained the gas boiler as back-up when the biomass boiler stops and for topping up on the coldest days.”

Mr Crowther was taken to the worked examples in section 6 of CIBSE AM15. With reference to Step 3 and the words, “If 100% of the annual energy is required from biomass, the boiler/thermal store must be able to supply 100% of the energy on the design winter day”, he acknowledged that a boiler sized according to his calculations would not be able to meet that condition, but he continued:

“What I’m contending is that that ‘if’ is not reasonable. ... [T]here are risks associated with oversizing oil or gas boilers. Therefore biomass boilers should not be sized to provide 100% of the load. They should be undersized using a support oil or gas boiler, if you’re really fussed about those few days that it’s cold and/or if the biomass is going to break down.”

226. Mr Crowther made clear that the assumption on which he based his opinion regarding boiler sizes at the Premises was that they were to be used “with the normal sort of strategy”. With reference to his Table 1 (reproduced above), he was questioned as to the actual heat generated for Buildings 2 and 17 (Boiler 3) and Buildings 3 and 4 (Boiler 4):

“Q. So, your theoretical boiler would be rated at 275 kilowatts.

A. Yeah. Well, you’d pick the next one up that was available, yes: 275 kilowatts, yes.

Q. And my point is, Mr Crowther, that if you look at the amount of heat that was generated by the boilers for those buildings in certain quarters, it simply would not be possible to generate the same amount of heat with a 275 kilowatt boiler. Is that a calculation you have considered making?

A. No, because the whole premise of my, of the report, was that the internal temperature should be at 15 degrees Centigrade or in this instance, 21 degrees Centigrade. The boilers were operated in accordance with, if you like, with the normal sort of strategy that would be expected to provide tenants with minimum cost and with genuine fuel effi – and with building, and with total concept fuel efficiency.

Q. I see. And as you say, that is the assumption that underpins your report?

A. Yes.”

Later in his evidence there was this exchange:

“Q. Now, would you agree that it would appear that the boilers at Stradey Park had been used in a way to maximise the payments that the defendants receive under the Renewable Heat Incentive?

A. I really do not know sufficient about the facts of what is going on on that site to be able to comment – to answer that. I cannot sit here under oath and answer that question.

Q. Was it something you have considered, Mr Crowther? Bearing in mind that you are under oath as you say.

A. I must have considered it because it is something we have frequently come across as part of the 67 boiler houses that we inspected for BEIS.

Q. And what is it you frequently come across?

A. That site owners contrive to overheat their buildings to maximise RHI payments.

Q. And having seen those figures that we saw this morning in respect of the NHS building, that is what has happened here, is it not, Mr Crowther?

A. I, I have been hired as an expert witness here to comment on the technical aspects of the design that I have seen it. I really do not know what the particular designs and operating strategy of those boilers are. I do know what they are using building 3 for. I really – under oath I cannot answer that question. But clearly I have thought of it and I am aware of it.

Q. You are being rather reticent, are you not, Mr Crowther? You have considered this and you have formed the view that the boilers were the size to maximise the financial returns, have you not?

A. I have seen that done on other sites. I have got no evidence that that has been done at R&A Properties. I do not think that is directly relevant to the issue in hand, that I thought was the oversize – was the optimum sizing of these boilers for their original and declared historical use. I still believe that smaller boilers would have performed better when fed with the correct woodchip etc. The current operational sense of those boilers is, I think, outwith the original remit given me to by the court.”

227. Mr Crowther was cross-examined about the fault logs for the boilers. It was put to him that the faults listed on the logs were the result of the control system, not of oversizing. He acknowledged that he was unable to answer the question about the control system. The exchange continued:

“Q. Well, Mr Crowther, one thing that I suggest you do know is that the faults are not attributable to oversizing, correct?

A. No, sorry - oh, no, they're not directly related to oversizing, correct.

Q. No, that's all that I was asking you, Mr Crowther, because your report says evidence of oversizing can be seen in the fault logs and I'm suggesting that's not correct.

A. OK.

Q. Do you agree?

A. I would – oversizing leads to more cycling, leads to overheating. But I agree that it's a more complicated chain than I wrote down in here, yes.

Q. Well, no, Mr Crowther, we're not going to – that's not quite right because you haven't calculated the actual performance of the boilers (we've established that) and so you don't know whether or not they are oversized for their actual use, do you?

A. Yes, I agree, yes.”

228. A few further points may be noted here.

- a) Mr Crowther confirmed his understanding that Building 2 and Building 4 (both occupied by the NHS) were to be heated constantly to a temperature of 21°C.
- b) He confirmed that when he populated the spreadsheet for the CT Tool he proceeded on the basis that all units would be continuously heated as they were let for storage.
- c) He accepted that the CT Tool did not display the formulae that it incorporated and that its reliability improved with familiarity and regular use. He was referred to the very strong terms of the disclaimer within the CT Tool, but he said that the CT Tool was widely used and recognised, including by CIBSE, and that he regarded it as being the best available sizing tool.
- d) Mr Crowther confirmed he had not examined the efficiency of the boilers installed by Biosol, nor had he calculated the load factor or the utilisation factor for any of the boilers.
- e) Mr Crowther also confirmed that he had not provided, or been asked to provide, an alternative design for biomass systems for the relevant buildings at the prices; it followed that he had not priced any such alternative design.

Mr Crawford's written evidence

229. Mr Crawford's opinion as to the correct method of sizing a biomass boiler may be taken from extracts from a number of passages in his responses to the second series of Part 35 questions:

“The first step in the design process is to assess the likely heat loss from a building the design winter day. This is achieved by using the building dimensions to work out surface areas of the

various components (roof, walls, floor, rooflights, doors etc). To those areas are then applied what are known as U-values and the difference in temperature between the external environment and internal environment. The U-values vary from component to component and define the rate at which heat passes through the component in the direction of the temperature gradient (i.e. inside to outside). ... By definition all of the figures used in this calculation contain a margin of error for a number of reasons. The final result therefore contains the summation of these errors. Therefore, to mitigate this risk, as with the design of any system, a margin [also referred to as a 'margin of uncertainty'] is added. ... In-house, we use margins of 15-20% (i.e. multiplication factors of 1.15 – 1.2) depending on how reliable we perceive the input data to be. ...”

“[T]he occupancy profile of most buildings includes the fact that the heating is switched off when the building is unoccupied and the heating switched back on at a predetermined time period before the occupants are due to arrive. During the period following switch-on, the instantaneous demand from the heating system can be much higher than the demand required to keep the building warm once it is already up to temperature (i.e. the steady state losses). This additional demand is called the Cold Start Margin ... Failure to include this value will result in the building taking a long time to heat up and therefore not meet the design criteria. ... I have proposed the use of a Cold Start Margin of 1.2, which is at the conservative end of the range advised [by CIBSE AM:15]. Using a larger margin would result in an even higher buffer vessel volume.”

“Once the steady state heat loss (including margin for uncertainty) and cold start margin have been established, the optimum boiler capacity and buffer vessel combination can be determined. For any combination of boiler capacity and buffer vessel volume to be successful, they must be able to provide both the start-up demand and the steady state demand for the duration of the occupied period. Failure to meet either will result in the heating system being undersized for the building. Too small a boiler can result in too larger a buffer vessel volume and vice versa. Furthermore, there is not an infinite range of boiler capacities or buffer vessel volumes available and therefore the choices made for each are constrained by what products the market has to offer. ... [T]he optimum boiler/buffer combination must be selected pragmatically.”

230. Reference to the Cold Start Margin highlights the fact that, when he wrote his first report and his Part 35 responses, Mr Crawford was proceeding on the basis that the boilers at the Premises were to be used intermittently. Mr Crowther’s understanding, by contrast, was that they were to run constantly. Mr Crawford addressed this difference when he wrote his supplemental report.

231. Mr Crawford noted that he was not provided with any detailed boiler-sizing calculations by Biosol, but for Boilers 3-10 he was provided with schematic and layout drawings, which showed the total heat load for most of the buildings. (The drawings for Boilers 1 and 2 were controlled by Mr Partridge and were not made available.) He also referred to a disclosed report on the entire installation (referred to by him as the “REA Report”; it appears that this was prepared by DC2 Engineering Limited), from which, with corrections to the calculations, he was able to tabulate the forecasted building loads. He said that these matched well the outputs of the boilers, save for a possible exception for Building 52. The results of his analysis were in Appendix C to the first report, from which the following figures are extracted:

Boiler	Buildings Served	Total heat output	Boiler capacity
3	B2 + B17	503kW	499kW
4	B3 + B4	?	499kW
7	B18 + B20	527kW	499kW
8	B19 + B21	527kW	499kW
5	B52(N) + Office	489kW	499kW
9	B52(S)	483kW	499kW
6	B53 + B1	527kW	499kW
1, 2 & 10	B200	?	1497kW

232. With reference to the figures in Appendix C, including those extracted in the foregoing table, Mr Crawford said that Boilers 1, 2, 3, 4, 7 and 8 were sized to match the predicted load of the buildings, contrary to the claim. In respect of the buildings served by Boilers 5 & 6, he did not have sufficient information to come to any conclusion regarding boiler capacity. He acknowledged that it appeared possible that Boiler 10 was oversized but said that he did not know whether “any other allowances” were made for Building 10 in the original calculations which he did not have in his possession.

233. In his first report, Mr Crawford made several further points, among which were:

- 1) It is accepted practice to design heating systems for the peak load on the design winter day, so that internal temperature can be maintained even when it is very cold outside, and for this reason the boilers are able to change their output in response to falling demand. Only when the load falls below the minimum output of the boiler will it be forced to turn off.

- 2) Although the maximum boiler output is 499kW, the boiler is able to turn down to only 150kW before turning off; therefore, if boiler is turning on and off ‘frequently’, the load must be less than 150kW, which is less than the estimated figures recorded by Mr Crawford in his Appendix C.
- 3) If Boiler 10 is oversized, the presence of the 12,000 litre accumulator will mitigate some of that oversizing, because it acts like a cushion between the boiler and the load.
- 4) Operational efficiency of a biomass boiler is improved by reducing the number of times the boiler switches off, and the presence of an accumulator (which Mr Crawford referred to as a “buffer tank”) allows a boiler to operate for longer periods before switching off. All of the boilers installed by Biosol were provided with accumulators.
- 5) Mr Crawford said that he was “not aware of any specific damage which can occur to a boiler as a result of cycling.”

234. In his supplemental report, Mr Crawford remarked that the “single largest differentiator” between the opinions expressed by him and Mr Crowther was their different assumptions as to the intended operation of the boilers: Mr Crowther had assumed continuous heating, whereas Mr Crawford had assumed intermittent heating. As Mr Crawford noted in the experts’ joint statement, continuous use of the boilers would eliminate the need for a Cold Start Margin (it has no bearing on the margin of uncertainty in respect of U-values); however, he there noted:

“If the buildings prove to be continuously heated then his [Mr Crawford’s] opinion must change and the Cold Start Margin [be] removed from his analysis. For the avoidance of doubt, the Cold Start Margin is largely, but not completely, built into the buffer vessels rather than the capacity of the boiler itself in biomass heating systems.”

235. Mr Crawford made two further important points.

- 1) He said that repeated efforts to use the CT Tool showed that the results produced by the tool were untrustworthy and exhibited significant but unexplained anomalies.
- 2) He expressed strong disagreement with Mr Crowther’s adoption of deliberate undersizing of the boiler and accumulator. He wrote:

“Mr Crowther appears to believe that the undersized boiler, whilst it may operate more efficiently as a result, adequately discharges the client’s requirements for a heating system. However, for this to be true, one would require to impose one of the two following caveats:

- 1) Either the client must contractually sign up to an undersized heating system inevitably leading to underheated buildings during the winter period; or

- 2) [One must] Provide a supplementary gas- or oil-fired boiler to make up the deliberate shortfall.”

