UNITED KINGDOM WITHOUT INCINERATION NETWORK

Application by AmeyCespa for Levitt's Field, Waterbeach Waste Management Park, Ely Road, Waterbeach, Cambridge

Application Reference: S/3372/17/CW

UKWIN COMMENTS AND OBJECTIONS REGARDING CARBON IMPACT

"Application for full planning permission for the construction and development of a Waste Recovery Facility (Waterbeach Waste Recovery Facility – WWRF) at Levitt's Field, Waterbeach Waste Management Park (WWMP), Ely Road, Cambridge comprising the erection and operation of an Energy from Waste Facility to treat up to 250,000 tonnes of residual waste per annum, Air Cooled Condensers and associated infrastructure: including the development of an internal access road; office/welfare accommodation; workshop; car, cycle and coach parking; perimeter fencing; electricity sub-stations; weighbridges; weighbridge office; water tank; silos; lighting; heat off-take pipe; surface water management system; hardstanding; earthworks; landscaping; and bridge crossings."

February 2018

Introduction

1. The United Kingdom Without Incineration Network (UKWIN) was founded in March 2007 to promote sustainable waste management. As part of fulfilling our aims and objects UKWIN facilitates access to environmental information, promoting public participation in environmental decision-making and justice in environmental matters. Since its inception UKWIN has worked with more than 120 local groups.

Objection

2. The applicant has failed to show that their proposal is likely, in relation to climate change impacts, to be any better than landfill, and the applicant has failed to rule out the realistic possibility that their proposed incineration facility would be significantly worse than sending the same material to landfill.

3. For example, when correcting for two flaws in the applicant's Carbon Analysis (the treatment of biogenic carbon sequestration in landfill and the electricity grid offset) the applicant's own scenario for electricity-only incineration with 50% biogenic carbon shows the proposal to be **30,723 tonnes of CO2e a year worse than sending the same waste untreated to landfill** (and 21,336 tonnes of CO2e worse than sending the same waste untreated to landfill even if heat were to be exported from the proposed Waterbeach incineration facility).

4. A detailed explanation of the two flaws are set out below. A modified version of the applicant's Table 1 (Carbon assessment results in tonnes CO2e/year – 50% biogenic content) which corrects for these two flaws is as follows:

Table 1a - Carbon assessment results in tonnes CO2e/year – 50% biogenic content

	Landfill baseline	Electricity only	Heat Export
Landfill gas release	82,224		
Electricity offset - landfill gas	-13,843		
Transport	54	1,071	1,071
Natural gas offset			-11,550
Electricity offset - EfW		-54,851	-52,688
Emissions - EfW		152,938	152,938
Net emissions	**68,435**	**99,158**	**89,771**
Net disbenefit (relative to landfill baseline)		**30,723**	**21,336**

5. The applicant has therefore shown through their own scenario (as corrected) that their proposal could be expected to be worse than landfill, and this should weigh heavily against this application in the planning balance in relation to relevant local and national planning policies on climate change.

6. It is further noted that the applicant has only compared their proposal to sending the same waste untreated to landfill. If they had instead compared their proposal to sending the waste to a more efficient incinerator, or to pre-treating the biogenic waste prior to landfill, then the Waterbeach proposal would have fared even worse.

7. Similarly, the applicant fails to account for other relevant and material issues, such as the potential for landfill mining for future recycling, as recently noted by Defra's Chief Scientific Adviser who stated earlier this month that: *"Now, it may give energy out at the end of the day, but actually some of those materials, even if they are plastics, with a little bit of ingenuity, can be given more positive value." If there is one way of extinguishing the value in materials fast, it's to stick it in an incinerator and burn it. Now, it may give energy out at the end of the day, but actually some of those materials, even if they are plastics, with a little bit of ingenuity, can be given more positive value."*[1]

8. As Defra's Science Advisory Council's Waste Sub-group has explained: *"…Although landfilling tends to be regarded as inherently bad and to be avoided, there is evidence that in some instances…landfill may be the least environmentally, economically or technically unsuitable option. Landfill can also be a way of storing materials that have a potential future value, and other countries already recognise the value of landfill mining".*[2]

9. Indeed, the Resource Minister Thérèse Coffey herself has stated: *"My hon. Friend the Member for Rugby referred to energy from waste. I caution against some of what he said. In environmental terms, it is generally better to bury plastic than to burn it"*.[3]

[1] https://resource.co/article/chief-defra-scientist-warns-more-incineration-could-harm-innovation-12382
[2] http://webarchive.nationalarchives.gov.uk/20130702173345/http:/www.defra.gov.uk/sac/files/sac-waste-subgroup-finalreport-june-20111.pdf
[3] https://hansard.parliament.uk/commons/2017-01-23/debates/590623BD-398C-4586-A693-FCC1DB5EA444/Non-RecyclableAndNon-CompostablePackaging

The importance of understanding and correctly assessing carbon impacts

10. The Background section of the applicant's Carbon Assessment acknowledges that the consultancy was asked to carry out a Carbon Assessment to meet Local Validation Requirements and to form part of the Planning Application Documentation.

11. Presumably this was not intended to be a tickbox exercise, but was required because the results of such an assessment are material to the consideration of environmental impacts of the application. It follows therefore that a mistake made as part of the Carbon Assessment, and the impacts once errors and omissions are corrected, is also a material planning consideration.

12. Government guidance and previous planning decisions have upheld the importance of correctly assessing the relative climate impacts of landfill and incineration on the basis that incinerators can be worse from a greenhouse gas (GHG) emissions perspective than sending the same way to landfill.

13. Paragraph 209 of the Government's 2011 Waste Review states: *"...while energy from waste has the potential to deliver carbon and other environmental benefits over sending waste to landfill, energy recovery also produces some greenhouse gas emissions. It is important to consider the relative net carbon impact of these processes, and this will depend on the composition of feedstocks and technologies used*". *(emphasis added)*.

