

## **Melbourne Water Innovation Competition – Reducing Scope 1 Greenhouse Gas Emissions**

### **Responses to Questions Received between 31 October 2018 and 07 November 2018**

NOTE: Some similar questions have been consolidated into a single question and answer. A question has been held over while data is assembled.

#### ***Q 34. What is the expected level of implementation finally expected with the \$200k award?***

The competition is focused on reducing Scope 1 greenhouse gas emissions from any source at Melbourne Water’s wastewater treatment plants. No actual implementation is necessarily expected within the funding pool provided by the Competition. The development delivered by preparation and conduct of a Detailed Solution, if awarded, will depend on the work conducted under the Detailed solution. See Section B7 of the Request for Solution document. Please also refer to Melbourne Water’s response to “Question 33”, in “Innovation Competition FAQ responses 30 October 2018” on the website <http://www.melbournewater.com.au/innovation-competition>.

#### ***Q 35. Can the solution focus on just one treatment plant or does it have to be applied to both?***

The response can focus on either or both treatment plants. The focus is on reducing Scope 1 greenhouse gas emissions from any source at Melbourne Water’s wastewater treatment plants.

#### ***Q 36. Where can we find information on existing or recent past projects (e.g. including research projects) that Melbourne Water has undertaken in the area of greenhouse gas emissions measurement and/or reduction?***

Melbourne Water’s work to date is detailed in Section B.1.d of the Request for Solution document.

#### ***Q 37. Does Melbourne Water capture and use all methane from the existing anaerobic digesters and anaerobic lagoons or is some of this methane flared?***

Methane rich biogas is captured from the anaerobic digestion processes at both the ETP and the WTP. Where possible this is delivered to power stations to fuel

biogas fuelled generator sets producing electricity to run the plant. Excess biogas is

delivered to flares for combustion. However some biogas is believed to escape as dissolved methane in the effluent and be released to atmosphere.

***Q 38. At the WTP are sludge lagoons part of the future solution from an operations and biodiversity point of view?***

Sludge drying occurs in constructed drying pans. Please refer to Melbourne Water's response to "Question 28", in "Innovation Competition FAQ responses 30 October 2018" on the website

<http://www.melbournewater.com.au/innovation-competition>. These pans, if alternate sludge drying or processing were available, could be decommissioned without affecting plant operations or biodiversity.

Separate to sludge drying pans, at the WTP sludge accumulates over time in facultative/maturation lagoons and is periodically dredged. Some of these lagoons have significant biodiversity values and therefore will be retained as part of any future solutions.

***Q 39. Though typical depths of ponds vary what is the typical depth of aerobic lagoons at WTP?***

Please refer to Melbourne Water's response to "Question 29", in "Innovation Competition FAQ responses 30 October 2018" on the website

<http://www.melbournewater.com.au/innovation-competition>

***Q 40. Does Melbourne Water use DO probes for control of aeration systems or are aerators DOL 100%?***

At the ETP and WTP aeration in the activated sludge process is controlled by DO probes via the plant control system. At the WTP surface aeration of aerobic lagoons is not controlled.

***Q 41. Is there any signs that N<sub>2</sub>O and CH<sub>4</sub> emissions will be regulated in Australia?***

Melbourne Water is required to annually report its greenhouse gas emissions and energy use under Australia's National Energy and Greenhouse Reporting Scheme (NGERS). The Victorian state government has required the state owned water industry, including Melbourne Water, to target zero net carbon emissions by 2030. This is documented in Section B.1.c of the Request for Solution document.

***Q 42. What is the IP agreement between innovator (proponent) and sponsor (Melbourne Water)? Will IP remain with entrant?***

The approach to Intellectual Property for idea submission is documented in Section E of the Request for Solution and Returnable Schedule 3 for submission of any Detailed Solution, if awarded.

***Q 43. Do you have online N<sub>2</sub>O sensors?***

No. However Melbourne Water is investigating the use of submerged sensors to detect dissolved N<sub>2</sub>O for monitoring.

***Q 44. How would a possible solution be best proven? Do you have pilot plants or a testing facility?***

Development and proof of any idea will depend on its level of maturity and development work needed. This may range from theory, to bench trialling to large scale piloting, depending on the level of development. Melbourne Water has some existing trial facilities (for example a nitrite shunt demonstration plant and high-rate algal raceway ponds), however does not have existing pilot plants or testing facilities dedicated to greenhouse emissions reduction.

***Q 45. Is there any additional weighting for submissions for Australian based companies?***

No. The Competition is open to anyone, without favouring any particular country.