I do not dispute [that], for any given load, a smaller biomass boiler would operate with a higher overall efficiency. This would be true of a biomass boiler sized for 70% of the calculated load as Mr Crowther proposes, but an undersized boiler would not satisfy the client’s requirements for an adequate heating system on its own without invoking one or other of the caveats noted above.”

Mr Crawford’s oral evidence

236. Mr Crawford acknowledged that his written evidence had made no reference to CIBSE AM15, though it had referred to CIBSE Guide A, which did not relate specifically to biomass boiler sizing as CIBSE AM15 did. He said that this was because he was concerned generally with fitness for purpose, of which sizing was only one aspect and to which he devoted proportionate time. He said that he had always been familiar with the principles set out in section 6 of CIBSE AM15: “More so recently, but, yes, in my background.”
237. Mr Crawford said that his first report had been based on intermittent heating, which seemed to him a reasonable assumption because the majority of heating applications in the country were intermittent; however, in the light of the information subsequently available to him that the buildings were heated continuously, he no longer thought it appropriate to size the boilers on the basis that the buildings were to be heated intermittently. He agreed that the worked example in section 6 of CIBSE AM15 would apply to the boilers in accordance with his original understanding that the boilers would run intermittently, but he acknowledged that he had not undertaken the first Step identified there (to create a load profile). He also accepted that he had used the term “buffer” to refer to what CIBSE AM15 calls a “thermal store”.
238. The gist of Mr Crawford’s evidence was that the application of a Cold Start Margin in his first report was wrong for two reasons: first, it would only apply if (as he had then thought) the boilers were to run intermittently; second, it ought not to be factored in to the calculation of boiler size (which is what he had done) but rather in to the sizing of the thermal store.
239. Mr Crawford confirmed that he had not used the CT Tool in the calculations in his first report. He accepted that CIBSE AM15 recommended its use both for intermittent heating and for continuous heating. It was put to him that this was because the CT Tool was widely respected in the industry; he replied, “I believe so. I don’t have first-hand knowledge of that.” He was asked whether he knew if the Carbon Trust was “well-respected within the industry”; he replied, “Well-respected is obviously a subjective term. I don’t have enough information to know whether that’s a true statement or not.” However, he was able to accept that CIBSE was well-respected within the industry, as it was the professional body representing

mechanical/electrical design. He said that his own experience of using the CT Tool made him doubt its credibility, though he did not cite any other source within the industry as expressing the same doubts. He rejected the suggestion that such problems as he had experienced were likely to be due to his own misuse of the tool. (I return to the use of the CT Tool below.)

240. Mr Crawford explained that his “margin of uncertainty” was used in establishing heat loss from the building; it was not applied at the stage of sizing the boiler. The U-value would first be calculated as accurately as possible, and the margin would be applied at the end of the process. He insisted that the margin he was talking about was different from that referred to in the text accompanying Figure 6.3 in CIBSE AM15. On that textual point, I think that Mr Crawford was correct. Whatever the merits or demerits of the arguments about his margin of uncertainty and about the sizing of the boilers, the passage in question is not referring to a margin added to the heat loss figure provided by the calculation of the U-values, but rather to a safety factor regarding boiler sizing with respect to the simultaneous imposition of various demands. It is not in itself helpful with respect to the issues before me.
241. What is relevant, however, is whether the application of the margin of uncertainty in the calculation of heat loss is appropriate, or whether to the contrary it (as distinct from the exercise in the passage referred to) results in inappropriate oversizing. It was put to Mr Crawford that it was irrational to reflect the uncertainty of heat loss by applying a margin of increase to the figures: the uncertainty could operate in the other direction, which would lead to a margin of decrease to the figures; no more can be done than perform the calculation itself on the best available basis, and there is then no basis for the application of a margin at all.

“Q. [Y]ou know that your calculations are the best estimate that is possible. That is right, is it not? That is why you make the calculation.

A. It is but ‘best possible’ does not mean ‘100% accurate’.

Q. Of course not. But it might be an over-estimate as much as it might be an under-estimate, might it not?

A. Technically, yes.

Q. And if there is a significant risk to the client in proceeding on the basis that there is bound to be an under-estimate, it is not appropriate to add in a margin, is it?

A. Again, we are talking about the margin associated with the establishment of the heat loss from the building. This section here is to do with the uncertainty of achieving that. I think it is appropriate to add a margin for uncertainty to give confidence in the figure, which you then use to size the boiler and buffer vessel.

Q. But if the only reason you are calculating the heat loss from the building is in order to size the boiler, then surely you need

to take into account what the various risks to the client might be from oversizing or under-sizing the boiler?

A. You can take them into account, yes.

Q. And it is not appropriate just to take into account the risk of under-sizing, is it?

A. Yes. It should be the risk of sizing, full stop.”

242. Mr Crawford accepted that the use of the CT Tool did not permit the introduction of the margin of uncertainty. (That was one aspect of his criticism of it.)
243. Mr Crawford accepted that, in writing his reports, he had not done any calculation in respect of Step 4 in CIBSE AM15 (consideration of adding an auxiliary boiler). The thrust of his evidence was that CIBSE AM15 envisaged the possibility that biomass could be used as the sole source of heat, and that that was in fact what had been done in the instant case. He accepted that CIBSE AM15 recommended Step 4 in any case where the boiler was to be used for intermittent heating, and that when he wrote his first report that was how he understood the boilers in the present case were to be used.
244. Mr Crawford accepted the general principle that biomass boilers ought not to be oversized. He also accepted that the low turn-down ratio of biomass boilers created a risk that biomass systems would be significantly oversized with respect to summer loads and that the risk should be avoided so far as possible. He accepted that a client ought to be advised of the risk that it would be overpaying if the system were oversized. He accepted that in considering boiler sizing he had not considered the effect on cost of different balances between the size of the boiler and the size of the thermal store.

“Q. They [i.e. CIBSE AM15, section 6] say in relation to their example, and the figures that they have taken for that example, while the thermal store size would be reduced to 44,000 litres, the capital cost would be significantly greater while the minimum boiler output would also increase. So, for their calculation, they are not only performing an engineering calculation to see what the size of the thermal store should be in some abstract sense, but they are also asking themselves how would different balances between boiler and thermal store size affect the cost that would be incurred by the ultimate customer in purchasing and installing the system, are they not?

A. They are.

Q. That is a calculation which you have not performed, have you?

A. That is correct, yes.

Q. You have not taken it into account at all.

A. I have not taken the costing element into consideration, no.

Q. No, you have not. And it is important is it not?

A. It is, depending on the client's view of – and what his instruction is to the installer.

Q. Well, it is certainly something you need to find out before you make a recommendation, is it not?

A. It is certainly worth discussing with the end client, yes.

Q. Well, it is more than worth discussing, is it not, Mr Crawford? It is critical.

A. It forms part of the analysis, yes.

Q. It does not just form part of the analysis, Mr Crawford, it is a critical part of the analysis, because you are making a recommendation to somebody as to how to spend their money. You need to take into account how much of their money they are going to spend, do you not?

A. Yes. I was not present at any of those original discussions between the client and Biosol and therefore I have no idea what the conversation consisted of.

Q. Mr Crawford, I am not asking you about those conversations, I am asking you about the process of making engineering decisions. And you know that the capital costs imposed on the ultimate customer are a critical element in those decisions, are they not?

A. They are a significant element, yes.

Q. Yes, they are a significant element. And do you agree that the process of deciding on the balance of the size between boiler and thermal store must be in part informed by the capital costs that that balance will impose on the customer?

A. Yes.

Q. And that is not a straightforward exercise, is it?

A. No, you would need to cost up the various options, that is right.

...

Q. Do you remember you have expressed that opinion [i.e. that if one were to design a system in which the building were to be under-heated for some period during the year, it would be necessary to explain to the client the risk of under-heating]?

A. I do.

Q. And I would suggest to you, Mr Crawford, that it would be equally necessary to explain to a client, who is being recommended to spend more than they had to spend, that there was another option. Do you agree with that?

A. Yes, I agree.

Q. And the real point here, is it not, that where you have an engineering choice that depends, in part, upon the customer's preferences, you need to explain the choice to the customer, find out what those preferences are and then design a system in accordance with those preferences?

A. I'd agree.

245. Mr Crawford accepted that the worked example referred to in section 6 of CIBSE AM15 (cf. Step 6) would result in significantly reduced capital costs for the customer if the boiler were rated at only 30% of peak load, while the receipts from RHI payments would be only marginally less than those in the case of a boiler that produced 100% of the required heat. However, Mr Crawford said that the worked example in CIBSE AM15 was for intermittent heating, not continuous heating. He said that it was implicit in a client's instructions that the heating system should be able to meet the internal temperatures on the worst winter day; that would be the basis of the design.

246. It was put to him that the CT Tool contradicted his approach to boiler sizing:

“Q. Mr Crawford, you are also aware, are you not, that when operating the Carbon Trust Sizing Tool, it is not possible to size the Biomass boiler at more than 80% of peak load, is it?”

A. That's correct.

Q. And it is reasonable to infer, is it not, that the authors of the sizing tool consider that it would not ever be appropriate to size a Biomass boiler at more than 80% of peak load?

A. On the basis they don't allow that to be chosen, yes.

Q. And it is also the case that the Carbon Trust Sizing Tool allows the user the choice of intermittent or continuous heating, is it not?

A. It does.

Q. Therefore, it is reasonable to infer that the authors of the Sizing Tool consider that a Biomass boiler, for a space that is to be continuously heated, should not be sized at more than 80% of peak load, is it not?

A. That would appear so, yes.

Q. And I put to you that there is good reason to think that the rest of the industry considers that to be right, is there not?

A. I can't speak for the rest of the industry.

Q. Well, Mr Crawford, what I put to you is that when Mr Crowther has said that boilers should be sized at no more than 80% of the peak load, so he has treated that as effectively a maximum, he is expressing a consensus view within the industry, is he not?

A. He's expressing a view, certainly, that's reflected in the limitations of the Tool, yes, which doesn't allow you to select anything more than 80%.

Discussion of boiler sizing

247. I begin with an obvious point, but one that it is important to keep firmly in mind. The issue in the case is not which of the experts' approach to boiler sizing is preferable but (to state the issue in condensed form) whether the boilers supplied by the supplier were oversized for the client in this case. The conclusions as to which parts of the expert evidence are to be preferred will inform consideration of that issue. But R&A's boilers were not sized or selected by either expert. That said, neither expert was entirely convincing.

248. Mr Crawford's evidence seemed to me to be problematic as regards methodology, in particular in the following respects:

- 1) Mr Crawford's failure to refer to, or even to make any apparent use of, CIBSE AM15 or the sizing principles it contains when he wrote his first report was striking; the more so since he did refer to CIBSE Guide A, which has far less relevance. His written evidence did not suggest that he had assimilated the design principles in CIBSE AM15. Mr Crawford's use of the word "buffer" is itself a minor matter. His failure to create a load profile is a more significant example of the way in which his approach was out of line with that recommended by CIBSE AM15; though Mr Crowther, who was aware of CIBSE AM15, did not create a load profile either.
- 2) I do not think that Mr Crawford knew of the CT Tool before this case; he acknowledges that he had not used it, and he was unable to answer a question concerning the status of the CT Tool within the industry. His main objections to the CT Tool appeared to be, first, that he could not get it to work reliably and so had doubts about its "credibility" and, second, that it did not make manifest the formulae used in its algorithms and did not permit application of the margin of uncertainty. These are not convincing objections. As to the first, this is very likely to be the result of Mr Crawford's prior unfamiliarity with the CT Tool; it is hardly likely to be recommended by CIBSE if it is

unreliable. As to the second, it is in the nature of computational tools that the formulae on which they are based are built into the programmes. The fact that there is no room for the application of a margin of uncertainty need not occasion surprise. I note at this point that the disclaimer in the CT Tool does not seem to me to reduce its reliability, for reasons that were explored by Mr Emmett with Mr Crawford. The CT Tool has clearly found widespread professional acceptance, despite Mr Crawford's unawareness of the fact.

