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By email to: mark.cockburn@cepa.co.uk

18 January 2018

Dear Sir,

Re: The Independent Public Inquiry into the Non Domestic Renewable Heat Incentive (RHI) Scheme
Provision of a Section 21 Notice requiring the provision of evidence in the form of a written statement

I am writing to you in my capacity as Solicitor to the Independent Public Inquiry into the Non Domestic Renewable Heat Incentive (RHI) Scheme (known as 'the RHI Inquiry') which has been set up under the Inquiries Act 2005 ('the Act').

I know that you will already be familiar with the work of the Inquiry and its Terms of Reference from your previous engagement with the Inquiry.

The Inquiry is grateful for the four witness statements already provided by you¹ and for your attendance before the Inquiry on 30 November and 1 December 2017 to provide oral evidence.

¹ Dated 5 July, 19 October, 28 November, and 21 December 2017.

Having considered your evidence, and that of a number of witnesses who provided oral evidence to the Inquiry after 1 December 2017, the Inquiry has identified a small number of further issues in respect of which it wishes to ask you questions.

In the circumstances, please find enclosed with this letter a further Section 21 Notice requiring you to provide evidence to the RHI Inquiry Panel in the form of a further written statement addressing the matters identified in the Schedule to the Section 21 Notice.

As the text of the Section 21 Notice explains, you are required by law to comply with it.

The Schedule to the enclosed Section 21 Notice provides further detail as to the matters which should be covered in the written evidence which is required from you.

As you are aware, receipt of this correspondence and its enclosures places you under a duty of confidentiality to the RHI Inquiry in respect of them. You may share the correspondence and the enclosed Notice with your legal representative(s), but neither you nor they may show, communicate the contents of, nor provide this correspondence or the Notice to any other person or organisation without the express permission of the RHI Inquiry. Any breach of this duty of confidentiality is actionable at the suit of the Inquiry Chairman. In addition, a similar restriction is contained in Restriction Order No 2 of 2017 made by the Inquiry Chairman and available on the RHI Inquiry website.

You will also find attached to the Section 21 Notice a Guidance Note explaining the nature of a Section 21 Notice and the procedures that the RHI Inquiry has adopted in relation to such a notice. In particular, you are asked to provide your evidence in the form of the template witness statement which is also enclosed with this correspondence.

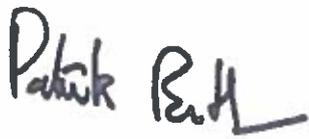
Given the tight time-frame within which the RHI Inquiry must operate, the Chairman of the Inquiry would be grateful if you would comply with the requirements of the

Section 21 Notice as soon as possible and, in any event, by the date set out for compliance in the Notice itself.

Finally, I would be grateful if you could acknowledge receipt of this correspondence and the enclosed notice by email to Patrick.Butler@rhiinquiry.org.

Please do not hesitate to contact me to discuss any matter arising.

Yours faithfully

A handwritten signature in black ink that reads "Patrick Butler". The signature is written in a cursive style with a long horizontal stroke at the end of the name.

Patrick Butler

Solicitor to the RHI Inquiry

0289040892

SCHEDULE
[No 5 of 2018]

The oral evidence of Fiona Hepper

1. The questions at A. to D. below arise out of the oral evidence of Fiona Hepper on 7 and 19 December 2017 and relate to certain differences between CEPA's draft final report of 31 May 2011 and CEPA's final report of 28 June 2011, the timing of the CEPA model runs or other work which were the source of those differences, and the communications (if any) with DETI officials about those differences prior to 28 June 2011. The most relevant parts of Mrs Hepper's oral evidence in this regard can be summarised as follows:

a. 7 December 2017

- i. In the context of a written submission provided to Minister Foster on 8 June 2011 (on foot of the draft final CEPA report of 31 May 2011) and a subsequent briefing with the Minister on or about 14 June 2011, Mrs Hepper suggested that the briefing was informed by contact that had taken place with CEPA after 31 May 2011 (but before the briefing on 14 June) as a result of which DETI officials became aware of the changes that were going to be made in the final CEPA report (see, in this particular regard, **TRA-1864** at lines 16 to 18);
- ii. Mrs Hepper further suggested that the relevant contact with CEPA may have occurred prior to the finalisation of the written submission to the Minister on 8 June (see, in particular, **TRA-1865** at lines 21 to 23) and that she thought that the contact was between Peter Hutchinson of DETI and Iain Morrow of CEPA (**TRA-1866** at lines 12 to 15);
- iii. Mrs Hepper was unclear as to precisely the detail that was provided during the relevant contact with CEPA (see, in this

particular regard, **TRA-1882** and **TRA-1883** from line 12 on the former to line 5 on the latter; see also **TRA-1894** to **TRA-1896**);

b. 19 December 2017

- i. Mrs Hepper, when asked about Peter Hutchinson's evidence that, in terms, engagement with CEPA occurred on or after 15 June 2011², maintained that DETI had received some form of communication or reassurance from CEPA prior to 8 June 2011 that the balance as between RHI and Challenge Fund was not going to change as between draft final report and final report (see, in this particular regard, **TRA-2224** and **TRA-2230 to 2234**);

It is clear that there are a number of significant differences between the 31 May 2011 draft final report and the 28 June 2011 final report including the following:

- I. the projected level of renewable heat delivered by each of the challenge fund and NI RHI Alt (no solar thermal) in the funding 2 scenario rose from below 10% (**DFE-187760** Table 3) to above 10% (**WIT-600** Table 1);
- II. the lifetime subsidy spend for a challenge fund (funding 2 scenario) changed from £311 million (**DFE-187828** Table 7.13) to £161 million (**WIT-673** Table 7.13);
- III. the lifetime subsidy spend for a NI RHI Alt (no solar thermal) (funding 2 scenario) changed from £227 million (**DFE-187828** Table 7.13) to £334 million (**WIT-673** Table 7.13);
- IV. the lifetime cost of a challenge fund (funding 2 scenario) changed from £351 million (**DFE-187844** Table 10.2) to £212 million (**WIT-688** Table 10.2);

² TRA-1997 to 1999;

- V. the lifetime cost of a NI RHI Alt (no solar thermal) (funding 2 scenario) changed from £257 million (**DFE-187844** Table 10.2) to £405 million (**WIT-688** Table 10.2);
- VI. the net present value of a challenge fund (funding 2 scenario) changed from -£114 million (**DFE-187844** Table 10.3) to -£24 million (**WIT-688** Table 10.3);
- VII. the net present value of a NI RHI Alt (no solar thermal) (funding 2 scenario) changed from -£140 million (**DFE-187844** Table 10.3) to -£242 million (**WIT-688** Table 10.3);
- VIII. the net present value of a challenge fund (funding 3 scenario) changed from a negative figure (-£23 million) to a positive figure (£50 million).

Against this backdrop, CEPA is now asked to answer the following questions:

- A. summarise all of the communications that occurred between CEPA and DETI in respect of the final report and its contents between 31 May and 28 June 2011;
- B. clarify whether (and, if so, precisely when, through whom, to whom, and in what form) –
 - i. on or before 8 June 2011; and/or
 - ii. on or before 14 June 2011;

CEPA advised DETI that the balance between RHI and challenge fund would not change, or would not change significantly, as between the draft final report of 31 May 2011 and the final report;

- C. confirm that there were, in fact, significant changes in both the absolute and relative costs of the challenge fund and NI RHI Alt (no solar thermal) options,

particularly in respect of the funding 2 scenario, as between the 31 May 2011 draft final report and 28 June 2011 final report;

- D. clarify when precisely CEPA undertook the work (including, in particular, any model runs) that led to each of the significant changes outlined at paragraphs I. to VIII. above and state when each of the said changes was first communicated to DETI (including details of the means of each communication and the persons through whom, and to whom, each such communication was made).

The oral evidence of Peter Hutchinson and Fiona Hepper

2. During the oral evidence of Fiona Hepper on 7 December 2017 (TRA-1919 line 25 to TRA-1922 line 22) and during the oral evidence of Peter Hutchinson on 18 December 2017 (TRA-2089 to TRA-2091 inclusive) it was suggested that, following receipt of the CEPA addendum report of 16 February 2012, DETI reverted to CEPA to check that tiering was not required for any tariff (tiering having been raised in the said addendum report as appropriate for the domestic GSHP tariff in the absence of deeming – see DFE-579, row 8, footnote 6, in this regard). Please address the following questions arising from this:
- a. Confirm whether DETI did in fact revert to CEPA in respect of the addendum report at any time to check whether tiering was required in respect of any tariff other than the domestic GSHP;
 - b. If DETI did so revert:
 - i. provide full details of when, through whom, to whom, and in what precise form DETI communicated with CEPA;
 - ii. provide full details of the work CEPA undertook in response to DETI's communication;

- iii. provide full details of any response from CEPA to DETI including details of the date and form of same and the relevant CEPA and DETI personnel.

The oral evidence of Shane Murphy

3. During his oral evidence on 20 December 2017, Shane Murphy suggested (at **TRA-2432** line 6 to **TRA-2434** line 8) that CEPA may have made an error in respect of the discount rate used in, *inter alia*, the cost calculations regarding the different incentive options such that the cost difference between the challenge fund and the NI RHI options may not have been accurately stated in CEPA's final report of 28 June 2011. Please consider Mr Murphy's evidence and address the following questions:
 - a. Clarify the discount rate used by CEPA in each of its calculations;
 - b. Clarify whether CEPA accepts any of Mr Murphy's criticism and:
 - i. If CEPA does, clarify what criticism CEPA accepts and set out what figures ought properly to have been included in the final report in place of any figures that CEPA now believes to be erroneous;
 - ii. If CEPA does not, set out the reason(s) for this;
 - c. If it is the case that CEPA requires more information from Mr Murphy before answering (or fully answering) the questions posed at b. above, please set out the precise class(es) of information so required.
4. During his oral evidence on the same date (**TRA-2520** line 4 to **TRA-2524** line 21), Mr Murphy also suggested that CEPA may have made an error in the addendum report of 16 February 2012 where, in Annex A at Tables A.10 to A.12 (**DFE-602 to DFE-603**), they failed to recommend a tiered tariff in respect of the small commercial GSHP even though the fuel cost of 12.14p/kWh, when

adjusted to take account of efficiency of 360%, was less than the recommended tariff level (3.33p/kWh vs. 4.3p/kWh). Please consider Mr Murphy's evidence and address the following questions:

- a. Clarify whether CEPA accepts any of Mr Murphy's criticism and:
 - i. If CEPA does, clarify what criticism CEPA accepts and set out what the addendum report ought properly to have recommended in respect of the relevant GSHP;
 - ii. If CEPA does not, set out the reason(s) for this;
 - b. If it is the case that CEPA requires more information from Mr Murphy before answering (or fully answering) the questions posed at a. above, please set out the precise class(es) of information so required.
5. Aside from the two issues raised by Mr Murphy in his evidence, clarify:
- a. whether any tariff specified in Annex A of the 16 February 2012 addendum report (aside from the small commercial biomass tariff and, potentially, the small commercial GSHP) ought to have been the subject of a recommendation in respect of tiering (and, if applicable, please provide full details of same);
 - b. whether CEPA is aware of any other errors or omissions in the final report or addendum report of which CEPA has not previously advised the Inquiry (and please provide full details of same, including details of when and how they first came to CEPA's attention).