14. On 3rd August 2015 Planning Inspector Mel Middleton decided to dismiss an appeal for a circa 140,000 tonne per annum incinerator proposed for the Former Ravenhead Glass Warehouse and other land at Lock Street, St. Helens, Merseyside WA9 1HS (Appeal Ref: 2224529, 'the Lock Street decision'). One of the issues material to the refusal was the poor "*carbon credentials*" of the plant - this was deemed to conflict with relevant local and national policies.

15. Paragraph 30 of the Lock Street decision states: "*In certain circumstances generating electrical energy from waste can contribute to carbon emissions to a greater extent than depositing the same material as landfill. It is therefore not a simple exercise to demonstrate that an EfW will have a positive effect on overall carbon emissions..." (emphasis added)*

Flaw in the applicant's approach to sequestered biogenic carbon

16. Whilst the applicant assumes that half of the biogenic carbon is sequestered in landfill, and whilst the applicant uses this assumption to reduce the assumed quantity of methane released (what they call 'total dissimable carbon'), the applicant fails to follow best practice (see Annex 1, below) by neither crediting landfill with 'negative emissions' for this sequestered biogenic material, nor by including the additional release of this biogenic carbon on the incineration side of the equation.

17. When waste is incinerated the carbon (C) in the waste is combined with oxygen (O) to make carbon dioxide (CO_2) which is then released into the atmosphere. As we know the differences in mass between carbon (12g/mol) and carbon dioxide (44g/mol) we can calculate how much CO_2 will be released from incineration, and also how much CO_2 release is avoided through sequestration.

18. Using the applicant's figure for 'total dissimable carbon' of 20,075 tonnes of carbon for their 50% biogenic content scenario (taken from Table 12 of the applicant's Carbon Assessment) we can determine the impact of their omission by calculating the CO_2 associated with 20,075 tonnes of carbon as follows: 20,075 X 44 / 12 = 73,608 tonnes CO_2 avoided through landfill.

19. Table 1 of the applicant's Carbon Assessment sets out that the carbon benefit for the 50% electricity-only scenario is 53,183 tonnes.

20. If one subtractions the 73,608 tonnes CO_2 avoided through landfill from this benefit then the incinerator would actually result in a net disbenefit of 20,425 tonnes of CO_2.

21. This means that, based on the applicant's own assumptions but correcting for their mistake in omitting the CO_2 that is avoided by landfilling the same waste, if the facility were to operate in electricity-only mode with 50% biogenic content then incinerating the waste at the proposed Waterbeach facility would be 20,425 tonnes CO_2 per annum worse than landfill.

22. Assuming a 30 year lifespan for the incinerator, this equates to more than an additional 612,000 tonnes of CO_2 released into the atmosphere when compared with sending the same waste, untreated, to landfill.

Flaw in the applicant's approach to grid offset

23. In addition to the flaw in the applicant's approach to sequestered biogenic carbon, the applicant mistakenly uses a higher grid offset than best practice would dictate.

24. Paragraph 3.1.2 of the applicant's Carbon Assessment states that: *"The grid displacement factor is the overall kg CO2e emissions per kWh for the UK grid…The 2017 grid displacement value is 0.35156 kg CO2e/kWh"*.

25. The correct figure to use is not the conversion factor for 2017, but the marginal energy mix for the year of commissioning.

26. As explained in Defra's 'Energy recovery for residual waste: A carbon based modelling approach' (February 2014): *"…we should use the marginal energy mix which represents the carbon intensity of generating an additional kW of electricity…"* (emphasis added)

27. Defra's February 2014 Energy from Waste Guide similarly noted: *"When conducting more detailed assessments the energy offset should be calculated in line with DECC guidance using the appropriate marginal energy factor"*. (emphasis added)

28. According to BEIS, the long-run generation-based marginal emissions factor for the anticipated year of commissioning (which is assumed to be 2019) is 0.281 kg CO2e/KWh, which is significantly lower than the grid displacement figure of 0.35156 kg CO2e/kWh that was incorrectly adopted by the applicant.

29. This means that, as calculated in Annex 2 below, the claimed net benefits of electricity-only incineration at Waterbeach should be reduced by 10,298 tonnes CO2e when compared with landfill (in the 50% biogenic carbon electricity-only scenario).

30. When these reductions have been made then, using the applicant's figures combined with applying the correct offset, it becomes clear that in climate change terms it would be better sending the same waste to landfill than using that waste as feedstock for the proposed Waterbeach incinerator.

31. This should weigh heavily against the proposal in the planning balance.

Other problems with the applicant's carbon assessment

32. In this submission UKWIN has looked into the implications of just two of the many possible examples where the applicant has adopted assumptions and methodologies that flatter incineration compared to reasonable alternatives, and the applicant has failed to include sensitivity analysis which shows that the impact of using alternative approaches that have been set out in previous Defra work would result in the proposal being far worse than landfill.

Annex 1 - Best practice in accounting for biogenic carbon in comparative analysis of incineration and landfill

33. As noted in the evidence-based recommendations of Eunomia's 2015 report entitled 'The Potential Contribution of Waste Management to a Low Carbon Economy': *"All lifecycle studies engaged in comparative assessments of waste treatments should incorporate CO2 emissions from non-fossil sources in their comparative assessment".*[4]

34. Eunomia's report also explains that: *"In comparative assessments between waste management processes, it cannot be considered valid to ignore biogenic CO2 emissions if the different processes deal with biogenic CO2 in different ways…"*

35. As stated at Paragraph 18 of Defra's 'Energy recovery for residual waste A carbon based modelling approach' (February 2014): *"By convention biogenic carbon has been ignored in the modelling, however, some biogenic carbon that would be released in energy recovery is sequestered in landfill. We have modelled an approach that aims to reflect this sequestered component".*

36. Defra's document goes on to explain, at Paragraphs 171-173, how: *"…the model assumes that not all of the biogenic material decomposes in landfill but it is all converted to CO2 in energy from waste. Landfill therefore acts as a partial carbon sink for the biogenic carbon. This is a potential additional benefit for landfill over energy from waste. There are two ways to account for this additional effect:*

