
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 (CO₂) 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 CO₂ will be released from incineration, and also how much CO₂ 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 CO₂ associated with 20,075 tonnes of carbon as follows: $20,075 \times 44 / 12 = 73,608$ tonnes CO₂ 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 subtracts the 73,608 tonnes CO₂ avoided through landfill from this benefit then the incinerator would actually result in a net disbenefit of 20,425 tonnes of CO₂.
21. This means that, based on the applicant's own assumptions but correcting for their mistake in omitting the CO₂ 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 CO₂ 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 CO₂ 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://zerowasteurope.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:
- $$195,200 \times 0.35156 = 68,625 \text{ tonnes CO}_2 \text{ (same as stated in Table 8)}$$
- $$195,200 \times 0.281 = 54,851 \text{ tonnes CO}_2 \text{ (uses 2019 marginal factor)}$$
- $$68,625 - 54,851 \text{ tonnes} = \underline{13,774} \text{ tonnes of CO}_2 \text{ not displaced by electricity generation from the proposed incinerator}$$
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:
- $$49,263 \times 0.35156 = 17,319 \text{ tonnes CO}_2\text{e (same as stated in Table 14)}$$
- $$49,263 \times 0.281 = 13,843 \text{ tonnes CO}_2\text{e (uses 2019 marginal factor)}$$
- $$17,319 - 13,843 \text{ tonnes} = \underline{3,476} \text{ tonnes of CO}_2\text{e not displaced by electricity generation from landfill gas}$$
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 CO₂e 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).