CEPA's models and the RHI scheme budget

6. Please clarify the following in respect of CEPA's modelling work for each of the 2011 final report and 2012 addendum report:

- a. whether CEPA calculated budget usage only up to 2020 and, if that is the case, the reason(s) for this;
- b. whether CEPA incorporated any measure of inflation in their models and:
 - i. if CEPA did do so, please provide full details of same;
 - ii. if CEPA did not do so, please provide an explanation;
- c. whether CEPA's models assumed that 2020 payment levels would continue unchanged for the following 20 years and:
 - i. if they did do so, the reasons for this including, in particular, an explanation of whether (and, if so, how) CEPA took any or adequate account of the fact that payments in 2021 might be greater than those made in 2020 by reason of payments made to applicants who entered the RHI Scheme part of the way through the 2020 year;
 - ii. if they did not do so, the reasons for this, the anticipated differences between payment levels in 2020 and payment levels in any of the following 20 years, and how (if at all) these differences were taken into account by CEPA.
- d. clarify whether CEPA now believes they made any errors or omissions in respect of how they dealt with the RHI budget in their modelling work (including details of any such errors or omissions as well as when and how CEPA first came to be aware of same).

An additional net monetised present value calculation

7. In the final report of 28 June 2011, CEPA presented the net monetised present value of each option in Table 10.3. In respect of the NI RHI Alt option in the funding 2 scenario the figure of -£242 million was derived by subtracting a

projected total monetised cost of £405 million (Table 10.2) from a projected total monetised benefit of £163 million (Table 10.1). The said cost figure of £405 million included some £334 million in subsidy spending (Table 7.13). In the addendum report of 16 February 2012 CEPA indicated, at Table 3, that the NI RHI Alt subsidy cost would rise from £334 million to £445 million. However, no new net monetised present value figure (to replace the 2011 figure of -£242 million) is included in the 2012 addendum report in respect of the NI RHI Alt option. The Inquiry now requests that CEPA provide such a figure, using the scheme cost information contained within the 2012 addendum report.

INQUIRY INTO THE RENEWABLE HEAT INCENTIVE SCHEME**RHI REF: Notice 5 of 2018****DATE: 22 February 2018**

Witness Statement of: Mark Cockburn

I, Mark Andrew Cockburn, Director of Cambridge Economic Policy Associates Limited (CEPA), will say as follows: -

The content of this statement is prepared by CEPA in response to two notices issued upon CEPA by the RHI Inquiry on 18 January 2018 (Notice No 5 of 2018) and subsequently on 5 February 2018 (Notice No 9 of 2018) under section 21 of the Inquiries Act 2005. Upon the issuance of the second of these Notices, CEPA was asked to compile a single statement responding to both notices and was originally instructed to supply such on or before 15 February 2018.

In order to accommodate for a period of leave, CEPA applied for and was granted for the purposes of Section 21(4) of the Inquiries Act 2005 an extension to 23 February 2018 in order to comply with the requirements of both notices. However, subsequently, by email from the Solicitor to the Inquiry, CEPA was asked to supply its answers to questions 1, 2 and 7 of Notice No 5 and 1, 2 and 3 of Notice No 9 prior to the deadline.

Noting the points above and replacing CEPA's statement provided on 20 February 2018, which was submitted in draft form in order to be of assistance to the Inquiry, CEPA provides its responses to the questions 1-7 of Notice 5 of 2018 and 1, 2 and 3 of Notice 9 of 2018 below.

[The oral evidence of Fiona Hepper](#)

1. The questions at A. to D. below arise out of the oral evidence of Fiona Hepper on 7 and 19 December 2017 and relate to certain differences between CEPA's draft final report of 31 May 2011 and CEPA's final report of 28 June 2011, the timing of the CEPA model runs or other work which were the source of those

differences, and the communications (if any) with DETI officials about those differences prior to 28 June 2011. The most relevant parts of Mrs Hepper's oral evidence in this regard can be summarised as follows:

a. 7 December 2017

i. In the context of a written submission provided to Minister Foster on 8 June 2011 (on foot of the draft final CEPA report of 31 May 2011) and a subsequent briefing with the Minister on or about 14 June 2011, Mrs Hepper suggested that the briefing was informed by contact that had taken place with CEPA after 31 May 2011 (but before the briefing on 14 June) as a result of which DETI officials became aware of the changes that were going to be made in the final CEPA report (see, in this particular regard, TRA-1864 at lines 16 to 18);

ii. Mrs Hepper further suggested that the relevant contact with CEPA may have occurred prior to the finalisation of the written submission to the Minister on 8 June (see, in particular, TRA-1865 at lines 21 to 23) and that she thought that the contact was between Peter Hutchinson of DETI and Iain Morrow of CEPA (TRA-1866 at lines 12 to 15);

iii. Mrs Hepper was unclear as to precisely the detail that was provided during the relevant contact with CEPA (see, in this particular regard, TRA-1882 and TRA-1883 from line 12 on the former to line 5 on the latter; see also TRA-1894 to TRA-1896);

b. 19 December 2017

i. *Mrs Hepper, when asked about Peter Hutchinson's evidence that, in terms, engagement with CEPA occurred on or after 15 June 2011¹, maintained that DETI had received some form, of communication or reassurance from CEPA prior to 8 June 2011 that the balance as between RHI and Challenge Fund was not going to change as between draft final report and final report (see, in this particular regard, TRA-2224 and TRA-2230 to 2234);*

¹ TRA -1997 to 1999;



It is clear that there are a number of significant differences between the 31 May 2011 draft final report and the 28 June 2011 final report including the following:

I. the projected level of renewable heat delivered by each of the challenge fund and NI RHI Alt (no solar thermal) in the funding 2 scenario rose from below 10% (DFE-187760 Table 3) to above 10% (WIT-600 Table 1);

II. the lifetime subsidy spend for a challenge fund (funding 2 scenario) changed from £311 million (DFE-187828 Table 7.13) to £161 million (WIT-673 Table 7.13);

III. the lifetime subsidy spend for a NI RHI Alt (no solar thermal) (funding 2 scenario) changed from £227 million (DFE-187828 Table 7.13) to £334 million (WIT-673 Table 7.13);

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VI. the net present value of a challenge fund (funding 2 scenario) changed from -£114 million (DFE-187844 Table 10.3) to -£24 million (WIT-688 Table 10.3);

VII. the net present value of a NI RHI Alt (no solar thermal) (funding 2 scenario) changed from -£140 million (DFE-187844 Table 10.3) to -£242 million (WIT-688 Table 10.3);

VIII. the net present value of a challenge fund (funding 3 scenario) changed from a negative figure (-£23 million) to a positive figure (£50 million).

Against this backdrop, CEPA is now asked to answer the following questions:

A. summarise all of the communications that occurred between CEPA and DETI in respect of the final report and its contents between 31 May and 28 June 2011;

We have identified 32 communications between CEPA and DETI between 31 May and 28 June 2011. In summary, the communications show that CEPA provided DETI with a draft report on 31 May 2011 requesting comments. DETI subsequently provided their feedback by telephone on 2 June and then in writing on 3 and 7 June.

On 8 June, CEPA provided DETI with the draft model and a guide to using it. Two teleconferences were then arranged, the first, a model training session, which was held on 14 June and the second, to discuss feedback about the draft report, which took place on 21 June.

Following the teleconference on 21 June, some further points were raised and addressed by email and a call was held on 27 June to finalise the remaining issues. The final draft of the report was initially sent to DETI on 28 June 2011.²

The communications we have identified are as follows:

1. Tuesday, 31 May 2011 - Email from: Iain Morrow (IM) to: Peter Hutchinson (PH)
Cc: Mark Cockburn (MC), Paget Fulcher (PF), Patrick Taylor (PT), Mahmoud Abu-ebid (MA), Oliver Edberg (OE), Jeremy Stambaugh (JS) – Provision of draft report (“DETI RHI draft final 31052011.pdf”), requesting comments, raising a query about the inclusion of one funding scenario and suggesting a discussion of that point and next steps later in the week.
2. Wednesday, 1 June 2011 - Email from: PH to: IM – Confirming that he would provide comments and asking when the model could be provided.
3. Thursday, 2 June 2011 Call between: IM & PH – Feedback on draft report and next steps.
4. Friday, 3 June 2011 - Email from: Samuel Connolly (SC) to PH – Comments on

² We note that a version of the final report with updates to the table of tariff bands on p68 and the Executive Summary was provided to DETI in an email from IM to PH on 4 July 2011.



draft report [DFE-383663].

5. Sunday, 5 June 2011 - Email from: IM to: PH Cc: PF – IM out of office, so send comments to PF.

IM, CEPA's main point of contact for DETI was on annual leave for two weeks starting 6 June 2011.

6. Tuesday, 7 June 2011 – Email from: PH to: IM Cc: MC, PF, PT, MA, OE, JS, Joanne McCutcheon JMC) SC & Susan Stewart (SS) – Providing comments on draft report.
7. Wednesday, 8 June 2011 - Email from: PF to: PH Cc: MC, PT, JMC, SC, SS – Providing draft model and guide.
8. Thursday, 9 June 2011 - Email from: PH to: PF – Confirming receipt of model and guide and committing to check availability for a video/teleconference.
9. Thursday, 9 June 2011 - Email from: PH to: PF Cc: JMC, SC, SS – Taking up offer for a model training session.
10. Thursday, 9 June 2011 - Email from: PH to: PF Cc: JMC, SC, SS – Suggesting teleconference for model training session on 14 June 2011.
11. Friday, 10 June 2011 - Email from: PF to: PH Cc: JMC, SC, SS, IM, MC – Confirming that the model training session on 14 June 2011 could be done by teleconference and suggesting a teleconference to discuss comments on the draft report on 20 June 2011 following IM's return from annual leave.
12. Friday, 10 June 2011 - Email from: PH to: PF Cc: JMC, SC, SS, IM, MC – Suggesting possible timing of teleconference for discussion of the draft report on Monday, 20 June 2011.
13. Tuesday, 14 June 2011 - Email from: PF to: PH Cc: IM – Asking for confirmation of timing for teleconference to discuss draft report comments on Monday, 20 June 2011.
14. Tuesday, 14 June 2011 - Email from: PH to: PF Cc: IM – Confirming timing of teleconference to discuss draft report comments on 20 June 2011.
15. Tuesday, 14 June 2011 - Email from: PF to: PH Cc: JMC, SC, SS, IM – Providing an updated model for the training session.
16. Tuesday, 14 June 2011 - Email from: PH to: PF – Confirming that updated model could be used in the model training session.