***Q 46. Are we required to have a presence in Australia to take part? Or have a partner company for delivery, if selected?***

Individuals, institutions and corporations based in Australia and overseas are eligible to apply.

***Q 47. Are their plans for additional digesters/digestion at ETP?***

There are no current plans to increase constructed digestion volume at the ETP. However projects are underway to better utilise existing digester volume via improved thickening of feed sludge and recuperative thickening of digestate.

***Q 48. Would you consider electrocoagulation as a decentralised, adaptable, cost effective and proven solution based on past successes and technical viability?***

Melbourne Water is interested in any ideas, technologies or novel process solutions that would materially reduce Scope 1 greenhouse gas emissions.

***Q 49. What is the total volume of wastewater to be treated in the ETP and WTP? per day?***

Please refer to Melbourne Water's response to "Question 30", in "Innovation Competition FAQ responses 30 October 2018" on the website <http://www.melbournewater.com.au/innovation-competition>.

***Q 50. Would you consider ammoniacal nitrogen removal from wastewater into a reusable commodity product?***

Melbourne Water is interested in any ideas, technologies or novel process solutions that would materially reduce Scope 1 greenhouse gas emissions.

***Q 51. What level of technical detail will be required in the submission?***

Please refer to Melbourne Water's response to "Question 12", in "Innovation Competition FAQ responses 30 October 2018" on the website <http://www.melbournewater.com.au/innovation-competition>.

***Q 52. Can you inform us of weightings for submission detail?***

The Evaluation Assessment is detailed in Section B6 of the Request for Solution document. Melbourne Water will not be making public the individual weightings of the Evaluation Criteria.

***Q 53. Are any partner companies involved?***

Melbourne Water is conducting the Competition in partnership with the Victorian Government's Department of Environment, Land, Water and Planning (DELWP). No other partners are involved.

***Q 54. Are there any other discharge limits for the wastewater treated other than reduction of emissions?***

The ETP and the WTP must meet discharge licence requirements set by EPA Victoria. However, Melbourne Water is interested in any ideas, technologies or novel process solutions that would materially reduce Scope 1 greenhouse gas emissions even where these impacted licence compliance.

***Q 55. Will this slide presentation be made available for future reference?***

Recordings of the webinar series are now available on the website <http://www.melbournewater.com.au/innovation-competition>.

***Q 56. Are the mesophilic digester's suited for conversion to thermophilic operation?***

The ETP digesters are thick-walled concrete tanks, ranging in age from 20 to 40 years. A previous assessment concluded that converting them from mesophilic to thermophilic operation would present structural risks including cracking and leakage, due to increased temperature gradients and thermal expansion. Further work would be needed to determine whether these structural risks could be managed. Other components (e.g. heat exchangers) would also require modification or augmentation to enable thermophilic operation.

***Q 57. To which extend is Bio-P implemented or operational at the sites?***

Neither of Melbourne Water's wastewater treatment plants incorporates biological phosphorus removal processes. Both plants are designed primarily for ammonia removal (ETP, WTP) and total nitrogen removal (WTP). Any reduction in phosphorus is incidental with the biological processes employed.

***Q 58. Is the digestate from digesters dewatered or put out for drying as such?***

Please refer to Melbourne Water's response to "Question 28", in "Innovation Competition FAQ responses 30 October 2018" on the website <http://www.melbournewater.com.au/innovation-competition>

***Q 59. Are submissions for ideas intended to be from one entity or can they be from teams?***

Entries will be received from single entities or from teams.

***Q 60. What if solution spans two categories? Does it have to be limited to one of the categories?***

Solutions spanning more than one category are acceptable. The focus is on reduction of Scope 1 greenhouse gas emissions..

***Q 61. Can you provide a more detailed breakdown of Scope 1 emissions***

Please refer to Melbourne Water's response to "Question 18", in "Innovation Competition FAQ responses 30 October 2018" on the website <http://www.melbournewater.com.au/innovation-competition>. Should you require more detailed emission data, please request this via email at [innovationcontest@melbournewater.com.au](mailto:innovationcontest@melbournewater.com.au) specifying your requirements in detail. Data will be provided if available.

**Q 62. Do we need to include costing for solution with submission?**

Costing is not part of the initial Request for Solution. Cost may become important in developing a Detailed Solution, if awarded.

