

30 May 2022

Sheelagh Laguna  
A/Team Leader – Industry Assessments  
Department of Planning and Environment

Cleanaway Pty Ltd  
ABN: 79 000 164 938

1725 Elizabeth Drive  
Kemps Creek NSW 2178  
Australia

Dear Sheelagh,

**Kemps Creek Suez Advanced Waste Treatment Facility Review of the Greenhouse Gas Feasibility Report (MP06\_0185 PA-18)**

I am writing in response to the request for additional information relating to the Greenhouse Gas Feasibility Report sent by the Department on 27, April 2022. The Department has requested to submit a revised Greenhouse Gas Feasibility Study report in accordance with the Condition 11 of Schedule 3 of the approval for the Kemps Creek Suez Advanced Waste Treatment Facility (MP06\_0185).

The Department has stated that the submitted Greenhouse Gas Feasibility Report did not meet the requirements of Condition 11. Ramboll has been re-engaged to update the report and has proposed the below responses points mentioned in the letter.

***Point 1: Options to capture and use greenhouse gas emissions in the generation of electricity when the facility is at maximum approved capacity.***

Methane and Oxygen measurements were taken in the composting areas to demonstrate that aerobic conditions are being maintained. These measurements were included in the Greenhouse Gas Feasibility Report section 6.1. The measurements concluded that no methane was generated in the halls. This means that it is not feasible to capture methane to generate electricity.

These measurements were taken when the facility was at normal operational conditions with General Solid Waste. No biosolids were present when the methane measurements were taken. However, biosolids are organic compounds and should not/ in theory produce methane if aerobic conditions are maintained. The measurements demonstrate that aerobic conditions were and are maintained in the composting tunnels. See extract below:

		<p>Calibrated portable multi-gas detector used for monitoring methane and oxygen. The Calibration Report is attached as Appendix 1.</p>
		<p>Gas monitoring taken in first location in Composting Tunnels</p> <p>First location read 0% COMB/EX (methane / CH4 is included in the COMB/EX measurement) and 20.8% oxygen / O2.</p>
		<p>Gas monitoring taken in second location in Composting Tunnels</p> <p>Second location read 0% COMB/EX (methane / CH4 is included in the COMB/EX measurement) and 20.7% oxygen / O2.</p>

**Point 2:** Quantification of greenhouse gas emissions when the facility is operating at the maximum approved capacity (i.e including up to 14,400 tpa of biosolids inputs, and with the 5 maturation tunnels in operation)

CO<sub>2</sub> (Carbon Dioxide) is the only gas that is created and can be quantified at the facility. It should be noted that CO<sub>2</sub> created from organics is not typically classed as a net Greenhouse gas emission.

**CO<sub>2</sub> Calculation:**

Fst = Feedstock: 120,000 tpa

Eff = Efficiency: 50%

Vol = Volatile Matter in Waste (assumption from industry norm. This can vary depending on feedstock): 80%

H<sub>2</sub>O = Moisture: 50%

Car = Carbon Content in MSW (assumption from industry norm. This can vary depending on feedstock): 45%

Fst / H<sub>2</sub>O = 60,000 tpa  
 60,000 x Vol (0.8) = 48,000 tpa  
 48,000 x Eff (0.5) = 24,000 tpa  
 24,000 x Car (0.45) = 10,800 tpa  
 10,800 tpa = carbon (C)  
 C (Losses) = 10,800,000,000 g  
 900,000,000 mol

Composting process (Carbon balance): C + O<sub>2</sub> = CO<sub>2</sub>

O<sub>2</sub> 1,800,000,000 mol  
 CO<sub>2</sub> 2,700,000,000 mol  
 CO<sub>2</sub> 118,800,000,000 g  
 CO<sub>2</sub> = 118,800 tpa

**Point 3:** A threshold for when the capture of greenhouse gas emissions would be reasonable and feasible, the basis for using the threshold, and an assessment of when the projected greenhouse gas emissions from the approved development would reach this threshold.

This point raised by the department requested a threshold to be identified for when the capture of greenhouse gas would be reasonable and feasible.

Biogas would need to be created to make it reasonable and feasible to capture the greenhouse gas. Biogas is mainly made up of methane and CO<sub>2</sub> generated from the decomposition of organic material in the absence of oxygen. Referring to the environmental guidelines for “Composting and Related Organics Processing Facilities” issued by the Department of Environment and Conservation (NSW), biogas is made up of an approximate mixture of 65% methane and 35% CO<sub>2</sub>. The Guidance states that “energy recovery systems can be installed to recover energy from biogas”. A Gas engine for power production requires approx. >25-35% methane to be cost-effective.

For this reason, >25-35% methane should be used as the threshold to make it reasonable and feasible to capture greenhouse gas (biogas). As mentioned in Point 1, the facility does not create any methane as it is an aerobic process. This means that the facility will not reach the identified threshold under its operating conditions.

In addition, based on the observations and readings taken at the facility (referring to the readings in the extracted photos above under Point 2) no methane was generated. This indicates it will never be reasonable nor feasible to capture the greenhouse gas (biogas) to power up a gas engine.

Please advise if the above information adequately addresses the points and meets the requirements of the Condition 11 of Schedule 3 of the approval. If approved, Cleanaway will submit finalised Greenhouse Gas Feasibility Report updated to include this information to the Department.

If any further information is required on this matter, please feel free to contact Khushboo Singh on 0436 443 204 or via email at [Khushboo.singh@cleanaway.com.au](mailto:Khushboo.singh@cleanaway.com.au).

Yours sincerely,



Louise Saunders

NSW ARRT and Organic Manager