17. Tuesday, 14 June 2011 - Model training teleconference with PF and DETI staff (we understand, but cannot confirm for definite, that PH and SC were in attendance).
18. Tuesday, 14 June 2011 - Email from: PH to: PF CC: IM – Confirming teleconference on 20 June.
19. Wednesday, 15 June 2011 – Possible call between PF and PH - to arrange rescheduled teleconference.
20. Wednesday, 15 June 2011 - Email from: PF to: PH Cc: MC, IM, MA, OE, JS, JMC, SC, SS - regarding scheduling a teleconference for Tuesday, 21 June 2011 and with an attachment setting out draft responses to 56 comments received by email. The email also refers to a telephone conversation between PF and PH during which timing of the teleconference was discussed.
21. Thursday, 16 June 2011 - Email from: PH to: PF – Confirming teleconference for Tues, 21 June 2011.
22. Tuesday, 21 June 2011 - Teleconference between DETI, CEPA, and AEA regarding draft final report comments (expect attendance to have at least included PH, IM, PF, MA & OE).
23. Thursday, 23 June 2011 - Email from: IM to: PH – Setting out some anticipated changes to recommendations for domestic consumers, noting some additional value for money analysis and asking for input on funding scenarios.
24. Thursday, 23 June 2011 - Email from: PH to: IM Cc: JMC. SC – Responding to the points noted in IM's email noted above and requesting the inclusion of a full list of technologies supported in the final document.
25. Thursday, 23 June 2011 - Email from: IM to: PH Cc: JMC, SC – Responding to IM's email noted above regarding premium payments for domestic consumers and report wording on funding.
26. Friday, 24 June 2011 - Email from: PH to: IM Cc: JMC, SC – Agreeing report wording on funding and discussing analysis of premium payments.
27. Friday, 24 June 2011 - Email from: SC to: IM, PH Cc: JMC – Agreeing approach to value for money analysis proposed in IM's email the day before and noting further points that could be referred to.
28. Friday, 24 June 2011 - Email from: IM to: PH Cc: MA, MC, PF, OE – suggesting conference call on Monday re: RHI.
29. Friday, 24 June 2011 - Email from: PH to: IM Cc: MA, MC, PF, OE – Confirming



his availability for a conference call on Monday re: RHI.

30. Monday, 27 June 2011: Teleconference meeting invitation sent from: IM to: PF, MA, OE PH, MC.

31. Monday, 27 June 2011 - Teleconference "NI RHI - final issues" hosted by IM with invitees from DETI (PH), AEA (MA and OE) and CEPA (MC and PF).

32. Tuesday, 28 June 2011 - Email from: IM to: PH Cc: MA, MC, OE, JS, PF, PT, SC – Delivery of final report ("DETI RHI Final report.pdf").

We believe the correspondence mentioned above has all previously been disclosed to the Inquiry and to the best of our knowledge represents the full set of communications between CEPA and DETI between 31 May and 28 June 2011.

B. clarify whether (and if so, precisely when, through whom, to whom, and in what form)-

i. on or before 8 June 2011; and/or

ii. on or before 14 June 2011;

CEPA advised DETI that the balance between RHI and challenge fund would not change, or would not change significantly, as between the draft final report of 31 May 2011 and the final report;

CEPA is not aware of our communicating anything to DETI on or before 14 June 2011, that the balance between RHI and challenge fund would not change, or would not change significantly, as between the draft final report of 31 May 2011 and the final report.

As set out in response to Question 1A, DETI provided comments on the draft final report on 7 June 2011, some of which would have had potential to have significant impacts on the modelling: for example, a request to revise the tariffs to hit the 10% renewable heat target. As also set out in response to Question 1A, an initial written response to the comments from CEPA to DETI was not provided until 15 June 2011 and a teleconference to discuss our responses to the comments was not held until 21

June 2011, once Iain Morrow (the CEPA Project Manager) had returned from two weeks of annual leave. While we may not have had any reason to expect there to be a change in results one way or another prior to 15 June 2011, we consider it highly unlikely that we would have advised that the balance between options would not change without having first resolved the comments raised by DETI and then being able to complete model runs, something that would not have been possible until after 20 June 2011.

C. confirm that there were, in fact, significant changes in both the absolute and relative costs of the challenge fund and NI RHI Alt (no solar thermal) options, particularly in respect of the funding 2 scenario, as between the 31 May 2011 draft final report and 28 June 2011 final report;

By the costs of the abovementioned options, we assume that the Inquiry is referring to the values contained in Table 10.2 of the 31st May 2011 Draft Final and the 28th June 2011 Final reports titled *“Total monetised cost of each option, in £m, 2010 prices, compared to “do nothing.”*”

It is important to note that while the Draft Final Report included both an “NI RHI – Alt” option and a “NI RHI – Alt (no solar thermal)” option, the Final Report *only* contained the “NI RHI – Alt” option and as such the specific comparison requested is not comparing like with like. The following table presents the values shown for the “Challenge Fund” and “NI RHI - Alt” options in each of those tables.

Table: Total monetised cost of each option, in £m, 2010 prices, compared to “do nothing” (Funding Option 2 only)

	Draft Final Report	Final Report
Challenge fund	351	212
NI RHI – Alt	602	405
NI RHI – Alt (no solar thermal)	257	-

As can be seen in the table above, we can confirm that there were significant changes in the monetised cost values between the Draft Final Report and the Final Report for

both Challenge and the NI RHI-Alt options.

Although the relative cost of the “Challenge fund” and “NI RHI – Alt” options did change between the two reports, commenting on the significance of difference in the relative cost of the options is not as straightforward as the question posed suggests:

- As stated, the Final Report did not include results for the “NI RHI – Alt (no solar thermal)” option; only the “NI RHI – Alt” option was included in both reports.
- The Challenge Fund option was 42% less costly than the “NI RHI – Alt” option in the Draft Final Report but 48% less costly in the Final Report, which is a change, but we would not consider that it was a major change.
- The “NI RHI – Alt” option had some changes between the two reports: the tariff for solar thermal was reduced to a level where no solar thermal was taken up,³ making it more like its “no solar thermal” variant but there were also other changes such as the introduction of a 3.3p/kWh small ASHP tariff, which was not previously included in the “no solar thermal” variant.

As we are not strictly comparing like with like, it is difficult to provide a comment on the relative change in the cost of the NI RHI Alt (no solar thermal) option relative to the Challenge Fund option.

In addition to the above, we would like to highlight that given differences in the levels of renewable heat generated under the different options, the comparison of costs alone is unlikely to be the best metric to compare the options. Table 7.4 of both reports, for example, shows the average cost in £ per kWh of additional renewable heat in 2020”), which would be a better metric. As shown in the following table, while there were significant changes between the two reports, the challenge fund had a lower cost per kWh than the “NI RHI – Alt” options in both reports.

Table: Average cost in £ per kWh of additional renewable heat deployed by 2020 (Funding Option 2 only)

³ Table 7.7 on p76 of the 2011 report “Technologies in use in 2020 in funding scenario 2 with NI RHI (alternative methodology) rates” shows 0GWh for solar thermal.

	Draft Final Report	Final Report
Challenge fund	0.47	0.24
NI RHI – Alt	1.00	0.57
NI RHI – Alt (no solar thermal)	0.50	-

D. clarify when precisely CEPA undertook the work (including, in particular, any model runs) that led to each of the significant changes outlined at paragraphs I. to VIII. above and state when each of the said changes was first communicated to DETI (including details of the means of each communication and the persons through whom, and to whom, each such communication was made).

Subsequent to the submission of the draft report on 31st May 2011, a series of changes were made to the model before the submission of the final report on 28th June 2011, which led to the changes in the values outlined in paragraphs I to VIII above.

By examining a series of files available on emails (which we believe to already have been disclosed to the Inquiry) and using them to produce new runs of the scenarios in question (even where there is no record of having completed such runs at the time), it is possible to identify by what point the relevant changes took place.

The six models we have used for this exercise are as follows:

1. “DETI model 070611.xlsm”, sent by PF to IM on 7 June 2011;
2. “DETI RHITM model 080611.xlsm”, sent by PF to PH on 8 June 2011;
3. “DETI RHITM model 090611 - new approach.xlsm”, sent by PF to IM on 9 June 2011;
4. “DETI RHITM model 140611 - for training.xlsm”, sent by PF to PH on 14 June 2011;
5. “DETI RHITM model 230611 - FULLY COMPLETE RUNS.xlsm”, sent by PF to IM on 24 June 2011; and
6. “CEP-51346 - 2017-01-25 - 2011 model.xlsm”, the final 2011 model.

We provide responses regarding paragraphs I. to VIII. In turn below.

I. The projected level of renewable heat delivered by each of the challenge fund

and NI RHI Alt (no solar thermal) in the funding 2 scenario rose from below 10% (DFE-187760 Table 3) to above 10% (WIT-600 Table 1)

The potential for renewable heat projections to rise to above ten percent was driven by the inclusion of the Invista industrial site in the baseline, a major user of heat that was assumed to represent approximately 2.5% of Northern Ireland's heat demand in 2020.

The functionality to include, or not include, the Invista site in the baseline, was introduced to the model after the submission of the Draft Final Report and can be seen in a version of the model from 9th June 2011 "DETI RHITM model 090611 - new approach.xlsm".

The first record we have found of the increase in renewable heat being communicated to DETI is in the CEPA document "DETI comments draft response 150611.docx" provided to Peter Hutchinson as an attachment to an email from Paget Fulcher (Cc MC, IM, MA, OE, JS, JMC, SC, SS) at 14:15 on 15 June 2011. In response to the DETI comment on the draft final report "As no options deliver 10%, as above, can tariff levels be developed that would deliver 10%?", CEPA responded that "We have subsequently modified the tariff levels for domestic ASHPs, and included the switching of the Invista plant to biomass. In this scenario, the 10% target is achieved for some options."