    - *Estimate the amount of biogenic carbon sequestered and include the CO2 produced from the same amount of carbon in the EfW side of the model (or subtract it from the landfill side)*
    - *Include all carbon emissions, both biogenic and fossil on both sides of the model*

    While both approaches would address the issue of sequestered biogenic carbon the first would potentially be the better solution as it would avoid double counting carbon with other inventories." (emphasis ours)

37. The issue of properly accounting for biogenic carbon sequestration is also covered in Defra's 'Energy recovery for residual waste: A carbon based modelling approach' report which states: "…the model assumes that not all of the biogenic material decomposes in landfill but it is all converted to CO2 in energy from waste. Landfill therefore acts as a partial carbon sink for the biogenic carbon".[5]

38. The issue of properly accounting for biogenic carbon sequestration is also covered in Defra's 'Energy recovery for residual waste: A carbon based modelling approach' report which states: "…the model assumes that not all of the biogenic material decomposes in landfill but it is all converted to CO2 in energy from waste. Landfill therefore acts as a partial carbon sink for the biogenic carbon".[6]

[4] https://zerowasteeurope.eu/downloads/the-potential-contribution-of-waste-management-to-a-low-carbon-economy/
[5] http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=19019
[6] http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&Completed=0&ProjectID=19019

Annex 2 - Calculating the difference in grid offset

39. To calculate the impact of using the correct figure of 0.28095 (rounded to 0.281) kg CO2e/KWh rather than the applicant's 0.35156 kg CO2e/KWh one can calculate the impacts on both sides of the equation and determine the net impact on the figure for incineration relative to landfill.

40. One can separately calculate the difference between the emissions based on the higher emissions factor and the lower one for the quantities of energy generated in both incineration and landfill, and then find the difference between those two results to find the net change in relative benefit/disbenefit between incineration and landfill.

41. In Table 10 the applicant provides a figure of 195,200 MWh 'net electricity generated' in electricity-only mode, and have used this figure to calculate the impact of correcting the emissions factor used for the anticipated number of tonnes of CO2 that would be released from incineration as follows:

    195,200 X 0.35156 = 68,625 tonnes CO2 (same as stated in Table 8)
    195,200 X 0.281 = 54,851 tonnes CO2 (uses 2019 marginal factor)
    68,625 - 54,851 tonnes = 13,774 tonnes of CO2 not displaced by electricity generation from the proposed incinerator

42. The calculation above shows that the EfW electricity offset figure in Table 8 of the applicant's Carbon Assessment (68,625 tonnes CO2) should have been 13,774 tonnes lower, i.e. the applicant should have used a figure of 54,851 tonnes CO2 for the EfW electricity offset.

43. Table 14 of the applicant's Carbon Assessment gives a figure for power generated through landfill gas of 49,263 MWh (for their 50% biogenic content scenario), so we can calculate the impact of applying the correct emissions factors on the anticipated number of tonnes of CO2 that would be released from landfill as follows:

    49,263 X 0.35156 = 17,319 tonnes CO2e (same as stated in Table 14)
    49,263 X 0.281 = 13,843 tonnes CO2e (uses 2019 marginal factor)
    17,319 - 13,843 tonnes = 3,476 tonnes of CO2e not displaced by electricity generation from landfill gas

44. The calculation above shows that the landfill electricity offset figure in Table 14 of the applicant's Carbon Assessment (17,319 tonnes CO2e) should have been 3,476 tonnes lower, i.e. the applicant should have used a figure of 13,843 tonnes COe2 for the landfill electricity offset.

45. We then need to combine these two sets of calculations to arrive at the correct relative net impact in relation to the grid offset.

46. The impact of making these corrections to the EfW and landfill electricity offsets on the 'net benefit relative to landfill baseline' set out in Table 1 of the applicant's Carbon Assessment should therefore be 10,298 tonnes of CO2e per annum (i.e. 13,774 - 3,476, because when calculating net impact of incineration minus landfill the increase of 13,774 tonnes of CO2 emissions from incineration is reduced slightly by the 3,476 tonne increase of emissions from landfill).

UNITED KINGDOM WITHOUT INCINERATION NETWORK

Application by AmeyCespa for Levitt's Field, Waterbeach Waste Management Park, Ely Road, Waterbeach, Cambridge

Application Reference: S/3372/17/CW

UKWIN COMMENTS ON APPENDIX B OF THE APPLICANT'S APRIL 2018 CLARIFICATION

AND FURTHER COMMENTS IN RELATION TO THE APPLICANT'S CARBON ASSESSMENT

May 2018

Background

1. The applicant's planning application registered in December 2017 included a Carbon Assessment.
2. The United Kingdom Without Incineration Network (UKWIN) submitted comments and objections regarding the proposed incinerator in February 2018 in a document entitled 'UKWIN Comments and Objections Regarding Carbon impact' which included a critique of the applicant's Carbon Assessment.
3. Appendix B of the applicant's clarification submission dated 24th April 2018 is entitled 'Response to UKWIN Comments dated February 2018'. The initial portion of UKWIN's latest current submission comments on this 'Appendix B document'.
4. Whilst assessing the comments made in the Appendix B document we identified a further flaw within the methodology applied in the Applicant's Carbon Assessment, and this is set out at the end of our submission. The impact of correcting for this flaw, and the other two flaws, are shown below (in Table 1b).
5. This submission also draws the Waste Planning Authority's (WPA's) attention to serious concerns regarding the robustness and transparency of the waste composition assumptions used as the basis of the applicant's Carbon Assessment.
6. For the avoidance of doubt, whilst UKWIN is commenting on the applicant's assessment of the relative net impacts of the proposed incinerator relative to landfill, UKWIN thinks the proposed feedstock should actually be reduced, re-used, recycled and composted rather than being either burned or buried.
7. The majority of municipal solid waste (MSW) is recyclable or compostable, and that which is not readily recyclable at present is the target of reduction and redesign efforts. The only sustainable long-term option for waste management is to treat resources in line with the requirements of the circular economy and therefore to avoid leakages such as waste incineration and landfill.
8. As such, even if the applicant's assumptions with regard to the climate change impacts of incineration compared to landfill were correct then the weight given to such claims would need to be balanced against the potential of the proposal to be a significant barrier to improvements in recycling and maximising resource productivity throughout the lifetime of the proposed facility.