- 3) Mr Crawford's use of the Cold Start Margin was unimpressive. He accepted that his first report had used it incorrectly, even on the assumption made in that report that the boilers were for intermittent use.
- 4) I discuss the "margin of uncertainty" below.

249. Mr Crowther showed greater appreciation of recommended design principles and in that regard his evidence was to be preferred. However, these advantages were offset by real limitations in his evidence. In particular:

- 1) For all his theoretical understanding, Mr Crowther lacks Mr Crawford's practical experience in designing biomass installations. This showed itself both generally and specifically.
- 2) Generally, Mr Crowther's approach was dominated by the perspective provided by Kiwa Ltd's involvement in the BEIS Report. This meant that he tended to focus on methodological principle and on matters pertaining to efficiency in a conventional sense, rather than on practical considerations in respect of the sizing of biomass systems for clients. (Put rather starkly: the BEIS Report says that biomass designers generally do not follow optimum practice, and the tenor of Mr Crowther's evidence was that of external criticism of the industry rather than internal evidence of reasonable practice.) For all the criticisms I have made of him, Mr Crawford's pragmatism was in this respect an advantage.
- 3) Specifically, the confusion engendered by the misleading use of "efficiently" in R&A's case appeared to work through into Mr Crowther's evidence. He emphasised the importance of efficiency in meeting "heat demand" (for example, paragraph 217 above). But it is entirely clear that R&A was not interested in acquiring the boilers to meet any existing demand but rather to generate heat and therefore income. For essentially this reason, Mr Crowther placed primary emphasis in his approach to sizing on historic heat demand and was dismissive of subsequent heat production as being of no design relevance. But the purpose of acquiring ten boilers was emphatically not to meet historic heat demand, and the subsequent generation of heat cannot be dismissed as irrelevant to an expert's consideration of design, because it is or may be indicative of the purposes for which the design was implemented.
- 4) Again, Mr Crowther's questionable focus on historical data led him, as it seems to me, to fail to appreciate sufficiently that Mr Partridge's initial use of existing boiler capacity was a legitimate tool in boiler sizing and one commonly used in the industry. And his responses to questions concerning section 6 of CIBSE AM15 were unconvincing.

- 5) Mr Crowther's use of the fault logs to evidence oversizing did not stand up to scrutiny. He was unable to say whether the number of fault log entries was double the number of fault-events (that is, one for the event and one for the response). He had to concede that the logged faults did not constitute evidence that the boilers were oversized. He had to concede that he could in fact easily have calculated the load factors for the boilers at the Premises.
 - 6) Although Mr Crowther rightly stressed the potentially adverse cost implications for clients if boilers were oversized, his evidence was of little assistance in assessing what if any the actual costs implications might be in this particular case. He did not, of course, prepare an alternative design for the systems at the Premises.
250. The central points of substance between the experts concern the questions (1) whether a margin of uncertainty ought to be applied when assessing the peak load of the building and (2) whether a boiler ought to be sized to match the peak load of the building.
251. As regards the margin of uncertainty, I do not accept that it is wrong in principle to add such a design margin (which was at least the effect of Mr Crowther's approach) but I consider that Mr Crawford's approach to it was unjustified. The principles are summarised in CIBSE Guide B; see above. Such a margin may clearly be justified in the individual case, but the design margins have to be applied with caution and with due regard to the risk that they create, not only the risks they obviate. Mr Crawford's practice of routinely applying a margin within a given range is inconsistent with the guidance, and in my judgment, Mr Emmett's cross-examination was successful in showing the incoherence of Mr Crawford's position. If the calculation has been done on the most accurate available basis, there is no rational basis for supposing that the uncertainty can only have resulted in figures that are too low: it might just as well have resulted in figures that are too high. One can do no more than make the best possible calculation. The justification for applying the margin in a given case must rest on consideration of the relevant risks, having regard in particular to the downsides of under-sizing and those of oversizing the heating system. Mr Crawford appeared to accept this point eventually.
252. It is important to note that the conclusion is not that the margin of uncertainty is inappropriate, only that it is inappropriate to apply it automatically. Whether or not it is appropriate in a given case will depend on the consideration of the relative and respective risks.
253. As with his general application of a margin of uncertainty, so Mr Crawford's opinion that a biomass boiler ought to be matched to the peak load of the building is in my view unsound as a general principle. This is because to match the boiler to the peak load can result in significant oversizing at other times of the year, cause inefficient operation at low fractions of maximum capacity, and result in disproportionate capital outlay. The evidence suggests that many biomass boilers are oversized for their locations, and CIBSE AM15 observes that it is very important not to oversize a biomass boiler.
254. Mr Crowther's evidence was that the correct approach was to calculate the peak load and apply a discount of 20% to 30%. (The CT Tool does not permit a discount

smaller than 20%, though I cannot see that the user of the tool is precluded from applying a smaller discount in the exercise of his professional judgement.) The rationale of this approach was well put by Mr Emmett in para 166 of his written submissions:

“The reason to apply the discount is that the money spent on bringing the boiler up from 80% (or lower percentage) of peak load to 100% of peak load is not well spent. At best, it will provide a marginal benefit (i.e. ensuring the property is not under-heated for those short periods when the temperature is at its lowest). If this were a problem, which usually it would not be, it would be best solved by the installation of a small, cheap, supplemental fossil-fuel boiler.”

255. I consider that Mr Crowther’s approach is the sounder as a matter of general practice. However, I do not accept that it is necessarily wrong to size a boiler against the peak load. And it is important to remember that the issue in the case is not ultimately one of a choice between the experts on questions of methodology, but concerns rather the suitability of these boilers for the purposes of this client.
256. A convenient starting point is what is said in CIBSE AM15, in passages set out at more length above:

“The extent to which the boiler size can be reduced in relation to peak load is wholly dependent on the shape and duration of the daily load profile. A thermal store, in combination with a biomass boiler, should be designed to meet the desired percentage of energy from biomass (when an auxiliary boiler is incorporated) or 100% of the annual energy requirement if a biomass system only is to be installed.”

“[T]here is little scope for using a thermal store with the relatively flat profile of a continuously heated building which would require a boiler sized at the average load of the profile in Figure 6.2.”

“If 100% of the annual energy is required from biomass, the boiler/thermal store must be able to supply 100% of the energy on the design winter day.”

257. Mr Crowther was asked about the last of these extracts, and he said that it did not constitute advice as to the acceptability of the condition (namely, that 100% of the annual energy was required from biomass) but was merely a statement of what was required by the condition. That is correct, so far as it goes. However, the first and second of the extracts, taken with the third extract, show: (1) that CIBSE AM15 does not purport to rule out the use of a biomass system for continuous heating without an auxiliary system; and (2) that where there is such use the boiler must be sized against the peak load. It is R&A’s own case, expressly communicated to its expert and confirmed by the evidence, that it purposed to use the boilers on a continuous rather than an intermittent basis.

258. Regarding the present case, I have set out the evidence at considerable length. Subject to a qualification to which I shall turn presently, I agree with Mr Walker's submission that the evidence shows that R&A's principal purpose in acquiring the boilers was to maximise the generation of heat, without regard for prior capacity, historic demand or, indeed, whether that heat was needed, and so to maximise the RHI payments: I refer, briefly, to the huge increase in the heat generated in the NHS buildings; the agreement to cap the NHS's heating charges and to provide additional ventilation rather than to turn down the boilers; the failure to complete the insulation of the pipework after Biosol left the site; the omission of thermostats; the omission of time clocks; and the provision in clause 3 of the Maintenance and Woodchip Agreement that the supply of fuel was "for the purposes of maintaining [the boiler's] output at maximum capacity". It seems likely, indeed, that R&A was clearly and deliberately generating useless heat and was thereby abusing the RHI Scheme. As the government publication *Renewable Heat Incentive* explains (cf. paragraph 17 above), the payments are calculated by metre readings, which do not themselves confirm that the heat was useful; the Scheme relies on the tariff system and normal economic considerations to control the risk of abuse.
259. Mr Crowther said in cross-examination that he was concerned with prospective design of boilers, not with their subsequent use. That is a fair enough approach for an expert. But I see no reason to suppose that Biosol misunderstood R&A's purposes and requirements. Indeed, I am satisfied that it did not.
260. Again, I agree with Mr Walker's submission that R&A had and expressed no real concern to heat the buildings at the Premises "efficiently". Its purpose was to maximise money-making. Efficiency was irrelevant in every sense other than that of the efficient making of money. There is nothing wrong with purposing to make money. But the use of the word "efficiently" both confuses the issue and gives the partners' motives a specious appearance of high-mindedness.
261. In these circumstances:
- 1) Despite my criticisms of Mr Crawford's evidence as to the principles of methodology, I am not persuaded that the boilers ought to have been designed other than against the peak load. I also consider that the application of a margin of uncertainty would be reasonable in the present case. This is on account of the purposes of R&A.
 - 2) To put the matter a different way, I do not consider that it was incumbent on Biosol to under-size the boilers. It was appropriate that the boilers be sized against the peak load and in a manner that minimised the risk of underheating and maximised the opportunity for income-generation.
 - 3) I am satisfied that R&A was content with an approach that minimised the risk of underheating rather than the risk of oversizing.
 - 4) The evidence suggests that Mr Partridge sized Boilers 1 to 4 by reference to the capacity of the existing heating systems, which is a common practice and a permissible guide to sizing.

- 5) Although Biosol was doubtless attempting to make sales, as any supplier would, it was not out to make sales inappropriately; this is shown by its insistence that it would be wrong to install 22 boilers.
 - 6) R&A's acquisition of boilers was piecemeal, in the sense that (a) it did not pursue a single integrated scheme for the Premises and (b) it actually acquired later boilers on the strength of the performance of the earlier boilers.
262. There remains the question arising out of the previously mentioned qualification to my agreement with Mr Walker's submission about R&A's purposes. The purpose of maximising RHI payments was necessarily subject to questions of return. At its simplest, there is no point paying for two boilers if they will produce no greater returns than will one boiler or, similarly, if the increased returns will be outweighed by the added costs of the second boiler. The basic question, therefore, is whether the supply of the ten boilers put R&A to cost that its purposes did not justify, such that the boilers were not reasonably fit for their purpose and that Biosol was in breach of duty in recommending them as being reasonably fit for their purpose.
263. In my judgment, there are serious difficulties facing R&A's case in this regard. These concern both breach and quantum, which necessarily intertwine.
264. In his closing written submissions, Mr Emmett wrote:
- “The Partners’ essential complaint is that they bought more boilers than they needed. The number of boilers they needed was 6. The best evidence of that is that, having taken advice, the Partners have decommissioned 4 of the boilers Biosol sold to them.”
265. This is an unsatisfactory premise on which to build the essential complaint.
266. First, I agree with Mr Walker that R&A's conduct since the dispute arose in October 2017 is not a reliable guide to its intentions, wishes or purposes at an earlier date. I reject Mr Emmett's contention that the fact that R&A has decommissioned four of the boilers (and sold two of them) shows that it would have acquired fewer boilers in the first place if “properly” advised. The partners have shown that they are quite capable of having decided on their more recent course of action with a view to manufacturing a plausible case as to their intentions and purposes before October 2017.
267. Second, even if the partners' actions are entirely *bona fide*, they do not establish that more or larger boilers were supplied than were required; merely, at best, that the partners believe this to be the case. Mr Emmett, who is careful and precise with his use of language, described the partners' conduct as the “best evidence” of over-supply. That is indicative of the fact that the evidence adduced by R&A fails to establish what Biosol ought to have done. For reasons already indicated, Mr Crowther's sizing calculations do not establish the respects if any in which, in the circumstances, Biosol departed from the range of reasonable and acceptable practice. Neither expert calculated the actual efficiency of the boilers or the relevant load factors. Mr Crowther was ultimately unable to say whether smaller boilers would have been able to generate the heat, or the RHI payments, that the boilers actually installed did generate. (Mr Emmett submitted that 6 boilers would have been able to

generate RHI payments equivalent to those actually generated by the 10 boilers, but that was not the way the case was put in para 46 of the defence and I do not find it to have been proved.) In a passage of evidence already referred to, it was put to Mr Crowther that he had not calculated the actual performance of the boilers and therefore did not know whether or not they were oversized for their actual use. He agreed. Correspondingly, Mr Crowther did not (and was not asked to) prepare a design for what ought to have been installed. Mr Walker submitted (written submissions, para 124) that R&A has not quantified or explained the economic factors at play or what solution ought to have been achieved by Biosol: “For example, there is no credible analysis of relative capital costs or the impact of RHI.” I regard that submission as well made.