II. The lifetime subsidy spend for a challenge fund (funding 2 scenario) changed from £311 million (DFE-187828 Table 7.13) to £161 million (WIT-673 Table 7.13)

The reduction in the lifetime subsidy spend for the challenge fund in funding scenario 2 was driven by the rectification of an issue with the model that was identified after the submission of the Draft Final report: biomass chip installations had been picking up biomass pellet prices and as such inflating the level of support they would require in the challenge fund option. This issue was rectified in a model from 7th June 2011 ("DETI model 070611.xlsm"), from which point onwards the option produces a lifetime subsidy spend of

approximately £160m (2010 prices).

Versions of the model with this issue rectified were provided to DETI on 8th June 2011 (“DETI RHITM model 080611.xlsm”) and 14th June 2011 (“DETI RHITM model 140611 - for training.xlsm”) but they were not populated with the results of model runs (though a model guide “RHITM model guide 020611.docx” with instructions for how to complete model runs was provided on 8 June 2011). With the passage of time, we have no recollection of having specifically communicated this change in lifetime subsidy spend to DETI before the submission of the Final Report on Tuesday 28th June 2011.

III. The lifetime subsidy spend for a NI RHI Alt (no solar thermal) (funding 2 scenario) changed from £227 million (DFE-187828 Table 7.13) to £334 million (WIT-673 Table 7.13)

The lifetime subsidy spend for the NI RHI Alt (no solar thermal) option in funding scenario 2 appears to have occurred once a tariff for small ASHPs was added to the NI RHI Alt options. This update can be seen in a model from 9th June 2011 (“DETI RHITM model 090611 - new approach.xlsm”). From that point onwards, the model produces results between £328m and £342m (2010 prices) for the NI RHI Alt option with either no or low solar thermal support (that is “NI RHI Alt (no solar)” and then “NI RHI Alt” once the solar thermal tariff was set to 8.5p/kWh (2010 prices), which can be seen in a model from 23 June 2011 (“DETI RHITM model 230611 - FULLY COMPLETE RUNS.xlsm”).

A version of the model with the addition of the small ASHP tariff was provided to DETI on 14th June 2011 (“DETI RHITM model 140611 - for training.xlsm”) but it was not populated with the results of model runs. However, with the passage of time we have no recollection of having specifically communicated this change in lifetime subsidy spend to DETI before the submission of the Final Report on Tuesday 28 June 2011.

IV. The lifetime cost of a challenge fund (funding 2 scenario) changed from £351 million (DFE-187844 Table 10.2) to £212 million (WIT-688 Table 10.2)



The lifetime cost of the challenge fund under funding scenario 2 changed for the same main reasons and with the same timing as for its lifetime subsidy spend. As such, please see the response on point II above. The magnitude of the change was different to the change in subsidy spend as the monetised cost estimates also included the cost of scheme administration, metering and administration costs for those installing renewable heat.

With the passage of time we have no recollection of having specifically communicated the change in this value to DETI before the submission of the Final Report on Tuesday 28 June 2011.

V. The lifetime cost of a NI RHI Alt (no solar thermal) (funding 2 scenario) changed from £257 million (DFE-187844 Table 10.2) to £405 million (WIT-688 Table 10.2)

The lifetime cost of the NI RHI Alt (no solar thermal) option under funding scenario 2 changed for the same main reasons and with the same timing as for its lifetime subsidy spend. As such, please see the response on point III above. The magnitude of the change was different to the change in subsidy spend as it included the value of carbon savings as well as the cost of scheme administration, metering and administration costs for those installing renewable heat.

With the passage of time we have no recollection of having specifically communicated the change in this value to DETI before the submission of the Final Report on Tuesday 28 June 2011.

VI. The net present value of a challenge fund (funding 2 scenario) changed from -£114 million (DFE-187844 Table 10.3) to -£24 million (WIT-688 Table 10.3)

The net present value of the challenge fund under funding scenario 2 changed for the same main reasons and with the same timing as for its lifetime subsidy

spend. As such, please see the response on point II above. The magnitude of the change was different to the change in subsidy spend as it included the value of carbon savings as well as the cost of scheme administration, metering and administration costs for those installing renewable heat.

With the passage of time we have no recollection of having specifically communicated the change in this value to DETI before the submission of the Final Report on Tuesday 28 June 2011.

VII. The net present value of a NI RHI Alt (no solar thermal) (funding 2 scenario) changed from -£140 million (DFE-187844 Table 10.3) to -£242 million (WIT-688 Table 10.3);

The lifetime cost of the NI RHI Alt (no solar thermal) option under funding scenario 2 changed for the same main reasons and with the same timing as for its lifetime subsidy spend. As such, please see the response on point III above. The magnitude of the change in value was different to the change in subsidy spend as it also included the value of carbon savings as well as the cost of scheme administration, metering and administration costs for those installing renewable heat.

With the passage of time we have no recollection of having specifically communicated the change in this value to DETI before the submission of the Final Report on Tuesday 28 June 2011.

VIII. The net present value of a challenge fund (funding 3 scenario) changed from a negative figure (-£23 million) to a positive figure (£50 million).

The net present value of the challenge fund under funding scenario 3 changed from a negative to a positive figure for the same main reasons and with the same timing as for its lifetime subsidy spend under funding scenario 2. See response on point II above. With the passage of time we have no recollection of having specifically communicated the change in this from a negative value to a positive value to DETI before the submission of the Final Report on



Tuesday 28 June 2011.

The oral evidence of Peter Hutchinson and Fiona Hepper

2. During the oral evidence of Fiona Hepper on 7 December 2017 (TRA-1919 line 25 to TRA-1922 line 22) and during the oral evidence of Peter Hutchinson on 18 December 2017 (TRA-2089 to TRA-2091 inclusive) it was suggested that, following receipt of the CEPA addendum report of 16 February 2012, DETI reverted to CEPA to check that tiering was not required for any tariff (tiering having been raised in the said addendum report as appropriate for the domestic GSHP tariff in the absence of deeming - see DFE-579, row 8, footnote 6, in this regard). Please address the following questions arising from this:

a. Confirm whether DETI did in fact revert to CEPA in respect of the addendum report at any time to check whether tiering was required in respect of any tariff other than the domestic GSHP;

Prior to 16 February 2012, we have no *written* evidence that suggests NI biomass tiering was discussed, but it remains possible that at some point this may have been discussed verbally between Peter Hutchinson and Iain Morrow (but any such discussion would have taken place at a point when the modelled tariff did not include an uplift for on-going hassle costs, such that in the model the level of the would not have yet reached the point at which tiering would be needed).

The final version of the Addendum was delivered, first in the morning of February 16th, after which DETI came back with some minor comments and then in the afternoon, once these comments had been addressed. One of these comments was to move a bullet point on biomass tiering in GB from a footnote back into a main table. No queries were raised on NI biomass tiering.

After 16 February, CEPA has neither identified a written record nor any recollection of DETI checking, in respect of the addendum report, whether tiering was required in respect of any NI tariff. Had DETI made such a request we believe that it would have been recorded in writing.

- b. If DETI did so revert:
- i. provide full details of when, through whom, to whom, and in what precise form DETI communicated with CEPA
 - ii. provide full details of the work CEPA undertook in response to DETI's communication;
 - iii. provide full details of any response from CEPA to DETI including details of the date and form of same and the relevant CEPA and DETI personnel.

Not applicable.

The oral evidence of Shane Murphy

3. During his oral evidence on 20 December 2017, Shane Murphy suggested (at TRA-2432 line 6 to TRA-2434 line 8) that CEPA may have made an error in respect of the discount rate used in, inter alia, the cost calculations regarding the different incentive options such that the cost difference between the challenge fund and the NI RHI options may not have been accurately stated in CEPA's final report of 28 June 2011. Please consider Mr Murphy's evidence and address the following questions:

- a. Clarify the discount rate used by CEPA in each of its calculations;

CEPA's 2011 approach was the same as DECC's in terms of applying a 12% discount rate in the case of non-domestic and 16% in the case of domestic installations to the cash flows of both renewable and counterfactual costs. The difference between these two cash-flows drives the tariff, which includes a 12% (non-domestic) or 16% (domestic) return for the *reference* installation (we note that for installations other than the reference installation that there would be a distribution of returns around these levels).

A real 3.5% discount rate was then used to compare the costs and benefits of the RHI options with that of the Challenge Fund. This 3.5% rate is therefore being used to evaluate the use of the subsidy from a public policy perspective; that is the use of



public resources, taking into account the time value of money (i.e. the value of immediate costs (subsidy and other costs) and benefits (carbon savings) is greater than those in future years). For clarity, the 3.5% is not being used to generate an investor return.

The GB RHI scheme also applied the same 3.5% in its assessment of the costs and benefits of the GB RHI scheme. This is because Treasury rules stipulate this approach. The DECC impact assessment (as well as that of 2013) clearly sets out on p3 that a 3.5% discount rate was applied.

b. Clarify whether CEPA accepts any of Mr Murphy's criticism and:

i. If CEPA does, clarify what criticism CEPA accepts and set out what figures ought properly to have been included in the final report in place of any figures that CEPA now believes to be erroneous;

We do not accept Mr Murphy's criticism.

ii. If CEPA does not, set out the reason(s) for this;

See response to 3a above.

c. If it is the case that CEPA requires more information from Mr Murphy before answering (or fully answering) the questions posed at b. above, please set out the precise class(es) of information so required.

Not applicable.

4. During his oral evidence on the same date (TRA-2520 line 4 to TRA-2524 line 21), Mr Murphy also suggested that CEPA may have made an error in the addendum report of 16 February 2012 where, in Annex A at Tables A.10 to A.12 (DFE-602 to DFE-603), they failed to recommend a tiered tariff in respect of the small commercial GSHP even though the fuel cost of 12.14p/kWh, when adjusted to take account of efficiency of 360%, was less than the recommended tariff level (3.33p/kWh vs.

4.3p/kWh). Please consider Mr Murphy's evidence and address the following questions:

- a. Clarify whether CEPA accepts any of Mr Murphy's criticism and:
 - i. If CEPA does, clarify what criticism CEPA accepts and set out what the addendum report ought properly to have recommended in respect of the relevant GSHP;

CEPA does not accept any of the criticisms made by Mr Murphy. CEPA adopted an approach to GSHPs consistent with that of DECC at the time.

- ii. If CEPA does not, set out the reason(s) for this;

The Inquiry (and presumably Mr Murphy) are familiar with pages 13 to 15 of DECC's 2011 Impact Assessment, which sets out the rationale for tiering. As we have repeatedly stated, at the time the principal rationale for the introduction of tiering was to avoid the perverse incentive to over-generate heat just to realise the subsidy. In addition to the points I raised in the Oral Hearing (such as the fact that tiering was not applied in the case of the >1MW biomass band), the case of small-scale GSHPs provides further support to this contention. It also demonstrates that the decision to apply tiering at the time was not totally mechanistic and involved taking a judgement on the potential for subsidy beneficiaries to exploit any perverse incentive.