Comment on relevance to Waterbeach of the Bilsthorpe Energy Centre decision

9. It should be noted that the applicant for the Bilsthorpe Energy Centre proposed a markedly different technology than is proposed for Waterbeach and operated on a different feedstock. Furthermore, a key part of the Bilsthorpe applicant's case related to the potential for future use of their facility to produce hydrogen for fuel cells and that is not an element that is proposed for Waterbeach.

10. The Bilsthorpe decision did not explicitly endorse any particular approach to assessing climate change impacts of conventional waste incineration plants such as that proposed for Waterbeach and in any case BEIS guidance on assessing climate change impacts has been update subsequent to the Bilsthorpe decision.

11. The anticipated date of commissioning of the Waterbeach facility is significantly later than the assumed date of commissioning for the Bilsthorpe Energy Centre, meaning the Waterbeach facility would be displacing electricity that is more decarbonised than assumed for the Bilsthorpe Energy Centre. This means that the carbon context of the Bilsthorpe Energy Centre is markedly different with respect to the marginal emissions factor against which a proposal should be assessed, and the Waterbeach facility would fare worse in relation to a given unit energy displaced.

12. As such, we conclude that the Bilsthorpe is not particularly relevant to the Waste Planning Authority's determination of the Waterbeach proposal.

Comments on best practice regarding sequestration of biogenic carbon

13. The Waterbeach applicant's Appendix B response fails to provide any logical reason why the Waste Planning Authority (WPA) should not take account of the relative net carbon impact differences between the quantity of biogenic carbon released by the two processes (i.e. landfill and the proposed Waterbeach incinerator).

14. Such a comparative assessment would be in line with the Government advice, for example the advice found at Paragraph 209 of their Waste Review 2011, which states that: "…while energy from waste has the potential to deliver carbon and other environmental benefits over sending waste to landfill, energy recovery also produces some greenhouse gas emissions. It is important to consider the relative net carbon impact of these processes".

15. Therefore, the original point made by UKWIN, that the applicant should have taken into account the carbon benefits of biogenic carbon sequestration, remains valid.

16. The context within which UKWIN cited Eunomia's 'Potential contribution of waste management to a low carbon economy' report was with respect to best practice in relation to comparative analysis, whereas the Waterbeach applicant's Appendix B response discusses the issue in relation to a different context, i.e. that of national GHG inventory reporting.

17. However, it is noteworthy that the Appendix B document comments on the IPCC's approach to handling biogenic carbon released from incineration but fails to draw attention to the IPCC's guidelines on accounting for the biogenic carbon sequestration benefits of landfill, i.e. the applicant failed to comment on what the IPCC guidelines state with respect to the approach UKWIN actually adopted in correcting for the flaws in the applicant's Carbon Analysis.

18. Interestingly, unlike the applicant's Carbon Analysis, the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (which are the current guidelines to be followed by the UK and other nations for GHG inventories as noted in the Appendix B document) does indeed acknowledge the GHG impact (benefits) of biogenic carbon sequestration.

19. Chapter 3 of Volume 5 of the 2006 IPCC Guidelines states that: "Some carbon will be stored over long time periods in SWDS [solid waste disposal sites, i.e. landfill]. Wood and paper decay very slowly and accumulate in the SWDS (long-term storage)" and expects that changes in the 'long-term carbon stored' as a result of landfill are reflected in the GHG inventory reporting.

20. In January 2018 Resource Minister Dr Thérèse Coffey, responding on behalf of the Department for Environment, Food and Rural Affairs (Defra) to a Parliamentary Question (Written question 124194), made clear that: "A comparison of the CO2 impact of waste going to energy from waste and landfill is included in the analysis of the 2014 report 'Energy recovery for residual waste: A carbon based [modelling] approach'. No formal analysis has been undertaken since this report was published".

21. In relation to the Defra's November 2014 Carbon Based Modelling Approach document referred to by the Minister, the applicant's response seems to confuse discussion within the Defra document regarding the precise extent to which biogenic carbon would be sequestered with the issue of whether biogenic carbon sequestration in landfill is a valid benefit to take into account.

22. The applicant has given no rational reason why it would be inappropriate to take account of the benefit identified by Defra within the context of assessing the relative net carbon impact of the proposal. Accounting for such impacts would be both logical and consistent with best practice as outlined above.

23. UKWIN's correction to the applicant's model used the applicant's own assumptions for the quantity of biogenic carbon expected to be sequestration in landfill. The applicant had used this figure without qualification for the purpose of calculating methane emissions, and so it is strange that the applicant now seems to be criticising themselves in relation to the figure they adopted in their own carbon assessment.

24. As such, the applicant's defence of their failure to account for biogenic carbon sequestration in landfill does not stand up to scrutiny, and it remains appropriate for the WPA to assess the application on the basis of the full relative net GHG impacts of the proposal as set out previously by UKWIN (and as further explored below).

Comment on Displacement of Grid Electricity

25. As previously stated by UKWIN (at paragraph 28 of UKWIN's February 2018 objection) the current relevant marginal emissions factor (MEF) for the earliest anticipated year of commissioning (2019) is **0.281** kgCO2e/kWh and this should be used for calculating the carbon intensity of displaced electricity.

26. As explained below, CCGT is no longer an appropriate comparator due to the passage of time and the changes in guidance that have occurred. As such, historic WPA and inquiry decisions that were made on the basis of superseded guidance and different years of commissioning are not relevant as they do not reflect the current context within which Waterbeach application will be determined.