268. Moreover, in my judgment there is a basic problem with R&A’s case, which its formulation—in terms of the efficient heating of the buildings in which the boilers were located—tends to hide. The case takes as its starting point a desire to heat such-and-such buildings and to do so efficiently; and it says that 6 boilers could have achieved the job as well as 10. But this is a fundamentally false way of putting things. R&A did not start from a desire to heat such-and-such buildings. It started from a desire to maximise its investment in biomass boilers as a way of providing a return on capital: that is why it saw buying boilers as an alternative to buying a business; it is why it started with an interest in putting a boiler in each building; and it is why it agreed to acquire more boilers before it even decided where to put them. This shows why framing the case in terms of efficiency is pernicious. It leads to a submission like that quoted in paragraph 264 above. If indeed it is the case, as alleged, that the ten boilers are more than is required to heat the buildings to which they are connected, it does not follow that R&A wanted fewer boilers: as the boilers were the reason for the production of heat, rather than the need for heat being the reason for the boilers, the proper conclusion would merely be that the boilers should be connected to additional buildings, of which many at the Property remain unheated. No evidence shows that this could not reasonably be done, because R&A’s case has been formulated so as to look through the wrong end of the telescope, and Mr Walker was entirely right to warn against taking the partners’ actions in decommissioning four boilers as anything other than a course of action adopted in order to defeat Biosol’s claim.
269. In all these circumstances, I hold that R&A has not proved its case in contract or in tort relating to the suitability of the boilers supplied by Biosol.
270. If I had accepted the case advanced at trial, namely that only six boilers and not ten ought to have been supplied, the question of damages would have arisen. As it does not arise on the basis of my decision, I shall deal with it only briefly.
271. In his written submissions, Mr Emmett advanced the following case on R&A’s losses:

Price of 4 unnecessary boilers	£880,000
Less amount received from sale of 2 boilers	- £170,000

Cost of financing unnecessary boilers	£170,361
Unnecessary maintenance costs (40%)	£41,877
Less difference in RHI payments	- £0
Total loss	£922,238

272. Mr Walker objected, reasonably, that this calculation was first advanced in submissions. Although the basic heads of loss were identified in the defence and counterclaim, when R&A gave Part 18 further information in respect of its plea of loss and damage, it declined to give particulars of the sums claimed on the basis that they were “matters for expert evidence”.
273. The award of contractual damages would not be entirely straightforward, because of the way in which R&A puts its case. It is not said that the boilers were unsuitable because they did not work as they ought to have: in that case, expectation damages might be awarded, for example, for the cost of providing necessary supplemental heating. Rather, what is said is that the boilers were not needed and ought not to have been supplied. This does not appear to leave any room for the application of expectation damages, because the contention is not that the contractual expectation ought to be made good but that the contract ought not to have been made. This might sound in an award of reliance losses. I shall simply proceed on the basis that the damages sought are for negligent advice to acquire four unnecessary boilers (counterclaim C3, in my classification).
274. The total cost of the supply and installation of each boiler was £220,000, of which £85,000 represented the cost of the boiler. There is no doubt but that the omission of a boiler would have entailed the omission of most of the mechanical engineering work associated with its installation. However, the use of six boilers to heat the buildings actually heated by the ten boilers would necessarily have resulted in additional pipework and in the installation of the necessary heat emitters. It may be that additional or larger thermal stores would have been required; if so, they would have required additional construction work. However, the premise of R&A’s case is that it would have acquired fewer boilers, not smaller boilers, and on that basis there is no reason to posit the need for additional construction work. It is highly likely that the supply of only six boilers would have saved additional costs beyond those of the boilers themselves. Mr Walker submitted that a relatively simple exercise would have enabled R&A to produce the necessary evidence but that, in the absence of such evidence, there was no rational basis for assessing the further costs that would have been incurred; therefore, he said, no award ought to be made in respect of the ancillary costs of installation. That is not very attractive. If the court finds on the balance of probabilities that loss has been suffered, it must do the best it can on the evidence available: see *Chitty on Contracts*, 33rd edition, para 26-018; *Wemyss v Karim* [2016] EWCA Civ 27 at [40]-[49], per Lewison LJ; and *116 Cardamon Ltd v MacAlister* [2019] EWHC 1200 (Comm) at [77]-[83], per Cockerill J. The view I

would have taken would have been that, on a properly conservative estimate, not less than half of the additional costs (that is, those in addition to the boilers themselves) would have been saved by the omission of the boilers. Therefore, I would have taken as the starting point of the calculation (a) the cost of four boilers ($4 \times \text{£}85,000 = \text{£}340,000$) and (b) half of the ancillary costs of the supply and installation of each boiler ($4 \times \text{£}135,000 \div 2 = \text{£}270,000$): a total of $\text{£}610,000$.

275. However, R&A got the boilers it paid for. It acknowledges that it would have to give credit for the moneys received from the sale of two boilers. It says that it has been unable to sell the other two. Mr Emmett says that they are “white elephants” and that credit should only be given for them if they are sold before judgment. That cannot be right. R&A would have to give credit for the value of the boilers. The question would be: what is that value? The evidence is that they are identical to the boilers that were sold for $\text{£}85,000$ each. That is, as it seems to me, the best evidence of their value. As Mr Walker observes, the figure should not occasion much surprise, because (i) the boilers are accredited boilers, and (ii) that is in fact what the other two boilers were sold for.
276. The finance charges relating to the unnecessary boilers would be recoverable in principle. Mr Walker complained that R&A re-financed at a lower cost by means of a bank loan and thus had not incurred the entirety of the finance costs. As re-financing would require compensation to the original finance company for lost interest, I am not persuaded that there is anything in the objection. However, as the matter is really just an arithmetical question, I would have permitted it to be explored before fixing a judgment sum.
277. Additional maintenance costs would be recoverable in principle. However, I am not satisfied that the costs properly attributable to maintenance of ten boilers were in excess of $\text{£}100,000$ for a two-year period, as R&A claims. Biosol identifies invoices amounting to slightly in excess of $\text{£}15,000$ as relating to maintenance costs for that period. It will be seen below that the cost of maintenance under the Woodchip and Maintenance Agreement would be of the order of $\text{£}10,000$ per annum; that is not itself the relevant measure of this head of R&A’s counterclaim, but it provides an interesting cross-reference. Something of the order of 40% of $\text{£}20,000$ would be acceptable under this head, absent close examination of the invoices. It is not profitable to spend more time on this point here.
278. The remaining point concerns the allowance to be made for RHI payments that would have been foregone if only six boilers had been installed. The defence and counterclaim identifies this as an allowance to be made, but Mr Emmett says that the allowance is nil: the same payments would have been received if R&A had only taken six boilers. In view of my earlier findings concerning R&A’s failure to prove its case on liability, I say no more on this point.

D: Breach of contract for late installation

279. R&A allege that the installations of the various boilers were not carried out within the times permitted by the various contracts:

- a) Boilers 1 and 2 ought to have been installed and commissioned by 15 February 2016, being a reasonable time (2 months) after the order was placed on 15 December 2015 (defence and counterclaim, para 16). In fact, they were commissioned on 22 June 2016.
 - b) Boilers 3 and 4 ought to have been installed and commissioned by 24 June 2016, being a reasonable time (2 months) after the order was placed on 24 April 2016 (defence and counterclaim, para 24). In fact, they were commissioned on 30 January 2017.
 - c) Boilers 5, 6 and 7 ought to have been installed and commissioned by 7 February 2017, which was a “guaranteed” date. In fact, they were not commissioned until 10 and 11 May 2017.
 - d) Boilers 8, 9 and 10 ought to have been installed and commissioned by 14 March 2017, which was a “guaranteed” date. In fact, they were not commissioned until 29 June 2017.
 - e) Alternatively, Boilers 5–10 ought to have been installed and commissioned within a reasonable time, which was either by 5 March 2017 (being 2 months after the date of the order) or by 31 March 2017 (being the date at which the then current RHI tariffs were due to expire). (See defence and counterclaim, paras 32 and 33.)
280. Biosol denies that any specific dates or times for installation and commissioning were agreed. It admits that there was an implied term that the boilers would be installed and commissioned within a reasonable time but denies that a 2-month period was a reasonable time.
281. I have already found that Biosol made no contractual promises regarding the dates of supply and installation of any of the boilers. Therefore the question in respect of each contract is as to the reasonable time for performance.
282. The Proposals produced by Biosol gave an indicative programme for the works to which they related. The programme in Proposal 3, for Boilers 1 and 2, is set out at paragraph 53 above. On the basis that stage 4 (planning) could be dealt with at the same time as stages 2 and 3 (manufacture and freight) and that stage 5 (removal of the redundant system) would not require planning permission, the programme would permit installation to commence within 8 to 11 weeks after the placing of the order. The subsequent parts of the programme are hard to analyse from the text, because stage 8 (heat mains and interface works) was to be concurrent with construction of the energy centre, which was not shown separately but had previously been allocated 4 to 6 weeks. It looks as though something of the order of 10 to 14 weeks was being allowed for the installation and commissioning stages. This indicates a total of between 18 weeks and 25 weeks from the placing of the order to the commissioning of the boilers: roughly 4 to 6 months, as compared with the two months contended for by R&A as a reasonable period.
283. When Mr Crawford was cross-examined, he agreed that the indicative programme could be compressed by carrying out works concurrently, and to a rather greater degree than I have suggested. It is not clear to me that he was correct to concede that

planning permission could be sought concurrently with stage 1: either stage 1 is illusory, or it would probably be required before the application for planning permission was submitted. He accepted that there might be some overlap between the times allowed for stage 6 (boiler and fuel feed site assembly) and stage 7 (pipe and chimney installation), though he was understandably unwilling to commit himself on this point without detailed knowledge of the works. He did accept, however, that the programme in the Proposal would have been produced on the basis of generous figures, so as to provide Biosol with a “a larger timescale than they felt was necessary” and thus give them some “elbow room”.

284. In his main report, Mr Crowther conceded that he could not make “a site specific comment”, but he expressed the view that the installations were not very large or complex and concluded: “Generally such an installation (on site work) should take 6 to 10 weeks depending upon the building work, electrics and cutting into the existing system.” Mr Emmett put this forward as a period of six to ten weeks from the date of the order (written submissions, para 206), but that is not obviously the case: Mr Crowther was specifically referring to on-site work, and it is not clear how long after the placing of the order Mr Crowther would allow for the commencement of the works to which he was referring, or how he thought the 6-10-week period would relate to the works in stages 1 to 4.
285. The experts were thus able to give views as to the likely duration of works of this kind in general, but they prescinded from specific comment on the particular works carried out at the Property. Their opinions are fairly summed up at the end of the relevant section of their joint statement:

“Points of agreement

It is agreed that installing multiple boilers simultaneously with overlapping work fronts makes it very difficult to ascertain whether the design, installation and commissioning period for any given boiler was appropriate or not.