In the 2011 Impact Assessment (p14) the perverse incentive to over-generate in the case of non-domestic GSHPs is set out in Table 4, where a tariff of 4.3p is set out for the <100kW band non-domestic GSHP, where it is recognised that where a generator has a co-efficient of performance [COP] (equivalent to an efficiency factor) of above approximately 250%, this can create a perverse incentive to generate heat solely to collect the subsidy. But, despite this, DECC also states (p15):

“However, even if tariffs are higher than electricity costs, generators are unlikely to have sufficient information on the co-efficient of performance (COP) at each point in time to exploit this opportunity. Therefore, although the risk of a



perverse incentive could exist in that category it is not considered as acute as for the medium biomass segments. Although no change in the tariff structure is proposed we will monitor this area and if required propose changes in future reviews".

Thus, despite the tariff being greater than marginal generation costs, DECC chose not to tier, illustrating (i) where there was limited ability to exploit the potential created by the tariff being higher than the marginal cost of generation, tiering was not applied, (and therefore) *irrespective of the implications for the return received*; and (ii) the fact that the decision to tier was not as binary as some would believe. In fact, the application of tiering was more nuanced precisely because of the nature of the problem it was seeking to address; that is, that of a perverse incentive. Whilst tiering does reduce returns, this is as a *result* of its introduction, not the reason for it (at least at the time of its introduction in 2011). This is further supported by the fact that tiering had never been applied in the case of different forms of feed in tariffs for the electricity sector, where for instance higher load factors in large scale off-shore wind farms can have significant impacts on profit, potentially leading to "over compensation" (depending upon the definition of the latter).

Thus, *initially*, consideration of the need for tiering only came about where (i) the tariff calculated in pence per kilowatt, resulting from assumptions on, fixed and variable costs, capacity and load factors is *above* marginal generation costs; and (ii) where there was an ability to exploit this perverse incentive. Where any one of these two did not exist, tiering was not introduced. Why? Because, apart from EU-mandated State Aids considerations the prevention of over-compensation was seen as being desirable rather than something which drove a policy focused on meeting a renewable output target (in which Government actually wanted a high number of renewable kilowatt hours), especially where there was considerable uncertainty over what level of incentive / return was necessary to drive the desired level of uptake.

In fact, in 2013, as uptake was low for all non-domestic GSHPs, following consultation and a further impact assessment⁴, DECC subsequently announced a number of

⁴ (1) Non-domestic renewable heat incentive: improving support, increasing uptake (Dec 2013). (2) RHI Tariff Review, Scheme Extensions and Budget Management (24/09/2013)

changes to the treatment of GSHPs, which were made to create a single band (rather than two), to increase the tariff significantly and to tier the tariff, given that it was now significantly greater than marginal generation costs:

- The existing two bands were collapsed into a single one (when information showed that returns to scale were largely constant), thus illustrating how banding structure changed in the light of new information.
- The new non-domestic GSHP tariff was increased substantially over what the small commercial tariff had been. In part, this appears to have been effected by reducing the load factor assumption used to calculate the tariff from 35% to 20%, thus reducing the number of kilowatt hours over which cost differences were to be recovered, thus driving an higher tariff⁵. This decision was made as a result of realised load factors being lower than those initially estimated to calculate the tariff:

“The non-domestic heat outputs were provided by Burro Happold (part of the consortium with the Sweett Group who undertook the research). In many cases, these heat outputs (and load factors) represent a significant reduction compared to AEA data. The impact of incorporating these assumptions would be to increase tariffs significantly in the non-domestic sector, particularly for GSHPs.” p48 RHI Impact Assessment 2013. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/263581/Impact_Assessment_RHI_Tariff_Review_Extensions_and_Budget_Management_Dec_2013.pdf

This illustrates how tariffs can be revised in the light of outturn being different to the initial assumptions used to set the tariffs (in this case as a result of a combination of lower realised load factor, meaning that costs needed to be recovered over a lower number of units, thus necessitating a tariff increase, and the low level of uptake observed). This illustrates how, in the case of biomass in the NI RHI the tariff could have been lowered (with or without tiering, as appropriate), given the higher load factors that were being observed in practice, relative to what had been assumed in calculating the initial tariff.

⁵ This also incorporated evidence from the SWEETT report of 2013 which the Inquiry should also review if it wants to understand how assumptions underpinning the GB RHI were revised in the light of new evidence.

- Tiering was recommended for GSHPs in 2013, demonstrating how tiering could be introduced *subsequently* to a scheme being introduced. In this case, the Tier 2 tariff was set at 85% of the assumed marginal generation cost, once efficiency was taken into account. This was a different approach to that pursued in the case of biomass, in effect also illustrating that there were potentially different approaches to setting the Tier 2 tariff, as long as the perverse incentive was removed. This perhaps also illustrates that there was no “cast iron” rule to determining the level of the Tier 2 tariff, with DECC adopting different approaches for different technologies. We are not, however, aware of anywhere where DECC sets out its thinking as regards why it chose different approaches to setting the Tier 2 tariff for different technologies. For instance, in the case of GSHP it could conceivably have sought to set a tariff to reflect an estimate of the difference in marginal costs of generation of GSHP and a gas counterfactual. Or alternatively, it could potentially have set the biomass Tier 2 tariff at 85% of its estimate of the biomass pellet or chip price.

More widely, if it has not done so already, we would suggest that the Inquiry read the aforementioned documents, as they demonstrate DECC’s learning after a couple of years of operation of the GB RHI. In particular, they set out the challenges of addressing several perverse incentives, including those created through the introduction and consequent interaction of tiering and banding in the GB scheme, including incentives to over-size and under-size biomass boilers:

*“Whilst tiered tariffs are designed to avoid the incentive to over-produce heat they can also introduce a secondary incentive to oversize the kit being installed. This is because the amount of heat under tier 1 or tier 2 can be determined by the capacity of kit (see note below *). So if it is relatively cheap for installers to increase the size of kit they will be able to earn larger revenues through the RHI by claiming for a larger proportion of their heat needs at the tier 1 tariff.*

The deployment data for biomass boilers that we have received to date does show a bias towards the larger sizes within size bands. However, it is difficult to identify how much of this is due to oversizing to take advantage of the higher tier 1 tariffs and how much is due to other factors.

The availability of a higher tariff for smaller installations creates an incentive to install kit that falls into the smaller band, even where it may have been more efficient to use larger kit. This incentive would also lead to larger numbers of installations at the top end of banding thresholds as has been seen in the scheme deployment data. Given the uncertainty in



identifying the key drivers of behaviour DECC will continue to monitor this issue and most likely revisit it as part of the wider 2014 review of the scheme.

This is the number of hours associated with a 15% load factor which is an estimate of the **lower-end of the range of possible load factors. The amount of heat an installation will receive at the tier 1 tariff is a product of its capacity and 1,314 hours. E.g. a 100kW system would be eligible for the tier 1 tariff on up 131,400kWh of heat”*

This demonstrates how addressing one perverse incentive (by tiering), can create another. and the need for constant monitoring of how beneficiaries are reacting to the incentive.

We believe the above observation is a major determinant driving the observation that the actual unit subsidy cost per kWh of <200kW GB biomass band would appear to have been historically higher than that of <100kW NI pence per kWh costs. So, from the point of view of subsidy cost per unit of output, as regards these comparable bands, NI has performed better than GB, which had tiering.

Linked to this, we would also draw the Inquiry's attention to the fact that the potential for over-sizing in the NI scheme was essentially half that of the GB scheme due to the limit being 99kW rather than the 199kW in the GB scheme. To reiterate our earlier evidence, the scale of the incentive is a combination of the average tariff, load factor and *capacity* as all combine to determine the revenue received.

In further support of the points made above, the DECC document also reiterates the prime purpose of the RHI being to meet the EU Renewable Energy Directive target and that value for money was related to the tariff level not the returns being made by installations. This supports CEPA's view that the value for money of a scheme should be determined by the average realised tariff of the scheme rather than the returns of beneficiaries:

“When the non-domestic scheme was launched in November 2011, tariffs were capped at a level we considered reflected the support provided to offshore wind...paying more than this level was considered not to achieve good value for money in terms of contributing to the 2020 renewable targets, which is the principal objective of the RHI...” Para 32 [Improving Support Increasing uptake]



DECC also sets out that the 12% return assumption was recognised as being more of a portfolio average rather than a cap and was determined on a pre-tax basis:

“We also invited views on the RHI rate of return. We continue to aim to incentivise up to the 50th percentile of the heat potential of each technology and to provide a pre-tax internal rate of return on financial costs of 12%. This is done on the basis of the best available evidence, and subject to the value for money cap. We consider that this approach assists us in ensuring the scheme does not give rise to overcompensation in the aggregate, in accordance with state aid rules.” Para 35 [Improving Support Increasing uptake]

In fact, we would suggest that the level of return required to achieve uptake in both the GB and NI schemes for many beneficiaries was significantly greater than 12%.

b. If it is the case that CEPA requires more information from Mr Murphy before answering (or fully answering) the questions posed at a. above, please set out the precise class(es) of information so required.

Not applicable.

5. Aside from the two issues raised by Mr Murphy in his evidence, clarify:

a. whether any tariff specified in Annex A of the 16 February 2012 addendum report (aside from the small commercial biomass tariff and, potentially, the small commercial GSHP) ought to have been the subject of a recommendation in respect of tiering (and, if applicable, please provide full details of same);

As we believe that DECC’s principal rationale for implementing tiering at the time was to address the risk of a perverse incentive, with any other interpretation being in effect a rewriting of history that contradicts all the relevant DECC reports of 2011, through 2013, the need for tiering did not exist in any other category, using the cost information in the model.

If, however, AEA’s additional research into biomass prices is used rather than the initially assumed biomass prices, the tariff rate is slightly greater than the marginal cost of generation, potentially creating a perverse, albeit weak, incentive to over-generate.

The potential to exploit this is, however, would have been unlikely to have existed, had such a tariff been introduced for domestics.

AEA provides a figure of 4.69p/kWh as the average input price for domestics in NI (WIT-110809). After adjusting for 85% boiler efficiency this gives a fuel cost of 5.5p/kWh as against a tariff of 6.2p/kWh. So, a top of the band 20kW boiler running for every hour of every day of the year could generate a gross annual “profit” of £850 per year, before servicing and other usage related costs. Unless there was a feeder (which would require electricity usage, depressing this profit further), 24/7 attention, 365 days of the year, would presumably be required to keep the boiler topped up. Of course, as with any other biomass boiler, access to free resource would alter these economics.