27. The 0.281 kgCO2e/kWh figure is taken from the Her Majesty's Treasury (HMT) Green Book guidance, specifically from Cell F22 of Data Table 1: 'Electricity emissions factors to 2100' (last revised in December 2017), which is the Department for Business, Energy and Industrial Strategy (BEIS) long-run marginal generation-based figure expressed as kgCO2e/kWh (which is the same as tonnesCO2e/MWh).

28. Paragraph 3.31 of the January 2018 version of the BEIS Guidance on Valuation of Energy Use and Greenhouse Gas Emissions explains that: "For estimating changes in emissions from changes in grid electricity use, analysts should use the (long run) marginal grid electricity emissions factors in data table 1". The term 'long run' appears in the original BEIS guidance document.

29. The use of the MEF as the counterfactual instead of CCGT is the correct approach according to Paragraph 68 of Defra's February 2014 'Energy recovery for residual waste: A carbon based modelling approach', which reads: "It is assumed that the source of energy being replaced would have been generated using a plant with the carbon intensity (emissions factor) of the marginal energy mix in line with HMT Green Book guidance on appraisal and evaluation…"

30. The footnotes to Paragraph 68 make it clear that whilst CCGT was an appropriate counterfactual to use in 2014 it would not remain appropriate. This is because of the progress being made to decarbonise the UK's electricity supply.

31. Footnote 20 of 'Energy recovery for residual waste: A carbon based modelling approach' states that: "The marginal energy factor relates to the generation of an additional unit of grid electricity. There will be a range of different plants generating so the carbon intensity will be a mix of these. As this mixture will change with time so will the emissions factor…Currently [i.e. in February 2014] this is approximately the same as CCGT hence its use as the baseline value, however, this factor should only be used as a guide - use of the marginal factor is the correct approach for detailed analysis".

32. Paragraph 119 of 'Energy recovery for residual waste: A carbon based modelling approach' further confirms the use of a MEF rather than CCGT for more detailed analysis, stating: "…Up to now we have used the comparator of CCGT to estimate the CO2 offset from energy generation. More correctly we should use the marginal energy mix which represents the carbon intensity of generating an additional kW of electricity. Currently [i.e. in February 2014] this is comparable to CCGT…however, as renewable energy and nuclear make a

greater contribution to the marginal energy mix this will change and the result will be a significant drop in the carbon intensity of the marginal energy mix".

33. This is consistent with the advice contained at Footnote 29 of Paragraph 41 of the Government's Energy from Waste (EfW) Guide, which states: "…When conducting more detailed assessments the energy offset should be calculated in line with DECC guidance using the appropriate marginal energy factor…"

34. As has been noted above, 'Energy recovery for residual waste: A carbon based modelling approach' was published in February 2014. Subsequent to February 2014 the marginal emissions have fallen as predicted, meaning that the MEF has reduced from being similar to an historic CCGT figure of around 0.373 kgCO2e/kWh (as noted in the Defra Carbon Based Modelling Approach) to 0.281 kgCO2e/kWh for plants being commissioned in 2019 (as per BEIS Data Table 1).

35. This demonstrates how the situation is now significantly different to that in February 2014 when CCGT was considered an appropriate counterfactual, and this change necessitates the use of the "correct approach", i.e. the use of the long-run marginal generation-based MEF figure in line with current BEIS guidelines.

Third flaw in applicant's original methodology - asymmetrical accounting for biogenic CO2 emissions

36. Whilst exploring the issues raised by the applicant we noticed a further error in the applicant's original approach.

37. Separate to the issue of accounting for biogenic carbon sequestration is the question of whether or not one should include the emissions of biogenic CO2 from the processes. The applicant has chosen not to include the emissions of biogenic CO2 in relation to incineration on the basis that such emissions can, in their view, be assumed to be dismissed as 'carbon neutral'. The applicant then goes go on to include the biogenic CO2 from landfill. This is clearly inconsistent.

38. Looking at Table 12 in the applicant's original Carbon Analysis, we see that the 155,832 tonne figure includes CO2 emissions from both the landfill gas engine (28,824) and from landfill itself (31,652).

39. As the non-biogenic (fossil, e.g. plastic) element does not biodegrade in landfill it is not released into the atmosphere, and so the entirety of the CO2 emissions attributed to landfill in the applicant's Table 12 is biogenic CO2.

40. Given that the analysis (in the applicant's Table 4) discounts the biogenic CO2 emissions from the incinerator (claiming on page 9 that "For the carbon assessment, only carbon dioxide emissions from fossil sources need to be considered, as carbon from biogenic sources has a neutral carbon burden"), to be consistent, it should do the same with the biogenic CO2 released from landfill.

41. This means the landfill gas release figure in the applicant's Table 1 should be the 95,356 tonnes of CO2e figure from the applicant's Table 12 (and not a figure of 155,832 tonnes as this figure include the biogenic CO2 which the applicant considers to be 'carbon neutral').

42. If one compares the CH4 stated to be in the Landfill Gas (15,257 tonnes of CH4) set out in Table 12 with the quantities stated to be released into the atmosphere or burned in the gas engine (3,814 and 10,482 tonnes of CH4 respectively) then there is a discrepancy of 961 tonnes which represents CH4 stated to exist in Table 12 but for which Table 12 does not specify a fate. It is assumed that this 961 tonnes of CH4 is flared and released as biogenic CO2.

43. If one corrects for this third flaw, alongside correcting the other two flaws in line with UKWIN's February 2018 objection, then the proposal is assessed to be even worse relative to landfill landfill than had previously been assessed. Correcting this issues triples how much the proposal is worse than landfill in electricity-only mode and quadruples how much the proposal is worse than landfill in heat export mode.