Points of disagreement

Mr Crowther: Mr Crowther still believes some H&V contractors could have scheduled the work in a parallel rather than sequential fashion and achieved faster installation rates.

Mr Crawford: Mr Crowther agreed to having insufficient information regarding actual work fronts during the construction period in order to determine whether any were carried out in parallel or any additional items could have been carried out in parallel. Therefore, it is not clear upon which basis Mr Crowther claims that the construction could have been shorter.”

286. I consider that Mr Crawford’s comments are fair and in point. The difficulty with this enquiry is that it takes place in general terms, without reference to the specific features and progress of the particular engineering and construction projects that are

in question. It may be that work on site took too long and could have been finished more quickly by more efficient planning. But such a finding would normally require specific information about the works actually undertaken, of a kind that is commonly produced in construction disputes involving allegations of delay. The furthest one can go, I think, is that in general terms a period of three or four months from confirmation of the order to the commissioning of the boiler is unlikely to be untoward, though a shorter or a longer period may be reasonable in a given case.

287. Boilers 1 and 2 were ordered by R&A, as I find, on 12 February 2016, not on 15 December 2015 as asserted by R&A. The deposit was only paid, in two instalments, on 26 February and 1 March 2016. Biosol placed the order for the boilers on 22 March 2016. The boilers were delivered to site on 11 April and were commissioned on 22 June 2016. In my judgment, there is no good reason for considering that the contract was not performed within a reasonable time.
288. Boilers 3 and 4 were ordered by R&A on 24 April 2016. The boilers were delivered to site on 31 August and 1 September 2016 and were commissioned on 30 January 2017. That is a total period of nine months. Mr Walker submitted that a finding of delay in breach of contract was not open to the court in the absence of supporting expert evidence. I do not agree: the court is entitled to consider all of the available information, including the expert opinions, and form its own view as to what was a reasonable period for completion of the works. My comments on Boilers 3 and 4 are as follows.
- 1) The first period of apparent delay is the period from R&A's order to delivery to site: 18½ weeks, compared with the indicative period of 8 to 11 weeks in the Proposals.
 - 2) The second period of apparent delay is the period from delivery to commissioning: 21½ weeks, compared with an uncertain but clearly shorter period in the Proposals.
 - 3) Mr Bundock's first witness statement accepts that there were "delays with shipping, building of the housing for the systems and accreditations" but says that Biosol did all that it could to rectify the issues and asserts that any delays were "due to circumstances outside of Biosol's control" (paras 48 and 49). Whatever else this evidence shows, it confirms that the time taken to perform the contract exceeded a reasonable time.
 - 4) In light of all these matters, I am confident that a reasonable period for performance of the contract would have been 3 months less than was taken. It may be that Biosol ought to have performed the contract yet more quickly; however, in the absence of any detailed analysis I am unwilling to make any more adverse finding.
 - 5) Mr Bundock's evidence, referred to above, was given for the purpose of showing that Biosol could avail itself of the benefit of its standard terms and conditions, which exclude liability for losses resulting from delays beyond Biosol's control. I find that Biosol has not shown that the delays were beyond its control; as Mr Emmett says, bare assertion does not, in these circumstances, amount to proof.

6) However, I award no damages, for reasons explained below.

289. Boilers 5, 6 and 7 were probably ordered by R&A on 15 November 2016, when the deposit payment was made. Biosol placed the order with the manufacturer on 18 November 2016. Boilers 5 and 6 were commissioned on 10 May 2017 and Boiler 7 on 11 May 2017. That is a total period of nearly six months. Although this timescale is more or less in accord with the indicative programme contained in the Proposals for Boilers 1 and 2, it is a slightly surprising length of time for completion of the works. Nonetheless, I do not feel able to find that Biosol took an unreasonably long time to perform its contractual obligations, in the absence of any detailed analysis as to the course of the works or any supporting expert opinion.
290. Boilers 8, 9 and 10 were probably ordered by R&A on about 15 February 2017, when Biosol placed the order with the manufacturer. The boilers were commissioned on 29 June 2017. That is a total period of four-and-a-half months. In the absence of any particular analysis of the progress of the contract, I do not find that there was any breach by Biosol by reason of delay.
291. As I have said, I award no damages for breach of contract in respect of the delays in installation and commissioning of Boilers 3 and 4. R&A puts its claim on the basis that it lost RHI revenue at the rate of £10,000 per month for the period of delay. That is a false basis. First, the rate is premised on a warranted return; however, I have rejected R&A's case as to that warranty. Second, and more importantly, the benefits under the RHI scheme accrue for a period of 20 years. R&A will get benefits for just the same duration, whether the boilers were commissioned early, late or on time. The effect of delay in commissioning is not to reduce the income stream but to delay its commencement. As it seems to me, the proper measure of damages would probably be interest on the amount of the income for the period of its delay (so, if income of £y were delayed for 1 month, the loss would be $\text{£}y \times z\% \div 12$). R&A has not advanced a claim on this basis or acceptable data for the calculation, and in view of the small amounts that could be involved—I think, at most a few hundred pounds—I do not propose to permit further time to be taken on it.

E: Breach of contract for defective installation

292. R&A alleges that Biosol was in breach of an implied contractual obligation to exercise reasonable care and skill in the installation and commissioning of the boilers. It complains of five breaches that, “individually and cumulatively, are likely to cause the Partnership to incur maintenance, repair and replacement costs over the lifetime of the boilers which would have been avoided if Biosol had exercised reasonable skill and care” (defence and counterclaim, para 40):
- a) That the boilers have not been fitted with dosing pots for provision of a chemical inhibitor, in accordance with best practice, thereby exposing the internal systems to corrosion;
 - b) That the boilers connected to existing fan systems are likely to be impeded by corrosions and blockages in those very old systems;

- c) That the layouts of the rooms in which the boilers have been assembled and constructed do not allow for full and proper maintenance (e.g. that in two cases the ash removal augers cannot be accessed completely for maintenance);
- d) That the installations are not protecting the boilers from overheating, so that they do overheat, which results in damage that over time will mean that certain parts may need replacing sooner than otherwise would be the case;
- e) That the heat emitter designs, where installed, do not meet the capacity of the boilers and are oversized.

The alleged breaches are denied by Biosol, though it neither is nor could reasonably be disputed that Biosol was under the obligation to exercise reasonable care and skill in the installation.

293. This head of claim was touched on only briefly by Mr Emmett in his closing submissions. No doubt at least one reason for this was the acknowledgment that R&A was unable to attribute a particular loss to a particular matter of complaint; the most that was said was that “it is to be inferred that these faults, together with the other matters of which the Partners complain (including the oversizing of the boilers) caused these costs [that is, alleged additional maintenance costs of £1,000 per boiler per annum] to be incurred” (closing submissions, para 21). R&A’s difficulty in identifying losses attributable to the matters complained of was apparent from the Part 18 further information that it provided in March 2019, when in answer to a request for particulars of the losses it replied that they were “a matter for expert evidence” and “[could] not be fully particularised” at that time. However, the experts’ joint memorandum produced in March 2020 recorded agreement that the experts did not have sufficient information to be able to say whether the maintenance costs already incurred were any different from what was to be expected. And no particulars of future losses referable to the alleged breaches have been provided or advanced at trial.
294. The absence of proof of any loss suffices to make these allegations academic, though of course it does not strictly rule out the availability of nominal damages if the breaches were proved. I shall deal briefly with the allegations in turn, adopting the references given above.
- a) The evidence shows that the absence of dosing pots does not itself cause or even increase the risk of corrosion. The purpose of the pots is to facilitate the introduction of chemical cleaning agents. However, it is possible to introduce such agents even if there are no pots, though it is easier to do so if there are pots. Mr Crawford’s opinion was that it was not mandatory to fit pots, though it is normal practice to do so. Mr Crowther’s opinion was that it was poor practice not to have fitted them. In my judgment, their omission was sub-optimal but did not amount to a breach of contract. I note that it is not said that R&A contracted and paid for dosing pots but did not receive them.
 - b) In buildings B200, B3 and B4 the biomass boilers were connected directly to the existing distribution systems. However, it is not said that Biosol was engaged or agreed to replace these existing systems and I do not consider that it was in breach of contract by not doing so.

- c) The limited evidence that there is indicates that the clearance around the boilers was in accordance with the manufacturers' instructions and does not establish that there is any material impediment to adequate access.
- d) This is an unparticularised allegation, in that it does not identify any specific default (such as a faulty part, or a poorly connected system) but points to what is said to be the unusually high number of times that the boilers have automatically shut down when the internal temperatures reach a certain level. However, the event so relied on is itself indicative of the fact that the boilers have automatic cut-out devices, as explained by Mr Crowther. This does not answer the questions whether the boilers are shutting down more often than would be expected and, if they are, why that is so. But it does mean that the boilers have their own protection against overheating. R&A has not proved (i) any respect in which the shut-downs are referable to a breach of contract by Biosol or (ii) that the shut-downs are liable to cause any damage to the boilers or (c) that any identifiable loss has been suffered.
- e) The experts' joint memorandum shows that the heat emitters are appropriately sized for continuous heating; if, as Mr Crowther opined, they might in fact be oversized for continuous heating, they would nevertheless function satisfactorily. (The experts thought that the heat emitters were *undersized* for intermittent heating. But that is not the complaint advanced by R&A.)

295. Accordingly, the head of claim involving these several allegations fails.

F1: Breach of warranty as to cost of fuel

296. R&A alleges that the contracts for the supply of Boilers 1 and 2 and Boilers 3 and 4 contained a warranty or term that the price of fuel for each boiler would not, at least for a period of 2½ years, exceed £16,563 per annum. See defence and counterclaim, paras 16(5)(iii) and 24(5)(iii). In respect of what is pleaded as a single contract for Boilers 5 to 10, the corresponding term is said to be that R&A would not, for a period of 2½ years, be obliged to make any payments to Biosol for fuel "to the extent that making such payments would cause the supply, installation and commissioning of the boilers to be unprofitable to the Partnership": defence and counterclaim, para 33(5)(iv). Particular reliance is placed on the Summary to support the existence of the alleged warranty in respect of Boilers 1 to 4.

297. In the light of my findings of fact, this head of claim fails.

F2: Breach of warranty as to quality of fuel

298. R&A alleges that all, or most, or some of the fuel supplied by Biosol between June 2016 and November 2017 was not of satisfactory quality or fit for its purpose of burning in the boilers, because it was not of the required grade or class (defence and counterclaim, paras 51 to 53). There is no issue as to the relevant contractual

obligation. Biosol denies the breach and maintains that it supplied fuel of the required standard.