Whether, on balance, from a perverse incentive perspective, this required tiering is a moot point. In any event, such a scale of boiler became part of the domestic scheme where payments were deemed, rather than metered.

b. whether CEPA is aware of any other errors or omissions in the final report or addendum report of which CEPA has not previously advised the Inquiry (and please provide full details of same, including details of when and how they first came to CEPA's attention).

We have spotted two other errors that have only come to our attention as a result of the recent questions asked by the Inquiry.

First, as part of responding to these questions, we identified an inconsistency between the 2011 report and the 2011 model: the 2011 model uses a funding profile set in constant prices but the title of Table 4.2 of the “Funding” section of the 2011 report noted that the profile used was set in nominal terms. The title of the table should have been the following: “*Profile of subsidy, £m (2010 prices) per year.*”

Second, we have found that Table B1 was not updated in the final version of the Addendum (as explained in response to question 1c of Notice 9 of 2018).



We are not aware of any other errors. However, we would like to clarify a number of issues where we believe that assertions made by counsel to the Inquiry, or by witnesses to the Inquiry, are not supported by the evidence.

First, the recommended review period. CEPA recommended a review after two to three years. This was, in fact, shorter than DECC's commitment to review both ROCs and the GB RHI after four years (although we have checked and can confirm that in the case of the former there were provisions for emergency review). This time period did not change for either GB ROCs or RHI even following problems encountered with the GB small-scale feed-in-tariff scheme.

In our 2011 Report we did, however, point to the need to review tariffs if most funding was flowing to a particular technology. This is a separate issue from the points on scheduled review but clearly sets out what should have happened, in the event that things played out as they did.

"If there is a bias towards the technologies that are less cost-effective, action may need to be taken to review rates or limit the annual payments for that technology (as we specifically recommend for solar thermal in any case)".
CEPA 2011 p107

So if the Inquiry is taking the view that biomass was not "cost effective" then there was a recommendation to consider remedial action. Of course, much depends upon what "cost effective" is taken to mean. If, however, it were taken to mean that it was not "cost effective" because installations were receiving more than was anticipated to effect take-up, then the warning was clearly there to do something. Moreover, direction was also there in terms of either reviewing rates (for instance, lowering the rate to take account of a higher load factor or capacity, thus increasing cost effectiveness) and / or limiting (for instance, through capping) annual payments.

CEPA's models and the RHI scheme budget

6. Please clarify the following in respect of CEPA's modelling work for each of the 2011 final report and 2012 addendum report:

- a. whether CEPA calculated budget usage only up to 2020 and, if that is the case, the reason(s) for this;

Assumptions relating to the budget are set out in Section 4.1 “Funding” of the 2011 report, which were also used for the 2012 analysis. As noted in the extract from that section (p46), CEPA did model budget usage after 2020 to accommodate ongoing payments for the NI RHI option:

“For the NI RHI, we have assumed smooth growth in annual subsidy levels to 2020, and then subsidy as necessary beyond 2020 to provide the required on-going stream of payments for installations to 2020.”

Ongoing payments were modelled to enable whole-life comparisons of subsidy costs with other options.

In general, only installations installed up to 2020 were relevant for the policy analysis conducted in the 2011 Report and 2012 Addendum as they related to policy initiatives to contribute to the UK’s legally binding 2020 renewables target.

- b. whether CEPA incorporated any measure of inflation in their models and:
- i. if CEPA did do so, please provide full details of same;
 - ii. if CEPA did not do so, please provide an explanation;

The CEPA models were developed in “real” terms, that is, inputs and calculations were expressed in a constant price base: 2010 prices. This involved, for example, ensuring that renewable and fossil fuel price projections were presented in real terms, with inflation assumptions being used to produce 2010 prices, if needed.

The price base shown in tables in the 2012 Addendum report was revised from 2010 to 2011, while the model retained the 2010 price base. As such, as detailed in Annex A of that report, an adjustment for one year of RPI inflation was made to values from the model when presenting them in the Addendum.



c. whether CEPA's models assumed that 2020 payment levels would continue unchanged for the following 20 years and:

i. if they did do so, the reasons for this including, in particular, an explanation of whether (and, if so, how) CEPA took any or adequate account of the fact that payments in 2021 might be greater than those made in 2020 by reason of payments made to applicants who entered the RHI Scheme part of the way through the 2020 year;

ii. if they did not do so, the reasons for this, the anticipated differences between payment levels in 2020 and payment levels in any of the following 20 years, and how (if at all) these differences were taken into account by CEPA.

The CEPA models assumed that under the NI RHI option, ongoing payments would be made after 2020, with payments dropping off as the 20-year period expired for installations made in earlier years. A 15-year period was used for some liquid biofuels in line with a shorter expected technology lifetime.

To help simplify the analysis, the CEPA models modelled future years with an annual resolution. This effectively meant that all new installations were made at the start of the year. As such, there would not have been a reason why payments in later years would have been higher due to applicants entering the scheme part-way through the year. In any event, it would have been assumed at the time that these assumptions would have been reviewed in the light of greater clarity arising on what future budgetary commitments that the Treasury was making available to NI.

d. clarify whether CEPA now believes they made any errors or omissions in respect of how they dealt with the RHI budget in their modelling work (including details of any such errors or omissions as well as when and how CEPA first came to be aware of same).

We consider that the approach to modelling the RHI budget was reasonable in the context of significant uncertainty regarding the maximum funding envelope available.

To include greater degrees of granularity post 2020 would have risked perceptions of spurious accuracy.

An additional net monetised present value calculation

7. In the final report of 28 June 2011, CEPA presented the net monetised present value of each option in Table 10.3. In respect of the NI RHI Alt option in the funding 2 scenario the figure of -£242 million was derived by subtracting a projected total monetised cost of £405 million (Table 10.2) from a projected total monetised benefit of £163 million (Table 10.1). The said cost figure of £405 million included some £334 million in subsidy spending (Table 7.13). In the addendum report of 16 February 2012 CEPA indicated, at Table 3, that the NI RHI Alt subsidy cost would rise from £334 million to £445 million. However, no new net monetised present value figure (to replace the 2011 figure of -£242 million) is included in the 2012 addendum report in respect of the NI RHI Alt option. The Inquiry now requests that CEPA provide such a figure, using the scheme cost information contained within the 2012 addendum report.

Using the approach set out in the 2011 report and the scheme cost information contained within the 2012 addendum, we now estimate that the value of the figure requested would be -£264m (2010 prices).

The key differences driving the reduction in the value from -£242m in the 2011 report to -£264m (2010 prices) are as follows:

- the projected subsidy cost increased by £111m (£445m less £334m);
- the scheme administration costs increased by £11.1m;⁶
- metering costs decreased by £0.9m;
- administration costs (for installations, not for DETI) decreased by £15.3m; and
- the value of carbon savings relative to an updated 'do nothing' counterfactual increased by £84.1m.

⁶ In line with page 77 of the 2011 report (section 7.6.2), scheme administration costs were assumed to be 10% of subsidy costs.



Summing the abovementioned changes gives the updated NPV benefit (cost) value of -£264m (2010 prices), rounded to the nearest £m.⁷

⁷ -£242m -£111m -£11.1m +£84.1m +£0.9m +£15.3m = -£263.8m

**[No 9 of 2018]**

1. In respect of CEPA's Addendum Report of 16 February 2012 ('the Addendum'):
 - a. Explain why Annex B was included in the Addendum and, in particular, whether (and, if so, for what stated reason[s]) DETI officials requested that carbon savings be addressed, updated, and/or altered in it (providing, if applicable, full details of the relevant communications);

Annex B was included at DETI's request, following discussions in December 2011/ January 2012 about their requirements for the addendum. DETI's initial requirement was stated as: *"Would also need to update any other tables on the overall impact of the scheme on CO2 and renewable heat output."* This was included in the email from Peter Hutchinson to Iain Morrow of 10 November 2011.

It was explicitly set out in our proposal for the 2012 addendum (as Annex B of that proposal, "2017-01-26 - 2012 proposal.pdf"). Task 9 in our proposal stated that we would:

"Present the high level impact of the NI RHI in terms of renewable heat delivered, carbon emissions displaced, technologies deployed and expected associated costs (see Annex B for example)".

We are not aware of any subsequent requests from DETI to update or alter the carbon savings. In any case, the carbon savings were calculated directly from the model assumptions based on DECC's carbon accounting methodology.

- b. Without prejudice to the generality of the foregoing request, clarify whether (and, if so, when and between whom and in what detail) there was any discussion between CEPA and DETI regarding the need to mitigate, whether by way of increased carbon savings, reduced administration costs, or otherwise, some or all of the £111 million increase in lifetime subsidy costs for the NI RHI Alt option as

between CEPA's Final Report of 28 June 2011 ('the Final Report') and the Addendum;

CEPA has no written evidence of, nor does it recollect, any such discussion taking place.

c. Explain in detail why Table B.1 in Annex B of the Addendum suggests that the total carbon projected to be saved by the NI RHI Alt option with the original tariffs is 5.1 million tonnes whereas Table 7.11 in the Final Report suggests that the total carbon projected to be saved by the NI RHI Alt option with the original tariffs is 5.4 million tonnes;

The figure of 5.1 million tonnes was from a draft version of the model rather than the final one, and was not updated when the report was finalised. In other words, the figures shown in Table B.1 were calculated using a version of the 2011 model with just a targeted subset of the 2012 updates implemented rather than all changes made to 16 February.

Given the above, we have revisited the calculation of the total carbon projected to be saved by the NI RHI Alt option with the 2011 tariffs. We undertook this analysis by inputting the tariff values from the 2011 report to the 2012 model and mapping them across to the updated tariff categories in the 2012 model. From that analysis, we calculate an updated estimate of carbon savings of 6.0m tonnes,⁸ an increase of approximately 0.6m tonnes from the 5.4m tonne value in the 2011 Report.

We understand that there are two reasons for this change in carbon savings even though the tariff values did not change:

1. Updates to model assumptions, further detail on which is provided in response to Question 1 (d) below.
2. A change to the size of the smallest non-domestic biomass boiler from 20kW to 50kW, meaning that in the uptake modelling, the 2011 1.3p/kWh tariff for

⁸ This value can also be seen in the table shown in response to Question 1(f) below.



installations over 45kW applied for small non-domestic biomass boilers rather than the 4.5p/kWh in the smallest biomass tariff band in 2011.