44. The three flaws corrected in Table 1b below relate to:

A. Landfill gas release figure

B. Biogenic carbon sequestration

C. MEF

Table 1b - Carbon assessment results in tonnes CO2e/year – 50% biogenic content			
	Landfill baseline	**Electricity only**	**Heat Export**
Landfill gas release **(Corrects Flaw A)**	95,356		
Credit for biogenic carbon sequestered **(Corrects Flaw B)**	-73,608		
Electricity offset - landfill gas **(Corrects Flaw C)**	-13,843		
Transport	54	1,071	1,071
Natural gas offset			-11,550
Electricity offset - EfW **(Corrects Flaw C)**		-54,851	-52,688
Fossil Emissions - EfW		152,938	152,938
Net emissions	**7,959**	**99,158**	**89,771**
Net disbenefit (relative to landfill baseline)		**91,199**	**81,812**

Comment on assumed feedstock composition

45. The Government Review of Waste Policy 2011 states: "…while energy from waste has the potential to deliver carbon and other environmental benefits over sending waste to landfill, energy recovery also produces some greenhouse gas emissions. It is important to consider the relative net carbon impact of these processes, and this will depend on the composition of feedstocks and technologies used."

46. Waste composition data is fundamental to any assessment of the climate change impacts of incineration facilities because the composition of material to be used as feedstock, alongside the details of the technology, will determine the efficiency of energy generation, the carbon content of the waste (and therefore the amount of CO2 and CO2e emitted), the quantity of energy to be generated by the plant, and the percentage of the carbon which is biogenic or fossil in origin.

47. It is a matter of serious concern that so little background information or justification is provided with respect to the basis for the composition figures that are relied upon for the applicant's carbon analysis.

48. Section 3.1.1 of the applicant's original Carbon Assessment states: "The assumed carbon content of the waste used in the carbon assessment is consistent with the composition of waste used in the Air Quality Assessment of the Facility, and is based on information provided by Amey".

49. The paragraph goes on to state that 50-60% biogenic content is considered reasonable, but the Carbon Assessment does not show that the range of 50-60% biogenic content would be consistent with the feedstock implied by Table 3.

50. Without more detailed knowledge of the composition it is impossible to definitively assess the applicant's claims with respect to potential biogenic carbon content and to the calorific value (CV) of the feedstock (which is necessary to properly assess any claims regarding the quantity of energy that would be generated by the incinerator).

51. For example, if the carbon content figure used in Table 3 of the applicant's original Carbon Assessment is based on a high level of plastics being incinerated to maximise energy generation (due to plastic's high CV) then it could imply a significantly higher proportion of the CO2 released would be fossil-based CO2 than the 50% biogenic scenario used for the applicant's Carbon Assessment.

52. It is standard practice to set out the assumed waste feedstock composition as the anticipated relative proportions of the various waste types that are intended to be processed (e.g. paper, card, plastics, food waste, textiles, glass, metal, etc.) and their associated attributes (carbon content, CV, biogenic percentage, etc.).

53. When one supplies this sort of data, which is typical of most waste incinerator planning applications, one can assess the internal consistency of the assumptions used in relation to inputs (e.g. feedstock) and outputs (e.g. electricity).

54. This standard approach means that sensitivity analysis carried out in relation to changes in waste composition, e.g. to reflect the impact of the recently adopted Circular Economy Package's requirement to separately collect bio-waste by 2023, reveals all of the implications of such changes and not merely a selection of impacts.

55. The fact that the sensitivity analysis carried out by the applicant uses two different biogenic content scenarios but the same assumption regarding the quantity of carbon seems to indicate that the applicant does not know what the actual feedstock composition will be.

56. Generally speaking, if one has a higher biogenic content then this correlates with a lower carbon content because a larger proportion of the input waste will be water, and conversely a higher carbon content implies a lower biogenic percentage.

57. Therefore, the applicant should be expected to provide full details in relation to the basis for their assumed waste composition.

58. If, as the result of a more detailed assessment of the anticipated waste composition, it is determined that the likely composition differs from that previously assumed by the applicant, e.g. in their Air Quality Assessment, then the WPA should expect the Air Quality Assessment to be re-run using the basis of the more likely waste composition data.

59. At Paragraph 3.1.2.1 of their original Carbon Assessment the applicant refers to an assumption that "It is understood that [the incineration] Facility will export up to 24.4 MW...". The quantity of electricity to be generated by the proposed facility is not an assumption that should be 'understood', but rather a figure that should be transparently and openly calculated based on assumptions that include the CV of the materials used as inputs and the efficiency of the energy generation process for that specific feedstock.

60. The absence of such feedstock composition data and associated evidence to support assumptions about the feedstock composition further undermines the relevance of the applicant's Carbon Assessment to the determination of this planning application, and raises serious questions regarding the completeness of the applicant's Environmental impact Assessment.

UNITED KINGDOM WITHOUT INCINERATION NETWORK

Application by AmeyCespa for Levitt's Field, Waterbeach Waste Management Park, Ely Road, Waterbeach, Cambridge

Application Reference: S/3372/17/CW

UKWIN COMMENTS ON THE APPLICANT'S 'SECOND RESPONSE TO UKWIN' AND 'UPDATED CARBON ASSESSMENT' DATED 26TH JULY 2018

August 2018

General Comments

1. UKWIN does not believe that the points raised in our earlier submissions have been adequately addressed by the applicant's most recent submissions and we do not agree with the applicant's approach to the various issues identified.
2. The rationale for each of our previous comments is already set out in our previous submissions and as such we do not need to go back over the detail, unless the Waste Planning Authority would like us to clarify any of the specific points made in any of our submissions.