299. For present purposes, there are two methods of classification of woodchip for use as biomass fuel. First, there is woodchip made from virgin wood; this is subject to classification (Classes A1, A2, B1, B2) under the international standard ISO 17225. Second, there is recycled fuel, which is made from waste products rather than from virgin wood and is graded in accordance with PAS (Publicly Available Standard) 111:2012, which has already been mentioned. The grades of recycled fuel under PAS 111:2012 are as follows:
- a) Grade A: visibly clean, non-hazardous waste wood from the arboriculture sector, packaging waste, scrap pallets, packing cases, cable drums, and off-cuts from the manufacture of untreated wood products;
 - b) Grade B: non-hazardous waste wood from the production of wood-based panels, such as chipboard and medium-density fibreboard (which are subject to requirements of PAS 104);
 - c) Grade C: non-hazardous waste wood sourced mainly from construction and demolition activities, recycling centres and civic amenity sites. This is not suitable for clean waste wood combustion plant;
 - d) Grade D: any item of waste wood which has been treated, coated, painted or otherwise contaminated with any hazardous substance. Grade D wood must be disposed of at a permitted hazardous waste disposal facility.
300. It is common ground that the boilers supplied by Biosol to R&A could properly be fuelled with either virgin woodchip or Grade A recycled woodchip.
301. R&A's pleaded case is that all, most or some of the fuel supplied by Biosol was unsuitable because (a) it contained trace metals well in excess of the levels permitted for Grade A and indeed for Grade B, and (b) it largely comprised not woodchip but hog fuel, which was of denser quality than woodchip and thereby impeded combustion and performance (defence and counterclaim, paras 51 and 52).
302. Biosol's pleaded case is that it "provided grade A fuel to the Partnership during the period referred to", which it had purchased from two accredited suppliers, namely Brook Energy and KPS (reply and defence to counterclaim, para 77). In fact, Biosol's evidential case at trial was that, apart from some Grade A fuel supplied for a period of some months, it had supplied higher quality virgin woodchip. Mr Emmett complained that this case required an amendment of the statement of case, but I agree with Mr Walker that the relevant question is simply whether R&A has proved that Biosol supplied substandard fuel.
303. In the narrative set out above, I have shown how the dispute concerning the quality of fuel arose. It is clear that the impression given by Mr Lovering, namely that Mr Golding alerted R&A to malpractice that had been going on and that R&A's decision to terminate the relationship with Biosol resulted from that discovery, is substantially false. Mr Golding had clearly not expressed any relevant concerns in the two months that he had been employed by R&A, and his exchanges with Mr Partridge in October

2017 (see above) show that he had no prior knowledge of any issue over fuel. The issue concerning fuel arose after Biosol informed R&A that it had put the matter of unpaid invoices in the hands of its solicitors. That was the point at which R&A began to look at the question whether the fuel was substandard. And by that stage it had already decided to end its relationship with Biosol, though not for any reason to do with substandard fuel. Only after the service of the statutory demand did R&A seek an analysis of a fuel sample, though it did not give Biosol any input into the identification of the sample. Nevertheless, the circumstances in which the issue arose do not answer the question whether or not R&A's complaint has substantive merit.

304. Mr Partridge gave material evidence to the following effect. He commissioned Boilers 1-4 to run on Grade A woodchip. Initially in 2016 Biosol was obtaining good quality fuel from a supplier in Port Talbot, Jason Hill. However, after a time the relationship with that supplier broke down and Biosol began obtaining fuel from a supplier in Brighton, KPS. The fuel from KPS was not burnable in the boilers, because it was contaminated. In his witness statement, Mr Partridge said that the contaminants included paint, glass and metal, which he himself observed on site. In his oral evidence, he identified two occasions when he had attended site because of a boiler blockage—apparently because of the introduction of inappropriate material—and confirmed that the woodchip was from pallets with paint on them and so was not Grade A. His statement said (para 26):

“In early 2017 [the date in fact was November 2016: see above] Biosol instructed me to re-commission boilers 1 and 2 in order that they could burn the contaminated fuel that it was supplying into the boilers. The contaminated fuel was not burning properly in the boilers and was causing them to break down. I attended at the site and recommissioned boilers 1 and 2 to burn the contaminated fuel that Biosol was supplying.”

Cross-examination with regard to that evidence was not ideally clear, I think, though nor were the answers. The written evidence was not directly and in terms challenged; however, the case advanced was sufficiently clear, namely that the boilers were only ever commissioned so as to be able to take Grade A fuel (not contaminated fuel); and the tenor of Mr Partridge's evidence was to the contrary, as confirmed in re-examination.

305. Mr Bundock's evidence was to the following effect. From June 2016 until November 2016 he had been obtaining virgin fuel from Jason Hill. In November 2016 he stopped using Jason Hill, because the “fuel was too large” (Mr Worsfold said that fuel above the graded size could cause sticking of the feed system) and, if he changed suppliers, he could procure Grade A fuel at a cheaper rate. In cross-examination he said that the decision to change supplier was made “after a discussion with R&A and the legalities around burning Grade A fuels, which the boilers they had were capable and accredited to do”. From November 2016 Biosol was supplying Grade A fuel that it obtained from KPS. Mr Bundock acknowledged that there had been a problem with some of the fuel supplied by KPS, but he insisted that it was a specific and limited problem. He stated (third statement, para 28): “I acknowledge that a small portion of the fuel delivered to R&A from [KPS] was not of the standard required. However, this was stored away from the fuel being used in the boilers and fenced off. The issue of a substandard load from Brighton was brought up with the supplier and the issue

was swiftly rectified. The supplier agreed not to charge for the substandard fuel.” Mr Bundock referred to an email dated 8 February 2017 from KPS, which said:

“Many thanks for forwarding the pictures of the problems with contamination.

I have been discussing this with our site manager Daryl and we will be looking at measures to solve the contamination issue.

We have introduced a better segregation of materials prior to processing which should remove clinker issue and are awaiting the demonstration of an eddy current sifter which will be the ideal solution.

I will keep you posted on the progress of both, but please do let me or Daryl know if you are having quality issues.”

(Eddy current separators are used to separate metallic from non-metallic materials.) However, Mr Bundock said that after KPS had supplied a couple of deliveries of substandard fuel, Biosol decided that it would stop using Grade A fuel, and from April 2017 (when, according to Ben Bundock, the premises at Resolven were fully operational) it supplied only virgin woodchip from Resolven.

306. Mr Bundock disputed Mr Partridge’s claim that he had been asked to recommission Boilers 1 and 2 so as to burn contaminated materials. He said that they had been recommissioned for the purpose of burning Grade A woodchip as well as virgin woodchip. He observed that Mr Partridge’s diary entries showed only two blockages in the ash auger; this, he said, was hardly remarkable for ten boilers that were operating over a period of about one year in which Mr Partridge was involved.
307. Mr Emmett observed that the invoices from KPS did not say that the fuel was Grade A; they described it as “Heating Recycled Wood Fuel 18% MC [moisture content]”, “Powerchip for Biomass 18% MC”, and “Woodchip for Biomass” but did not refer to the grade of the fuel. Mr Bundock insisted that the wood supplied by KPS was Grade A fuel. He also said that in 2017 he was supplying R&A with virgin woodchip that he had obtained from Green Otter and from Mr Nigel Short, with whom he had a business partnership concerning a wood-drying facility at Resolven. When Mr Bundock was asked questions concerning his email of 14 November 2017 to Mr Matthews of Carmarthenshire County Council, he acknowledged that it referred only to the supply of Grade A fuel to R&A, not the supply of virgin fuel. The explanation that he gave came to this: there was Grade A fuel that was being stored in the lean-to outside Building 65 for Biosol’s own use; inside Building 65 there were two piles of fuel, namely a pile of virgin woodchip that was for use in R&A’s boilers and a pile of Grade A fuel that was for Biosol’s own use.
308. I hold that R&A was not entitled to terminate the Maintenance and Woodchip Agreement on account of the delivery of unsatisfactory fuel and is not entitled to damages for breach of contract in that regard.
 - 1) As I have made clear, the entire issue about fuel quality arose only after R&A had already decided to end its relationship with Biosol and only after Biosol

had started pressing for payment. This shows, importantly, that Mr Golding had no knowledge of problems with the fuel, and that Mr Lovering's evidence is false both in its implication that he had done and in suggesting that discoveries about the quality of fuel were the reason for termination of the relationship. Of course, that does not necessarily mean that grounds for termination did not exist; a party may be held to have lawfully terminated a contract on the basis of matters not known to it at the time. However, it is a starting point, and ignorance of the matters complained of before October 2017 is highly material.

- 2) R&A's efforts to establish a case about the quality of fuel involved a degree of fabrication. First, I find that the allegation that neighbouring residents complained about smoke and odours being emitted from the Premises is untrue. There is no independent or objective evidence about such complaints and no residents were called to give evidence. At one point in his cross-examination Mr Lovering acknowledged that Mr Oliver Matthews was called in by R&A and I am satisfied that that was the case. Second, I find that Mr Partridge gave untruthful evidence about the recommissioning of Boilers 1 and 2 in November 2016. I reject his evidence that the boilers were recommissioned so that they could burn contaminated fuel. Rather they were recommissioned so that they could burn Grade A fuel and not only virgin fuel. This is the evidence given by Mr Bundock and it is consistent with what I consider to be the correct sequence of events regarding the supply of different kinds of fuel to the Premises. Mr Partridge's evidence is to be rejected for several reasons. (a) It is tainted by his animus against Biosol and Mr Bundock. (b) Recommissioning to burn contaminated fuel would have been egregious—everyone is agreed that contaminated fuel could not be burned in the boilers—and it is highly unlikely that Mr Bundock would have proposed it or that Mr Partridge, who had no stake in Biosol, would have been complicit in it. (c) The contention that the boilers were recommissioned so as to be able to burn the contaminated fuel relies for any specious plausibility on the chronology given by Mr Partridge, according to which the recommissioning took place in January 2017, after contaminated fuel had been delivered; it makes less sense when it is appreciated that it took place in November 2016, when the decision to change suppliers and stop using virgin fuel was first taken. (d) If Mr Partridge had known that Biosol had done what he now alleges, he would have been quick to tell Mr Golding and R&A. However, the email exchanges between Mr Partridge and Mr Golding in October 2017 do not contain any suggestion that Mr Partridge knew that the boilers had been specifically set up to burn contaminated fuel. This tends to confirm that his evidence on this point is a later fabrication. (e) Mr Bundock's communication with the supplier in February 2017 shows that, contrary to Mr Partridge's evidence, Biosol was not content to receive contaminated fuel.
- 3) The evidence concerning Mr Matthews shows that in November 2017 there was a stock of virgin woodchip present in Building 65, and that there were distinct piles of contaminated woodchip within Building 65 and in the lean-to adjacent to that building. Mr Matthews' concerns were, first, that the contaminated woodchip be not burned in the boilers and, second, that for that purpose there be no contact between the piles of contaminated and virgin

woodchip inside Building 65. Accordingly there was indeed virgin fuel present. The contaminated fuel was separate, even if Mr Matthews was concerned at a risk of mixing within Building 65. The most likely source of the contaminated fuel is the supply in early 2017, many months before Mr Matthews attended at the Premises. The contaminated fuel seen by Mr Matthews had, nevertheless, not been burned by November 2017. This coheres with Mr Bundock's evidence and with his complaints to the supplier in early 2017. It cannot be concluded that no contaminated fuel at all had been burned in the boilers. But it is a reasonable inference, and one that I draw, that the contaminated fuel was separated and was not being used for burning in the boilers, Biosol having (as Mr Bundock says) decided to change its supplier and reverted to the use of virgin wood.

- 4) It is not in point that Mr Bundock did not refer to virgin wood in his email to Mr Matthews. The fact that virgin wood was present is shown by Mr Matthews' own email. Mr Bundock was concerned to comment on the wood that Mr Matthews was complaining about. I am satisfied that that wood was originally obtained for use in R&A's boilers but that, after Biosol had complained about it and had received remission of the charges from the supplier, it kept the fuel in Building 65 for its own use, although no decision was taken as to what to do with it until later. Biosol had exclusive access to Building 65 and there was no difficulty in it leaving the contaminated wood in place in the meantime.
- 5) It is possible that some contaminated wood was burnt in the boilers, but the evidence that this happened at all is slight and the lack of documentary evidence, coupled with the absence of any positive evidence from a reliable source as to inappropriate burning practices, makes it clear to me that, if it did happen, it was a rare and occasional occurrence.
- 6) Mr Emmett made much in his closing submissions of an analysis of the invoices disclosed by Biosol. This is unsatisfactory. In cross-examination Mr Bundock several times invited Mr Emmett to take him to the invoices, and Mr Emmett was either unwilling or, more probably, unable to do so. I note the points that Mr Emmett has subsequently made, but I am not persuaded that I should infer either (a) that Mr Bundock's evidence as to the quality of the fuel being supplied was incorrect or (b) that supposed lacunae in the invoices are to be explained by the supplementing of virgin fuel with inferior (far less, contaminated) fuel.
- 7) The allegation that Biosol supplied "hog fuel" was barely touched on at trial. Mr Crowther said (first report, para 72) that the fuel he saw in January 2018 was hog fuel, which he defined as wood that was crushed and shredded rather than cut, though it is usually understood to refer to an unrefined mix of waste products such as bark, fibre and sawdust in irregular chunks. It is unclear what precisely Mr Crowther was looking at, but it was probably either the remnants of the contaminated fuel left by Biosol or even material subsequently imported by R&A.