**Q 63. Are there expected to be license requirement changes?**

Please refer to Melbourne Water's response to "Question 31", in "Innovation Competition FAQ responses 30 October 2018" on the website <http://www.melbournewater.com.au/innovation-competition>

**Q 64. Will raw data from SCADA systems be available for analysis during any of the phases?**

Please refer to Melbourne Water's response to "Question 26", in "Innovation Competition FAQ responses 30 October 2018" on the website <http://www.melbournewater.com.au/innovation-competition>.

**Q 65. Your design brief states that your emissions total 188 000 t/yr. However in your background documentation your emissions for the ETP totals 98 086 t/yr CO<sub>2</sub>e whilst for the WTP it totals 105 658 t/yr CO<sub>2</sub>e. This adds up to 203 744 t/yr CO<sub>2</sub>e. This is greater than the 188 000 t/yr CO<sub>2</sub>e stated in the design brief. I was wandering which figure is correct?**

The long term average emissions (eg 188,000 tCO<sub>2</sub>e) are detailed in Section B.1.c of the Request for Solution document. Emissions for a specific year (2017-18) are shown in Figs 1b and 2b of the Request for Solution document. The 2017-18 emissions are for that year and display the variability of specific years from averages.

**Q 66. Do the sludge drying pans in the WTP emit any methane? It was stated that the sludge drying pan in ETP emit methane on the order of 42 984 t/yr CO<sub>2</sub>e. What is it about the sludge drying pans in the WTP that make them emit 0 t/yr CO<sub>2</sub>e?**

Figure 1b and 2b in the Request for Solution document show the emissions from the ETP and WTP. These emissions are reported in accordance with Australia's National Energy and Greenhouse Reporting Scheme (NGERS). In the case of the ETP, sludges are delivered from covered digesters to drying pans where their emissions are reported. In the case of the WTP emissions from sludges are reported in their source lagoon, not the drying pan.

**Q 67. Regarding mass flows and composition of gas and sludge for certain sections of the plants which I need clarified so that I may perform the necessary calculations for unit sizing and pricing?**

Please see the summary table, below, for biogas produced by the anaerobic digestion processes at the ETP and WTP:

<b>Parameter</b>	<b>WTP</b>	<b>ETP</b>
Annual biogas flow	37 Mm <sup>3</sup> /yr	21 Mm <sup>3</sup> /yr
CH <sub>4</sub>	82%	59%
CO <sub>2</sub>	14%	40%
Other	4%	1%

Please also refer to Melbourne Water’s response to “Question 23”, “Question 24”, “Question 25” and “Question 28”, in “Innovation Competition FAQ responses 30 October 2018” on the website <http://www.melbournewater.com.au/innovation-competition>

**Q 68. What is the composition and mass flow rate of air exiting the activated sludge plants for the ETP and WTP in terms of O<sub>2</sub>, CO<sub>2</sub>, N<sub>2</sub> and N<sub>2</sub>O?**

Limited composition and mass flow rate data is available for air exiting the aeration tanks at the ETP and WTP (25W activated sludge system) where submerged diffusers are used. Little or no data is available for the WTP (55E activated sludge system) aeration tanks where surface aeration is used. Request for data at specific locations will be provided if available and where requested.

**Q 69. What is the mass flow rate of sludge to the drying pans for the ETP and WTP in t/yr and what is their initial and final moisture content.**

Please refer to Melbourne Water’s response to “Question 23” and “Question 28”, in “Innovation Competition FAQ responses 30 October 2018” on the website <http://www.melbournewater.com.au/innovation-competition>.

**Q 70. You mentioned in your background information that you were pursuing co-digestion options for your anaerobic digesters. What would be the additional capacity that your digesters would be able to handle in tonnes/yr of waste treated?**

No additional capacity for co-digestion is available. Additional co-digestion would require augmentation of digester capacity.

**Q 71. . Is the process of the sludge drying at the waste water treatment plant a considered part of the innovation contest?**

Yes. Melbourne Water is interested in any ideas, technologies or novel process solutions that would materially reduce Scope 1 greenhouse gas emissions.

***Q 72. We need to know which technology for sludge drying is used today at the waste water treatment plants East and West in Melbourne?***

Please also refer to Melbourne Water's response to "Question 28", in "Innovation Competition FAQ responses 30 October 2018" on the website <http://www.melbournewater.com.au/innovation-competition>

***Q 73. Is it possible to get some information about analysis values and distribution of the emissions at the waste water treatment plants?***

Please refer to the Request for Solution document in general, and specifically to Sections B.1 and B.3.

Web Page: <http://www.melbournewater.com.au/innovation-competition>  
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