Relevance of Bilsthorpe Decision

3. The Waste Planning Authority needs to adequately understand the climate impacts of the proposal in order to satisfactorily evaluate the overall environmental impacts of the Waterbeach development and the consistency of the proposal with various local and national policies and objectives. As such, it is important that no issue raised by an objector is dismissed without due consideration of the merits of the issue with respect to the specific circumstances of the proposal being considered.
4. Paragraph 209 of the Government's Waste Review 2011 acknowledges that: … while energy from waste has the potential to deliver carbon and other environmental benefits over sending waste to landfill, energy recovery also produces some greenhouse gas emissions. It is important to consider the relative net carbon impact of these processes, and this will depend on the composition of feedstocks and technologies used". The applicant has not disputed this principle.
5. Paragraph 44 of the Government's Energy from Waste Guide states that: "There is significant debate on how a number of issues are handled that mean it is important to consider things on a case by case basis". The applicant has not disputed this principle.
6. The Secretary of State's Bilsthorpe Energy Centre decision was issued in June 2016, and was based on an Inspector's report from January 2016 in response to inquiry hearings which were held in November 2015. Since then, the marginal emissions factors of the energy supply has decarbonised and new guidance on this issue has been released by the Government.

7. Given these points and the significant difference in circumstances between the two proposals, including the passage of time and therefore the further decarbonisation of the marginal energy supply, it is difficult to see how the Bilsthorpe decision provides a useful basis for assessing the relevance of the issues currently being raised by UKWIN in relation to the markedly different Waterbeach proposal.

8. In Section 2.1 of the applicant's Second Response to UKWIN (dated 26th July 2018), the applicant appears to accept that there are significant differences between the Bilsthorpe Energy Centre and the applicant's proposed Waterbeach facility and that neither the Inspector nor the Secretary for the Bilsthorpe decision stated that the issues raised by UKWIN could not provide grounds for refusing different Energy from Waste schemes in other circumstances, e.g. proposals that did not contain the provision for fuel cell technology that was part of the potential provided by the Bilsthorpe Energy Centre.

9. For the avoidance of doubt, UKWIN's comments on the relevance of the Bilsthorpe decision to the current Waterbeach proposal were not limited to the relevance or otherwise of the methodology applied by the Bilsthorpe applicant's climate change witness.

10. Neither the Bilsthorpe Inspector nor the Secretary of State commented on the details of the methodologies applied by any of the Bilsthorpe inquiry parties. The primary focus of UKWN's comments were and are therefore about the relevance or otherwise to Waterbeach of the conclusions reached by the Secretary of State given the differences in circumstances previously highlighted, including the new guidance released subsequent to the Bilsthorpe decision.

11. Thus, the applicant's criticisms of UKWIN's references to Bilsthorpe are not accepted, and UKWIN's previous comments still stand, alongside the new points raised above.

Sequestration of biogenic carbon

12. The Eunomia document cited by UKWIN makes it clear that it is best practice to account for biogenic carbon sequestration in comparative assessments, not simply for the purpose of international carbon accounting.

13. To repeat the original quotes from 'The Potential Contribution of Waste Management to a Low Carbon Economy': "All lifecycle studies engaged in comparative assessments of waste treatments should incorporate CO2 emissions from non-fossil sources in their comparative assessment" and "In comparative assessments between waste management processes, it cannot be considered valid to ignore biogenic CO2 emissions if the different processes deal with biogenic CO2 in different ways…" (emphasis added).[1]

14. The 'best practice' nature of accounting for biogenic carbon is further confirmed by the recent Rye House inquiry for an incinerator proposal for Hoddesdon, where all parties including the applicant's expert witness included the benefits of biogenic carbon sequestration in their assessment of relative net climate change impacts.

15. It is also worth noting that, prior to the Rye House inquiry where account of the benefits of biogenic carbon sequestration was taken as a matter of course, in previous planning inquiries this same expert witness, instructed by the same waste company, had not included the benefits of biogenic carbon sequestration, indicating a shift in the emerging standard industry practice to reflect best practice.

16. The Waterbeach applicant has yet to provide a convincing argument as to why accounting for biogenic carbon sequestration should not be considered best practice and why the impact should not be taken into account when modelling relative net climate change impacts for the Waterbeach proposal.

17. In relation to the applicant's use of the 12th February 2018 quote, found on Page 2 (within Section 2.2) of their Second Response to UKWIN (dated 26th July 2018), we note that the passage that is quoted relates to a portion of the modelling report which relates to landfill and EfW emissions and which fails to address other aspects of the Carbon Cycle, meaning that the quoted passage fails to address the issue of carbon sequestration, and focuses instead on emissions in isolation from other key elements within the Carbon Analysis as a whole, in particular those elements relating to carbon sequestration in landfill.

18. As such, UKWIN's submission to the Waste Planning Authority (WPA) which provide more detailed and comprehensive analysis, provide the WPA with a more accurate basis for assessing the climate change impacts of the proposed development.

[1] https://zerowasteeurope.eu/downloads/the-potential-contribution-of-waste-management-to-a-low-carbon-economy/

Displacement of grid electricity

19. The generation capacity of CCGT is two orders of magnitude greater than the generation capacity of the proposed Waterbeach incineration plant.

20. The gross generation capacity of the proposed Waterbeach development is claimed to be around 27 MWe.

21. By way of comparison, the capacities associated with emerging CCGT plants include around:

    a) 2,000 MW for Ferrybridge D[2],

    b) 1,700 MWe for SembCorp Tees[3], and

    c) 2,500 MW for Eggborough[4].

22. Thus, it seems obvious that the Waterbeach proposal would not literally be displacing a potential CCGT plant. As such, it is clear that the long-run BEIS marginal emissions factor should be applied in line with the Government's Energy from Waste Guide and the latest BEIS guidance.

23. Given the passage of time since UKWIN's previous submissions and the fact that a permit application has yet to be applied for, it seems that the likely date of commissioning of the proposed Waterbeach plant would be later than UKWIN has previously assumed. Therefore, it now seems more appropriate to assess the Waterbeach application using the Long-run Marginal Energy Factor (MEF) of 0.270 for 2020, or more conservatively the 0.258 MEF for 2021, rather than the 2019 MEF of 0.281.

Asymmetrical accounting for biogenic carbon

24. As per Eunomia's guidance and the aforementioned best practice, ignoring biogenic CO2 for both incineration and landfill is not an appropriate approach if the two processes release different quantities of biogenic CO2.