Biosol's Claim

309. Biosol's claim falls under three heads:

- 1) A claim for the unpaid balance of the purchase price for boilers 5 to 10, together with contractual interest;
- 2) A claim for the unpaid balance in respect of the provision of maintenance services and fuel between June 2016 and November 2017 together with interest;
- 3) A claim for loss of profit under the Maintenance and Woodchip Agreement.

(1) Unpaid balance of the purchase price for boilers 5 - 10

310. For the purposes of this judgment, it is unnecessary to explore some of the complexities that arise on the papers. It is now common ground that the total amount payable by R&A (that is, rather than by the finance companies) in respect of the supply and installation of the boilers at the Property was £624,314.80 and that the total amount actually paid was £327,500. The unpaid balance is therefore £296,814.80.

311. Biosol claims payment of contractual interest in accordance with clause 6 of its standard terms:

“The balance of the contract price must be paid within 7 days of completion of the work. If you do not pay us within the time without good reason, we reserve the right to charge you interest at 1.5% per month on the amount still due to us.”

312. R&A challenge this claim to interest on two grounds: first, that the standard terms were not incorporated into the contracts for the supply of the boilers; second, that the interest rate claimed is penal.

313. It follows from my previous findings of fact that the standard terms were effectively incorporated into the contracts. I therefore reject the first ground of challenge.

314. I reject, too, the second ground of challenge. I accept that a contractual rate of interest payable upon default is capable of being a penalty: cf. *Lordsvale Finance plc v Bank of Zambia* [1996] Q.B. 752 (Colman J), and *Jeancharm Ltd v Barnet Football Club Ltd* [2003] EWCA Civ 58, which on this point remain good authority, although not all of the reasoning in the judgments can survive the judgments of the Supreme Court in *Cavendish Square Holdings BV v Makdessi* [UKSC] 67. In the *Cavendish Square Holdings* case, Lord Neuberger and Lord Sumption said at [32]:

“31. The real question when a contractual provision is challenged as a penalty is whether it is penal, not whether it is a pre-estimate of loss. These are not natural opposites or mutually exclusive categories. A damages clause may be neither or both. The fact that the clause is not a pre-estimate of

loss does not therefore, at any rate without more, mean that it is penal. To describe it as a deterrent (or, to use the Latin equivalent, *in terrorem*) does not add anything. A deterrent provision in a contract is simply one species of provision designed to influence the conduct of the party potentially affected. It is no different in this respect from a contractual inducement. Neither is it inherently penal or contrary to the policy of the law. The question whether it is enforceable should depend on whether the means by which the contracting party's conduct is to be influenced are 'unconscionable' or (which will usually amount to the same thing) "extravagant" by reference to some norm.

32. The true test is whether the impugned provision is a secondary obligation which imposes a detriment on the contract-breaker out of all proportion to any legitimate interest of the innocent party in the enforcement of the primary obligation. The innocent party can have no proper interest in simply punishing the defaulter. His interest is in performance or in some appropriate alternative to performance. In the case of a straightforward damages clause, that interest will rarely extend beyond compensation for the breach, and we therefore expect that Lord Dunedin's four tests would usually be perfectly adequate to determine its validity. But compensation is not necessarily the only legitimate interest that the innocent party may have in the performance of the defaulter's primary obligations."

315. They continued with these cautionary words at [33]:

"The penalty rule is an interference with freedom of contract. It undermines the certainty which parties are entitled to expect of the law. Diplock LJ was neither the first nor the last to observe that 'The court should not be astute to descry a "penalty clause": *Robophone* at p. 1447. As Lord Woolf said, speaking for the Privy Council in *Philips Hong Kong Ltd v Attorney General of Hong Kong* (1993) 61 BLR 41, 59, 'the court has to be careful not to set too stringent a standard and bear in mind that what the parties have agreed should normally be upheld', not least because '[a]ny other approach will lead to undesirable uncertainty especially in commercial contracts'"

316. In the present case, the provision for interest is unexceptionable. Even in a consumer context the stipulated rate would be unlikely to raise eyebrows. This is not, of course, a case of a rate of interest that increases in the event of default; no interest would be payable if the debt were discharged promptly. Biosol had a legitimate and obvious interest in receiving payment quickly, because its own outlay was very considerable in respect of each contract of supply and it is a relatively small company. A rate of 1.5% per month is clearly not disproportionate to, or extravagant or unconscionable in comparison to, its legitimate interest.

(2) Unpaid balance for ancillary works and fuel

317. Biosol claims £310,602.74 for moneys due in respect of the supply of woodchip, decommissioning the gas boilers (that is, the works that were not included in Proposal 3 but were carried out by Biosol), and miscellaneous ancillary works, as set out in schedule POC5 to the particulars of claim.
318. I find that the woodchip was supplied and the works were carried out as specified in the schedule. Mr Emmett's submission that the ancillary works were carried out without reasonable expectation of payment was suitably half-hearted and I reject it.
319. I also find, in acceptance of Neil Bundock's evidence, that the agreed price for the woodchip was £75 per tonne.
320. Accordingly, Biosol is entitled to the moneys claimed.
321. Biosol claims interest at the rate of 8% per annum from the dates of the invoices for these supplies and services; most of the invoices are dated 17 July 2017, though some are dated 28 November 2017. In principle the claim for interest will be allowed. However, I shall be prepared to hear counsel as to the appropriate rate of interest if the parties cannot agree.

(3) Loss of profit under the Maintenance and Woodchip Agreement

322. Biosol claims damages for loss of profit on account of R&A's repudiatory breach of the Maintenance and Woodchip Agreement by purportedly terminating it on 24 November 2017. The loss of profit is alleged to be £661,358.
323. This head of claim, which was not given a great deal of attention at the trial, gives rise to the following issues:
- a) Was the Maintenance and Woodchip Agreement a valid contract?
 - b) If so, did R&A repudiate the contract by wrongfully purporting to terminate it on 24 November 2017?
 - c) If so, is the contract nevertheless unenforceable by Biosol as constituting an unreasonable restraint of trade?
 - d) What, if any, are the damages?

Valid contract?

324. For R&A, Mr Emmett submits that the Maintenance and Woodchip Agreement is invalid as a contract, because it imposes no obligations on Biosol and thus lacks consideration. The stated consideration, namely the installation of the boilers, was past consideration and therefore no consideration.

325. I reject that submission. The only sensible construction of the Maintenance and Woodchip Agreement is that, as R&A was obliged to obtain all the fuel, repairs and maintenance it required from Biosol, so Biosol was obliged to supply all R&A's required fuel, repairs and maintenance. Even if this construction of the agreement were uncertain, the principle would be as stated by Lewison, *The Interpretation of Contracts* (6th edition), at para 7.16:

“Where two interpretations of an instrument are equally plausible, upon one of which the instrument is valid, and upon the other of which it is invalid, the court should lean towards that interpretation which validates the instrument.”

The statement of principle was cited with approval by Jackson J in *Multiplex Constructions (UK) Ltd v Honeywell Control Systems Ltd (No. 2)* [2007] EWHC 447 (TCC), [2007] BLR 195, at [57]-[58]. Lewison, loc. cit., goes on to explain that the principle is based on the proposition that “the parties are unlikely to have intended to agree to something ... legally ineffective” (*per* Lord Hoffmann in *BCCI v Ali* [2002] 1 A.C. 251 at 269).

326. Mr Emmett submits that, if such an approach to construction is capable of imposing any obligations upon Biosol, those obligations are illusory or uncertain. For example, Biosol might avoid any effective obligation under clause 1 of the agreement by failing to advise that maintenance or repairs are required, or by stipulating an unreasonable and prohibitive cost. It is an unattractive feature of the submission that it seeks to negate the efficacy of an agreement, intended by commercial parties to be efficacious, by reference to hypothetical problems that are unlikely to reflect genuine difficulties in operating the agreement in practice. Especially where agreements have been drawn up by commercial parties themselves, without the professional assistance of lawyers, it can be very easy to identify all manner of problems that could arise out of the drafting. The courts are well used to applying principles of construction and implication to ensure that effect is given to agreements which the parties believed to be binding. To find that an agreement cannot be saved is a conclusion of last resort. In agreement with Mr Walker, I see no particular difficulty in addressing matters such as those raised by Mr Emmett by the implication of terms requiring Biosol to give such advice as may reasonably be required and to stipulate reasonable charges. I do not consider that the latter requirement contradicts the express terms of clause 1: the maintenance and repair cannot be priced in advance, it must be priced as it is required; Biosol will specify the price—there is no need to seek the view of a third party; but the price must be reasonable.

Repudiation?

327. Biosol's case is that R&A repudiated the Maintenance and Woodchip Agreement by wrongfully purporting to terminate it for breach by the letter of 24 November 2017. R&A's case is that it was entitled to terminate the contract by accepting Biosol's repudiatory breach in supplying fuel that was unsuitable for the boilers and was not of satisfactory quality.
328. In the light of my previous findings, I consider that R&A did indeed repudiate the Maintenance and Woodchip Agreement by purporting to terminate it on an unjustified ground.

Unlawful restraint of trade?

329. Mr Emmett submits that, if the Maintenance and Woodchip Agreement is a valid contract, nevertheless it is unenforceable by Biosol as constituting an unlawful restraint of trade.
330. The restraints upon R&A identified in the Maintenance and Woodchip Agreement are:
- The requirement that R&A permit Biosol to carry out all necessary maintenance and repair of the boilers for a period of 3 years;
 - The prohibition on R&A from obtaining maintenance and repair services for the boilers from anyone else for a period of 3 years;
 - The requirement that R&A purchase from Biosol all the woodchip necessary to run the boilers for a period of 3 years;
 - The prohibition on buying woodchip or other fuel from anyone but Biosol for a period of 3 years.
331. *Chitty on Contracts* summarises the restraint of trade doctrine thus at para 16-106 (citations omitted):
- “All covenants in restraint of trade are prima facie unenforceable at common law and are enforceable only if they are reasonable with reference to the interest of the parties concerned and of the public. Unless the unreasonable part can be severed by the removal of either part or the whole of the covenant in question, its inclusion renders the covenant or the entire contract unenforceable.”
332. At a high level, there is a two-fold test: first, whether the restraints are in restraint of trade within the meaning of the doctrine—that is, whether the doctrine applies to them at all; second, if they are restraints of trade, whether they are reasonable. The law relating to this test and its ramifications has been considered in a great many cases and need not be set out at length here. I refer, in particular, to *Petrofina (Great Britain) Ltd v Martin* [1966] Ch 146 (Court of Appeal); *Eso Petroleum Co Ltd v Harper's Garage (Stourport) Ltd* [1968] AC 269 (House of Lords); *Panayiotou v Sony Music Entertainment (UK) Ltd* [1994] EMLR 229 (Jonathan Parker J); *Proactive Sports Management Ltd v Rooney* [2011] EWCA Civ 1444, [2012] FSR 16 (Court of Appeal); *One Money Mail Ltd v RIA Financial Services* [2015] EWCA Civ 1084 (Court of Appeal); *CJ Motorsport v Bird* [2019] EWHC 2330 (QB), [2019] IRLR 1080 (Murray J); and, for no other reason than that it is a recent decision in which I have considered the law at some length, *Quantum Advisory Ltd v Quantum Actuarial LLP* [2020] EWHC 1072 (Comm). For the purposes of this judgment I have reminded myself of the law set out in the authorities.
333. In the present case, Mr Walker rightly did not seek to argue that the Maintenance and Woodchip Agreement was outside the scope of the restraint of trade doctrine. However, it is well to bear in mind that the two stages of the test, though analytically

distinct, are not necessarily entirely separate in practice. In *Esso* Lord Wilberforce said at 331:

“Often, in reported cases, we find that instead of segregating two questions, (i) whether the contract is in restraint of trade, (ii) whether, if so, it is 'reasonable', the courts have fused the two by asking whether the contract is in 'undue restraint of trade' or by a compound finding that it is not satisfied that this contract is really in restraint of trade at all but, if it is, it is reasonable. A well-known text-book describes contracts in restraint of trade as those which 'unreasonably restrict' the rights of a person to carry on his trade or profession. There is no need to regret these tendencies: indeed, to do so, when consideration of this subject has passed through such notable minds from Lord Macclesfield onwards, would indicate a failure to understand its nature. The common law has often (if sometimes unconsciously) thrived on ambiguity and it would be mistaken, even if it were possible, to try to crystallise the rules of this, or any, aspect of public policy into neat propositions. The doctrine of restraint of trade is one to be applied to factual situations with a broad and flexible rule of reason.”