Both of the abovementioned changes would have resulted in there being different uptake results for the same tariffs between the two models, and hence different levels of carbon savings.

d. Explain in detail the reasons for the carbon savings projected in respect of the NI RHI Alt option increasing by approximately 36% between the Final Report and the Addendum (as purportedly illustrated by Tables B.1 and B.2 of Annex B of the Addendum) including, in particular, why this increase occurred when the renewable heat projected to be delivered by the NI RHI Alt option reduced, as between the two reports, from 11.14% to 11.10%;

The carbon savings projected in respect of the NI RHI Alt option changed as the mix of renewable heat projected in the 2012 model had a greater carbon benefit associated with it than the mix projected in the 2011 model.

The composition of the renewable heat projected in the 2011 and 2012 models was driven by the mix of technologies projected to be installed. That mix changed between the 2011 and 2012 models due to:

1. the removal of 2011 installations from the uptake modelling;
2. updated technical assumptions; and
3. updated tariff rates.

1. Removal of 2011 installations

As set out in Section 2.3 of the 2012 Addendum, installations installed in 2011 were no longer included in the 2012 model given the delay to the start of the scheme:

“We have also removed the small number of installations originally expect to take up renewable heat in the model in 2011. These changes have only a very small impact.”

2. Updated technical assumptions

As set out in the 2012 addendum, there were a series of changes to the technical assumptions used in the modelling. Changes in those assumptions would have affected the relative attractiveness of different technologies, and as such would have had an influence on the mix of technologies installed in the uptake modelling. Some changes in assumptions would also have affected their carbon impacts.

The assumptions updated in the 2012 model included (but were not limited to) the following:

- an increase in the central commercial biomass chips scenario;
- a reduction in biogas gate fees;
- an increase in the heat demand per building for small commercial/public buildings;
- a change in the average efficiency of the oil boilers being displaced, as noted in response to Question 1e below;
- updates to capex for some biomass boilers and GSHPs; and
- updates to fixed opex for some biomass boilers, GSHP, ASHP and biogas injection.

3. Updated tariff rates

As set out in the 2012 Addendum, updated tariffs were implemented in the 2012 model. Those updates would have affected the relative attractiveness of different technologies post-subsidy. Updated tariffs are shown in Table 1 of the 2012 Addendum.

The combination of the above factors resulted in a different set of technologies and scales being found to be installed in the 2012 model. For example, while costs for biomass boilers increased, so did tariffs, and as such more of these technologies were taken up. There was also an increase in the use of liquid biofuels. However, there was less uptake of other technologies. In particular, there was less electricity used by heat pumps in the 2012 model than in the 2011 model. Comparing the renewable heat mixes for 2012 versus 2011 shows that ASHPs decreased from 24.1% to 22.5% of the



total renewable heat mix, while GSHPs decreased from 10.2% to 9.3%. Biomass boilers, in contrast, increased from 9.6% to 11.5%.

Overall, the above changes resulted in very little difference in the renewable heat being projected in 2012 Addendum than in the 2011 report with the percentage of renewable heat delivered in 2020 only changing at the second decimal place. Despite that, however, the projected carbon savings increased. That counterintuitive result was possible because the carbon impact of each technology and installation is not the same.

One of the drivers of the increase in carbon impact was a lower projected participation of heat pumps. Heat pumps use electricity, which is not carbon neutral. Therefore, if a unit of renewable heat is generated from biomass or bioliquids (which are assumed to have zero carbon impact⁹) instead of by a heat pump, the carbon benefit will be greater as the carbon benefit from reduced oil or gas consumption is not offset by emissions related to the production of the renewable heat.

e. Without prejudice to the generality of the foregoing request, clarify:

i. The extent to which, if at all, the projected increase in carbon savings was related to the increase in oil displaced as between 2011 (CEPA's model at CEP-51347, 'Impact' sheet, cell F25, refers) and 2012 (CEPA's model at CEP-51348, 'Impact' sheet, cell F25, refers);

The 2011 and 2012 models calculated carbon savings based on oil and gas use avoided net of carbon emissions from the production of electricity used to run heat pumps. The following table provides the breakdown of carbon savings, using values from the "Carbon" sheet of each model.

⁹ Biofuel, using DECC's carbon emissions valuation methodology, is assumed to be carbon neutral – its use does not lead to any net carbon emissions. While there is some question about this today, in 2012 this was the official UK Government carbon valuation methodology.

Table: Carbon savings, millions of tonnes of CO₂

	2011 model	2012 model	Change	% of change
Oil use avoided	6.1	7.1	1.1	70%
Gas use avoided	0.4	0.5	0.2	12%
Less electricity used to produce renewable heat	-1.1	-0.8	0.3	18%
Total	5.4	6.9	1.5	

As can be seen in the table above, the change in oil usage explains 70% of the change in carbon savings between the 2011 Report and the 2012 Addendum.

ii. [The reason\(s\) for the said increase in oil displaced as between 2011 and 2012.](#)

A comparison of the oil displaced by broad household/ industry category (e.g. large commercial urban using pellets, versus domestic urban using chips) shows a shift towards large commercial sites and away from domestic installations. The boilers in these sites have differing efficiencies (e.g. a typical commercial installation is shown as having an efficiency of 89% in the model), and so a kWh of heat may take a different amount of oil to produce. This means that the same amount of renewable heat can displace different amounts of oil depending on the type of installation being replaced.

In addition, there is a timing effect. The "oil displaced" figure represents oil displaced to 2020. The replacement of an oil boiler in 2012 will see nine years of oil displaced to 2020, compared to a boiler that is being replaced in 2018, which will only see three years of oil displaced. A comparison of the installations in the 2011 and 2012 models shows that in 2012, more oil per year was initially displaced. This effect persists until 2016, when the situation reverses. The reason for this change is a greater level of installation at commercial sites in early years, at the expense of domestic installations.

We also expect that the increase in the size of heat demand assumed for small commercial/public sites in the 2012 addendum may have affected the carbon savings values. The model includes a constraint on the number of renewable heat installations every year, and the increase may have allowed greater savings by allowing more saving per installation, up to the constraint on the number of installations.

f. Clarify whether (and, if applicable, to what extent and for what reasons) the carbon savings projected in respect of the other incentive scheme options identified in the Final Report (i.e. those other than the NI RHI Alt option) would also have changed if they had been reassessed at or about the time of the Addendum;

Further to our response in 1c above, it should be emphasised that while we have tried to answer the Inquiry's questions, using the 2011 tariffs in the 2012 model is quite an artificial exercise. This is mainly because many of the 2011 tariffs assume a certain banding, which is not the banding in the 2012 model. The point above about the change to the size of the smallest non-domestic biomass boiler is a case in point. Using the 2011 tariffs in the 2012 model requires a judgement about how those tariffs map to the updated reference installations in the 2012 model (as discussed in the addendum). The results of this exercise should therefore be treated with caution, and comparisons to the outputs, such as carbon saving, of the 2012 model with the 2011 tariffs is not strictly an 'apples to apples' comparison. The answers to parts (c), (f) and (g) should be read with this in mind.

Put another way, the 2012 model is not designed to take the 2011 tariffs as inputs. It was designed for the specific purpose of producing the 2012 addendum, which DETI wanted delivered quickly. Indeed, DETI originally thought that the addendum could be produced in a week. Given a longer period, a more complex model could have been designed, but this would have been a much larger exercise that would not have produced an answer by when DETI needed it (and would have involved many more days of input than budgeted for). In addition, as the Inquiry has noted, the model is already complex. It is also questionable whether the benefits of such a more complex model would have been justified given the issues, including added development cost, that go with increased model complexity.

In short, the 2012 model was designed to answer the questions posed by DETI at the time, and not for any other purpose. Like any model that is used for a purpose that it was not designed for, any results should be treated with caution.

Similarly, turning to carbon savings specifically, it is not possible to use the 2012 model

to obtain a directly comparable carbon savings figure to that in the 2011 Final Report for the NI RHI Alt option given, for example, the issues with mapping across the 2011 tariffs noted above. We did not consider any other options at the time of the 2012 addendum, as we were focused on amending the NI RHI Alt option that DETI had consulted on (with other options having been dropped by DETI by this point).

That said, in broad terms, updated technical assumptions (such as the inclusion of ongoing hassle costs for biomass) and updated tariffs would have changed the results of the uptake modelling under all options modelled for the 2011 Final Report and as such result in different projections of carbon savings if modelled now.

So turning to the results for the other 2011 options, the following table sets out the carbon saving projections that might have been calculated, had they been reassessed using the 2012 model at or about the time of the Addendum (assuming no changes to other schemes and a reasonable mapping of tariffs). The table also sets out the corresponding changes compared to the values set out in Table 7.11 “Cumulative carbon saved, by scenario and option, in millions of tonnes of CO₂ equivalent” of the 2011 report.

Table: Cumulative carbon saved, by scenario and option, in millions of tonnes of CO₂ equivalent

<i>Option</i>	<i>Funding scenario</i>	<i>2011 report values</i>	<i>Updated values using 2012 model</i>	<i>Difference vs. 2011 report values</i>
Do nothing	-	1.8	1.3	-0.5
Challenge fund	1	2.8	2.3	-0.5
Challenge fund	2	5.9	6.3	0.4
Challenge fund	3	5.5	5.7	0.2
Capital grant	1	2.3	1.9	-0.4
Capital grant	2	4.9	4.3	-0.6
Capital grant	3	3.1	3.1	0.0
GB RHI (2011 tariffs)	2	4.5	4.6	0.1
GB RHI (2011 tariffs)	3	3.0	2.7	-0.3
NI RHI - DECC approach (2011 tariffs)	2	5.1	6.0	0.9
NI RHI - DECC approach (2011 tariffs)	3	3.8	4.5	0.7
NI RHI - Alt (2011 tariffs)	2	5.4	6.0	0.6
NI RHI - Alt (2011 tariffs)	3	3.7	4.5	0.8

As explained in 1(d), there are lots of changes going on in the model which interact to



produce the results in the table above. As can be seen in the table above, the results from this exercise show that except for the NI RHI Alt option, increases in carbon savings are greater for the RHI and challenge fund options in funding scenario 2. We expect that the larger changes for the NI RHI options across all funding scenarios shown *may* reflect the issue with mapping 2011 tariffs to the 2012 model raised above.

g. Set out, in addition to the NPV for the NI RHI Alt, what the updated NPV was for each of the other incentive scheme options identified in the Final Report (i.e. those other than the NI RHI Alt option) at the time of the Addendum including details of (i) the reasons for any changes in the said NPVs and (ii) details of the relevant calculations;

The caveats in the answers to 1c, d and f above apply here too. To reiterate we are undertaking calculations now which were not undertaken at the time of the 2012 Addendum. They were not in scope and were therefore not calculated.