[2] https://infrastructure.planninginspectorate.gov.uk/projects/yorkshire-and-the-humber/ferrybridge-d-combined-cycle-gas-turbine-ccgt-power-station-project/?ipcsection=overview
[3] https://infrastructure.planninginspectorate.gov.uk/projects/north-east/tees-ccpp/?ipcsection=relreps
[4] http://www.eggboroughccgt.co.uk/

25. The applicant's most recently suggested modelling has not demonstrated that the two processes would Emit the same quantities of biogenic CO2, and as such the applicant has not demonstrated that it would be methodologically appropriate to exclude biogenic emissions for the incinerator side of their model.

26. As set out in UKWIN's previous submissions, when proper account is made of the biogenic carbon sequestered in landfill, the relative net carbon impact of the proposed Waterbeach incinerator, when compared to landfill, is adverse.

Comment on assumed feedstock composition (and electricity exported)

27. As mention is made of calorific value in Section 2.5 of the applicant's Second Response to UKWIN, we would expect to see an appropriate calculation of the energy content of the input waste.

28. The applicant appears to be assuming 26.6% overall net calorific value (NCV) thermal efficiency. That is to say, they assume 195,200 MWh/annum net electricity exported (as per Table 7 of 26th July 2018 Updated Carbon Assessment, on Page 8) based on 2,645,000,000 Mj/annum NCV thermal input (as per Table 2 of 26th July 2018 Updated Carbon Assessment, on Page 5) which equates to 734,781 MWh/annum. 195,200 divided by 734,781 is 0.2656573, i.e. 26.6%.

29. Reference is made by the applicant to a series of analyses undertaken by Amey in relation to MBT and MRF rejects and outputs to inform the waste characteristics set out in Table 1 of their Updated Carbon Assessment, on Page 3, but it does not appear that the applicant has provided copies of this analysis as part of their application. The mass balance analysis in Appendix 4-1 to the Planning Statement does not provide details of the characteristics of the waste feedstock, let alone details of the analysis upon which the appendix is presumably based.

30. Reference is made by the applicant to the anticipated waste feedstock for the Waterbeach incinerator proposal containing significant quantities of material (around 17%, i.e. 38,600 tonnes out of a total of 228,446 tonnes used for the Base Case in Table 2 of the Updated Carbon Assessment, on Page 5) which has gone through an MBT process to produce compost-like output (CLO).

31. In the first instance, it is unclear why this compost-like material could not simply be sold as compost. For example, is it because the applicant has failed to meet the relevant quality standards for this material?

32. Secondly, the inclusion of CLO raises questions of the extent to which that waste might be significantly more bio-stabilised than conventional mixed waste. Such bio-stabilisation would significantly alter (possibly virtually eliminating) the quantity of methane that would be released were the material to be sent to landfill.

33. According to Defra's 2011 Economics of Waste and Waste Policy report: "MBT (mechanical biological treatment)-landfill provides the best emissions performance in terms of the treatment/disposal of residual waste. It essentially involves landfilling somewhat stabilised wastes…The magnitude of the environmental impact depends on the extent to which the waste is stabilised".[5]

34. It seems that Table 4 of the Updated Carbon Assessment is based on 'default emissions factors' for CH4 (methane) without any consideration of the reduction in methane emissions that would result from bio-stabilisation via the biological treatment aspect of the MBT processes. As such, the applicant could be significantly overestimating the release of methane from landfill.

35. Furthermore, there are outstanding questions regarding the extent to which other waste streams would biodegrade in landfill. For example 7,400 tonnes of the waste throughput is said to be waste wood and 15,700 tonnes is said to be IVC Oversize, which whilst biogenic do not significantly degrade in landfill (due to the behaviour of the lignin within the waste wood and oversized 'garden waste' associated with the IVC rejects).

36. This adds approximately an additional 10% to the aforementioned 17%, meaning that a large proportion of the biogenic content of the anticipated feedstock may well not release the levels of methane anticipated in the Updated Carbon Analysis, and that the landfilling of this material would act as a carbon sink to store the carbon, in sharp contrast to the proposed incinerator which would immediately release all of the carbon.

37. Thus both the emissions of methane from landfill could be significantly lower and the CO2e emissions from the incinerator could be relatively higher than assumed by the applicant in their Updated Carbon Assessment.

---

5 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69500/pb13548-economic-principles-wr110613.pdf

38. It is factors such as this, which derive in part from the applicant's use of an unconventional waste feedstock, which highlight the importance of full details of the composition and its characteristics being provided and then for the analysis to be based on this composition rather than on default values which are likely to have been derived for a more conventional mixed waste feedstock such as unprocessed MSW.

39. To support their claims regarding electrical output, details on the gross calorific value (GCV) and NCV of the waste input should be accompanied by evidence of the plant's likely (GCV and NCV based) net efficiency for those inputs.

40. The applicant should therefore be expected to provide:

    a) A Sankey energy balance diagram;

    b) An energy flow diagram for the steam cycle (or, at the very least, details of the maximum temperature and the maximum pressure);

    c) A firing/stoker diagram which shows the impact of changes in input CV and waste throughput on the electrical output; and

    d) Details of the reduction in electrical output that would result from operating in CHP mode; and

    e) Details of the actual efficiency performance of equivalent operational facilities.

41. To date, the applicant does not appear to have provided these diagrams and details, rendering it impossible to evaluate the validity of the applicant's assertions in relation to their net electricity output claims. If the applicant is hoping that their claims will be afforded any weight in the planning balance then they should provide these diagrams and details.

42. In the absence of such information from the applicant, the Waterbeach proposal should, for the determination of the planning application, be assessed on the basis that the facility would be considerably less efficient than claimed by the applicant, and more in line with the lower end of the range of typical efficiencies as set out at Paragraph 74 of the Government's EfW Guide, i.e. 15% - 20% overall efficiency.