And in *Proactive Sports Management* Arden LJ said at [59]:

“[I]n practice, I find that the line between the two stages identified by Jonathan Parker J [in *Panayiotou*] is not clear cut, and that the analysis has to be an iterative one between them. In particular, the matters that might be raised under the second stage might also be relevant to the question whether the doctrine of restraint of trade is engaged at all.”

334. Where the doctrine of restraint of trade applies to the contract, the test of justification is that stated by Lord Macnaghten in *Nordenfelt v Maxim Nordenfelt Guns & Ammunition Co Ltd* [1894] AC 535, 565:

“[R]estraints of trade and interference with individual liberty of action may be justified by the special circumstances of a particular case. It is a sufficient justification, and indeed it is the only justification, if the restriction is reasonable – reasonable. that is, in reference to the interests of the parties concerned and reasonable in reference to the interests of the public, so framed and so guarded as to afford adequate protection to the party in whose favour it is imposed, while at the same time it is in no way injurious to the public.”

335. The relationship between the interests of the parties and the public interest has been viewed differently in various judgments, but the remarks of Lord Pearce in the *Esso Petroleum* case at 324 seem to me to be helpful:

“The onus is on the party asserting the contract to show the reasonableness of the restraint. That rule was laid down in the *Nordenfelt* case and in *Herbert Morris Ltd v Saxelby*. When the court sees its way clearly, no question of onus arises. In a doubtful case where the court does not see its way clearly and the question of onus does arise, there may be a danger in preferring the guidance of a general rule, founded on grounds of public policy many generations ago, to the guidance given by free and competent parties contracting at arm's length in the management of their own affairs. Therefore, when free and competent parties agree and the background provides some commercial justification on both sides for their bargain, and there is no injury to the community, I think that the onus should be easily discharged. Public policy, like other unruly horses, is apt to change its stance, and public policy is the ultimate basis of the courts' reluctance to enforce restraints. Although the decided cases are almost invariably based on unreasonableness between the parties, it is ultimately on the ground of public policy that the court will decline to enforce a restraint as being unreasonable between the parties. And a doctrine based on the general commercial good must always bear in mind the changing face of commerce. There is not, as some cases seem to suggest, a separation between what is reasonable on grounds of public policy and what is reasonable as between the parties. There is one broad question: is it in the interests of the community that this restraint should, as between the parties, be held to be reasonable and enforceable?”

336. In many respects, Mr Walker's submission that the contract in this case is unexceptionable is well made. The agreement is for a finite, relatively short period, it relates to routine matters of the supply of goods and services, and it provides to Biosol reasonable certainty of future orders. I do not think there is anything in Mr Emmett's complaint that the contract left it entirely up to Biosol to assess the need for maintenance and to fix the cost of the work: it is fanciful to suppose that there was a realistic prospect that Biosol would seek to operate the agreement in that manner, but in any event there must clearly be implied requirements that the work is reasonably required and that the price charged will be a reasonable price.
337. However, in my judgment clause 3 of the contract renders the restraints unreasonable. Clause 3 imposes on R&A an obligation to:

“Purchase from [Biosol] all wood chip required to supply a 500kw boiler for the purpose of maintaining its output at maximum capacity for a period of 3 years where applicable.”

That, in my view, is objectionable and unreasonable both in the interests of the parties and in the public interest, because it requires the boilers to be run at maximum capacity regardless of whether or not that is (a) justified or required by the needs of the occupiers or the landlords or (b) consistent with proper considerations of environmental wellbeing.

338. The question then arises whether the remainder of the contract can be saved by the severance of the offending part. Severance can only be achieved if three conditions are satisfied.

339. The first condition is the so-called “blue pencil” test. As Sargant J said in *SV Nevanas & Co v Walker and Foreman* [1914] 1 Ch 413 at 423, severance is only possible in

“cases where the two parts of a covenant are expressed in such a way as to amount to a clear severance by the parties themselves, and as to be substantially equivalent to two separate covenants”.

The dictum was approved in *Attwood v Lamont* [1920] 3 KB 571, where Younger LJ said at 593 that severance was only permissible

“where the covenant is not really a single covenant but in effect a combination of several distinct covenants. In that case and where the severance can be carried out without the addition or alteration of a word, it is permissible. But in that case only.”

The particular value of the condition is that it reminds the court that it is not entitled to rewrite contractual obligations.

340. The second criterion is that “the remaining terms continue to be supported by adequate consideration” (cf. *Tillman v Egon Zehnder Ltd* [2019] UKSC 32, [2020] AC 154, at [86], in the context of post-employment constraints). No issue in this respect arises in the present case.

341. The third condition is that severance must not constitute a major change in the overall effect of the agreement. Severance will not be permitted where the offending restraint is “inextricably interwoven with the other promises in the agreement” (*Kuenigl v Donnersmarck* [1955] 1 QB 515, 538) so that its removal would “alter entirely the scope and intention of the agreement” (*Attwood v Lamont* [1920] 3KB 571, 580). In *Tillman v Egon Zehnder Ltd* the Supreme Court did not disagree with the formulation of the condition as that “the removal of the unenforceable provision does not so change the character of the contract that it becomes ‘not the sort of contract that the parties entered into at all’”, though in the context of post-employment restraints it suggested that “the criterion would better be expressed as being whether removal of the provision would not generate any major change in the overall effect of all the post-employment restraints in the contract” (see [86]).

342. In my judgment, the mandatory covenant in clause 3 cannot be saved by deleting any of its words, such as “for the purposes of maintaining its output at maximum capacity”. That would simply be to rewrite a single covenant and alter its nature; it would not merely be a case of removing one of a number of covenants without affecting the substance of the agreement.

343. However, I consider that all necessary conditions are capable of being satisfied if clause 3 is deleted in its entirety. There is no difficulty over the “blue pencil” test. As for the third condition, of course the deletion of clause 3 will alter the effect of the

agreement. But that is bound to be the case where one covenant is removed as being unreasonable. In my view it is obvious that the removal of clause 3 will not effect any fundamental alteration in the scope and intention of the agreement, so as to turn it into a contract quite different from that which the parties entered. It will simply mean that R&A is bound not to get woodchip or other fuel for the boilers from any other source for the term of the contract.

Damages

344. Biosol claims damages of £661,358, representing the loss of its profit under the Maintenance and Woodchip Agreement over the remainder of its term. The calculation of the figure is set out in schedule POC6 to the particulars of claim:

- i. The main part of the claim is the value of lost sales of woodchip. The calculation assumes that each boiler would require 1,000 tonnes of woodchip each year: a total of 10,000 tonnes. The price at which woodchip would be supplied to R&A is taken as £75 per tonne in year 1 (the actual price), £85 per tonne in year 2, and £95 per tonne in year 3. Allowance is made for the sales actually made in year 1 before termination. The cost to Biosol of the woodchip is deducted; for all three years this is taken as £67.10 per tonne. The resulting loss of profit on woodchip sales is calculated at £49,513.25 in year 1, £179,000 in year 2, and £279,000 in year 3.
- ii. The other substantial part of the claim is “loading resources”. A profit rate of 73% is assumed on lost sales. An allowance is made for sales actually made in year 1. The resulting loss of profit on loading resources is calculated at £11,066.62 in year 1, £58,158 in year 2, and £62,095.50 in year 3.
- iii. The third part of the claim relates to maintenance charges. The total charges and total loss (no allowance is made for year 1, on the basis that no charges were levied before termination) are said to be £10,000 for year 1, £10,500 for year 2, and £11,025 for year 3. The assumed profit rate is 70%. Accordingly the resulting loss of profit on maintenance charges is calculated at £7,000 for year 1, £7,500 for year 2, and £8,025 for year 3.

345. My decision on restraint of trade affects the calculation of the loss of profit on the supply of woodchip.

- 1) The method of calculation of loss of profit in schedule POC6 to the particulars of claim is, in my judgment, incorrect. The damages claimed in paragraphs 15 and 16 of the particulars of claim are for loss of profit after the date of termination of the contract, namely 24 November 2017; and the express plea is that the defendants have refused to permit performance of the Maintenance and Woodchip Agreement since that date. Therefore, taking the date of completion of the installation to be 29 June 2017, the calculation concerns loss of profit for the remaining 2.6 years (roughly 2 years and 7 months) of the 3-year contract.
- 2) The balance of the evidence justifies the conclusion that Biosol made a profit of £7 per tonne on sales of fuel to R&A. I see no good reason for assuming any higher figure.

- 3) The quantity of fuel to which the profit margin is to be applied must be the actual fuel used by R&A, whether that be directly established or a matter of probable inference. I shall be prepared to receive representations in that regard, if the parties cannot agree the matter.
346. The claim for loss of profit in respect of “loading resources” apparently relates to the work involved in loading the boilers with fuel; this, at least, is how the matter was explained at trial. Mr Walker submitted that point 3 of the Agreement “contemplates loading of each boiler, rather than simply delivering fuel” to the Property. I disagree. Mr Walker may be correct in saying that there is nothing to suggest that Biosol would stop loading the boilers. However, in my judgment, on a true construction of the Agreement, R&A would not have been required to permit Biosol to load the fuel into the boilers. R&A could have performed the Maintenance and Woodchip Agreement without paying for these services; therefore they cannot form the basis of a claim for damages for repudiation of the Agreement.
347. The claim for damages for loss of profit on maintenance is justified in principle. On the basis of the evidence at trial, a base cost of £10,000 for year 1 appears reasonable. I would accept in principle an increase of approximately 2.5% per annum each year afterwards: £10,250 for year 2; £10,500 for year 3. The profit margin of 70% was not subject of challenge in the course of evidence. The figure for loss of profit is accordingly: (a) £7,000 x 0.4 = £2,800; plus (b) £7,175 for year 2; plus (c) £7,350 for year 3: a total of £17,325.

Conclusion

348. There will be judgment for Biosol on the claim for:
- 1) £296,814.80 for the unpaid balance in respect of the supply of the boilers;
 - 2) Contractual interest on that amount;
 - 3) £310,602.74 for ancillary services and the supply of woodchip;
 - 4) Interest pursuant to statute on that amount, at a rate and a sum to be determined after further representations if agreement cannot be reached;
 - 5) Damages for repudiation of the Maintenance and Woodchip Agreement, on the basis set out above, together with interest pursuant to statute, as to which I shall receive further representations if agreement cannot be reached.
349. The counterclaim will be dismissed.