Many of the NPV figures that we have now calculated and which are shown below are not particularly meaningful because they are based on the combination of 2011 tariffs and 2012 input assumptions.

With these caveats in mind, the following tables present the estimates produced from an exercise to demonstrate how the net monetised benefit (cost) values in the 2011 Report *might* have looked had they been calculated at the time of the 2012 Addendum, using the tariffs set out in the 2011 Report.



Table: Recreation of net monetised benefit (cost) by option and funding scenario using the 2012 model, (£m, 2010 prices)

Option	Funding scenario	Net monetised benefit	Net subsidy spending	Scheme mgmt. costs	Admin cost	Metering cost	Net monetised cost	Net monetised benefit/(cost)
2011 report values								
Challenge fund	1	46	22	2	7	1	32	14
Challenge fund	2	189	161	16	30	5	212	-24
Challenge fund	3	169	79	8	27	4	119	50
Capital grant	1	22	24	2	6	1	33	-11
Capital grant	2	143	167	17	31	3	218	-74
Capital grant	3	60	85	9	13	1	108	-48
GB RHI (2011 tariffs)	2	126	455	46	16	3	519	-394
GB RHI (2011 tariffs)	3	59	161	16	8	2	186	-128
NI RHI - DECC approach (2011 tariffs)	2	154	303	30	33	4	371	-217
NI RHI - DECC approach (2011 tariffs)	3	93	155	16	18	3	191	-98
NI RHI - Alt (2011 tariffs)	2	163	334	33	33	4	405	-242
NI RHI - Alt (2011 tariffs)	3	87	154	15	3	2	174	-87
Updated values using 2012 model								
Challenge fund	1	44	19	2	3	0	24	21
Challenge fund	2	223	94	9	16	1	120	104
Challenge fund	3	194	77	8	15	3	102	92
Capital grant	1	26	20	2	0	2	25	1
Capital grant	2	130	119	12	1	0	132	-3
Capital grant	3	81	76	8	1	1	85	-4
GB RHI (2011 tariffs)	2	148	425	43	4	1	472	-324
GB RHI (2011 tariffs)	3	61	160	16	1	3	180	-118
NI RHI - DECC approach (2011 tariffs)	2	209	243	24	15	1	283	-74
NI RHI - DECC approach (2011 tariffs)	3	142	151	15	11	3	180	-38
NI RHI - Alt (2011 tariffs)	2	207	244	24	15	2	285	-78
NI RHI - Alt (2011 tariffs)	3	142	147	15	12	2	176	-34



RENEWABLE HEAT INCENTIVE INQUIRY

<i>Option</i>	<i>Funding scenario</i>	<i>Net monetised benefit</i>	<i>Net subsidy spending</i>	<i>Scheme mgmt. costs</i>	<i>Admin cost</i>	<i>Metering cost</i>	<i>Net monetised cost</i>	<i>Net monetised benefit/(cost)</i>
Difference vs. 2011 report values								
Challenge fund	1	-2	-3	0	-5	-1	-8	7
Challenge fund	2	34	-67	-7	-15	-4	-92	128
Challenge fund	3	25	-2	0	-13	-1	-17	42
Capital grant	1	4	-4	0	-6	2	-8	12
Capital grant	2	-13	-48	-5	-31	-2	-86	71
Capital grant	3	21	-9	-1	-12	0	-23	44
GB RHI (2011 tariffs)	2	22	-30	-3	-12	-3	-47	70
GB RHI (2011 tariffs)	3	2	-1	0	-6	1	-6	10
NI RHI - DECC approach (2011 tariffs)	2	55	-60	-6	-18	-3	-88	143
NI RHI - DECC approach (2011 tariffs)	3	49	-4	0	-8	0	-11	60
NI RHI - Alt (2011 tariffs)	2	44	-90	-9	-18	-2	-120	164
NI RHI - Alt (2011 tariffs)	3	55	-7	-1	9	0	2	53



The table shows major improvements in the cost-benefit calculation under funding scenario 2 for the challenge fund as well as for the RHI options. Funding scenario 2 is the most generous in terms of funding availability. We believe that the increase in net monetised benefit for the challenge fund in funding scenario 2 will have been significantly influenced by the decision in the 2012 model to exclude support for solar thermal (which we have left unchanged for this exercise). In the 2011 model, a significant amount of support was provided to that technology under the challenge fund option. The implementation of this change can be seen in cell F90 on the funding sheet of the 2012 model.

For the RHI options, similar to the result shown in 1(f), we expect the improvement in net monetised benefit to have been driven by the inability to perfectly map the 2011 tariffs into the 2012 model. For example, in the 2011 model, small commercial/public sites would have been eligible for a 4.5p biomass tariff but in the 2012 model, because of the increase in the size of the reference boiler, it would mean they would be eligible for the lower tariff of 1.3p. This has the impact of lowering the costs for those installations and having knock-on consequences on the results of the uptake modelling.

In contrast, the impacts for all options under funding scenarios 1 and 3 are smaller because of the tighter budgetary constraint.

h. Clarify whether, at or about the time of the Addendum, any DETI official or any other person on behalf of DETI, communicated with CEPA regarding the NPV of the NI RHI Alt option or the NPV of any of the other incentive scheme options identified in the Final Report and, if any such communication occurred, specify:

As far as we are aware and can recall, there were no communications on this matter.

- i. The date on which it occurred;
- ii. The personnel involved in, or on behalf of, DETI;
- iii. The personnel involved in, or on behalf of, CEPA;

- iv. Any documents evidencing such communication; and
- v. The detail of the communication.

2. In respect of CEPA's Final Report of June 2013 in respect of Phase II of the NI RHI, clarify how the figures shown in Table 5 (CEP-05110) of the said report relate to and/or are to be understood with, the NPV figures for the NI RHI Alt and each of the other incentive scheme options identified in the Final Report of 28 June 2011.

Table 5 of the 2013 Report presents the net benefit (cost) to 2040, in present value terms, of the options assessed in that report relative to a "do nothing" scenario. While the 2011 Report similarly presents net benefit (cost) figures relative to a "do nothing" scenario in Table 10.3. The values in those two tables, however, are not comparable and are not intended to be compared.

The values in the two abovementioned tables are not comparable as the "do nothing" scenarios that options are assessed against in each report are different. The "do nothing" scenario in the 2011 Report is no financial support to renewable heat installations. The "do nothing" scenario in the 2013 report includes the ongoing provision of financial support to the Phase 1 non-domestic technologies.

The values in the two tables are also not comparable as the "do nothing" scenario in the 2013 Report was not the same as any of the options in the 2011 Report. While the Phase 1 non-domestic tariffs are provided as part of the 2013 "do nothing" scenario, they were the product of analysis completed in the 2012 Addendum,¹⁰ not the 2011 Report. Also, the 2011 Report values included support to the domestic sector, which would not have been included in the "do nothing" scenario in the 2013 Report, as support for the domestic sector had not yet been introduced.

3. In respect of its work on the NI RHI Alt option in 2011 and/or 2012, clarify

¹⁰ Revisiting the Phase 1 non-domestic tariffs was not in the scope of the 2013 work.



whether CEPA:

a. when determining the counterfactual vs. renewable costs differences in respect of each technology (or band within each technology) for the purpose of the relevant tariff-setting calculations; and/or

b. when considering the issue of European State Aid Rules;

took any account to the issue of a potential scheme beneficiary obtaining tax relief(s) in respect of any of his relevant expenditure and:

CEPA took no account of the issue of a potential scheme beneficiary obtaining tax relief(s). We have no evidence to suggest that the GB scheme considered the development of GB tariffs at such a level of granularity.

i. if CEPA took no account of this issue:

A. the reason(s) for this;

As we have previously pointed out to the Inquiry, CEPA was engaged to undertake an economic appraisal of options for the Northern Ireland RHI. We were neither asked nor offered to provide detailed tax advice on specific investments. This would have been beyond our competence as we are not tax experts. Nor did we offer to provide any advice on State Aids which is another specialist area, normally necessitating legal advice and again one which we would not have been comfortable to advise on. For instance, we would not have known and still do not know how state aid *de minimis* rules would have applied in the case of individual installations. The provision of such detailed tax and legal advice – which would have involved additional and potentially significant third-party costs was neither specifically requested in DETI's terms of reference, nor offered in our bid(s) to undertake the work.

There is no evidence that DECC looked into any differences in tax treatment between renewable and counterfactual investments, with all analysis been undertaken at the pre-tax level as illustrated by DECC's reference to a 12% pre-tax IRR (see response

to 4a). Such analysis would be potentially highly complex.

B. whether (and if so when, between whom, in what documents, and in what terms) CEPA had any communications with DETI or any other Northern Ireland government department on this issue;

Not applicable.

C. whether (and, if so, for what reasons) CEPA now believes that it ought to have taken account of this issue (including details of when CEPA first reached this conclusion);

CEPA does not believe that it ought to have taken account of this issue.

D. the difference (if any) that taking account of this issue would have made;

Not known.

ii. if CEPA took account of this issue:

A. the precise account that it took of this issue;

Not applicable.

B. details of any relevant communications with DETI or any other Northern Ireland government department (including details of when, between whom, in what documents, and in what terms such communications occurred);

Not applicable.

C. whether CEPA now considers that it took proper and/or full account of this issue and, if it did not, provide full details of this including the reason(s) for any relevant omission or mistake on CEPA's part as well as the difference, if any, that

taking proper account of this issue would have made.

CEPA considers that it took appropriate account of the issue given the exercise it was undertaking and given the range of uncertainty involved in setting a tariff *ex-ante* for a range of characteristics, even within a single technology band. In such incentive schemes it is not possible to know when introducing it, how the market will respond to a given incentive structure. The experience of most renewable energy schemes has been that they have started off more generous than they became, once tariff reviews reduced their generosity and / or the introduction of depression which helps bring demand for subsidy into line with supply of it. Tariff depression reductions reduce the attractiveness of the scheme, in return reducing demand.

Given this, as set out in CEPA's 2011 Report, there is always a risk of over-subsidy, associated with not knowing how much of an incentive is required to deliver the desired level of investment. We believe that CEPA's approach in this respect was consistent with the approach pursued by DECC in GB. The impact of taxes and reliefs on different beneficiaries is a level of detail that is not normally taken into account (although this would be more likely in the case of larger single investments). The exercise involved setting a level of incentive expected to promote a level of scheme uptake – it was not to tailor a return for specific investments at an highly detailed level (such as in the case of, say, a power purchase agreement between a power utility and a generator). The two are different and should not be conflated.

Statement of Truth

I believe that the facts stated in this witness statement are true.



Signed: _____

Dated: 22 February 2018