Innovation Competition

Scope 1 Greenhouse Gas Emissions

Summary

Melbourne Water treats and disposes of approximately 90 per cent of the sewage generated in Melbourne and the wider metropolitan area at our two world-class treatment sites; Western Treatment Plant (WTP) and the Eastern Treatment Plant (ETP).

Together, the plants provide Melbourne with a vital service for protecting public health and the environment.

We are committed to continually improving our processes and are working towards a target of zero net carbon emissions by 2030.

To help us achieve this, we are running an Innovation Competition to identify ways to reduce our direct (Scope 1) greenhouse gas emissions from the treatment plants. This competition gives you the opportunity to submit your ideas. Winners will share in a pool of up to $200,000 (AUD), allowing them to take the next steps in bringing their ideas to life.

A solution is either an existing or proposed idea, product or process that has the potential to measure, model, materially reduce or eliminate methane and nitrous oxide emissions.

This competition opens on **22 October 2018**. The deadline for submissions is at 5pm on **3 December 2018**.

Three briefing sessions for interested entrants will be held on **30 October 2018** – **1 November 2018**.

For more information go to: **www.melbournewater.com.au/innovation-competition**

Background

Melbourne Water

Melbourne Water makes a vital contribution to the famous Melbourne lifestyle by underpinning human health, enhancing community well-being, supporting economic growth and balancing the natural and man-made environment.

The organisation is responsible for the supply of affordable, high-quality water, reliable sewerage, healthy waterways, integrated drainage and flood management services and cooler greener spaces, helping make greater Melbourne a fantastic place to live.

Climate Change

Climate change is a critical challenge for the entire community and our natural environment. Melbourne Water's services, infrastructure and customers are impacted by these challenges and can be subject to the effects of drought, fire, floods, storms and sea level rise. Addressing the challenge of climate change is central to Melbourne Water's commitment to protecting the environment, promoting conservation, and ensuring safe sewage treatment and healthy drinking water.

In 2017 Melbourne Water adopted a new *Climate and Resilience Plan*, building on nearly two decades of effort to understand and respond to climate change. The new plan will continue to expand our climate change work, and support implementation of the new *Victoria Climate Change Adaptation Plan*.

Greenhouse Gas Emissions

Melbourne Water emits approximately 408,000 tCO_2e[1]/year (average Melbourne Water greenhouse gas emissions 2011 to 2016) of greenhouse gas emissions and accounts for 51% of the Victorian water sector total greenhouse gas emissions.

Greenhouse gas emissions are reported as Scope 1 emissions – emissions directly emitted by Melbourne Water's operations (mostly from wastewater treatment) and Scope 2 emissions – emissions emitted from Melbourne Water's use of grid electricity. Melbourne Water's total emissions comprise approximately 46% Scope 1 (188,000 tCO_2e/year) and 54% Scope 2 (220,000 tCO_2e/year).

In 2016 the Victorian Government published its *Climate Change Framework*, which included a legislated commitment to achieving zero net carbon emissions across the state by 2050. As a government-owned business and wishing to adopt a leadership position, Melbourne Water's Board has endorsed a pledge that commits to reaching zero net emissions by 2030, over two pledge periods. Under the Victorian State Government's *Take 2* Program[2] and by the *Statement of Obligations* (*Emission Reduction*), Melbourne Water has committed to reducing its greenhouse gas emissions by 50% (below 204,380 tCO2e/year) by 2024/25[3] and to achieve net zero emissions by 2030.

Melbourne Water is committed to achieving its pledge targets and making a meaningful contribution to the mitigation of climate change risks. To achieve this Melbourne Water will make material emissions reductions and be an industry-leader in the area of greenhouse emissions.

Our Response to the Climate Change Framework

Melbourne Water has a long history of undertaking carbon reduction initiatives, both in the use of its resources and infrastructure to generate its own electricity from renewable sources (reduced Scope 2 emissions), and in the capture of fugitive emissions both ETP and WTP (reduced Scope 1 emissions).

Melbourne Water has in train a number of large projects to reduce Scope 2 emissions by becoming a self-supplier of electricity. These include: expansion of an existing biogas-fuelled power station; planned construction of large and mid-scale solar power stations; and energy efficiency measures. These will substantially reduce Melbourne Water's Scope 2 emissions by reducing the need for imported grid electricity.

There are currently limited identified opportunities to reduce Scope 1 emissions, which are largely due to wastewater treatment

[1] tCO_2e = tonnes carbon dioxide equivalent
[2] See https://www.take2.vic.gov.au/ which defines Melbourne Water's operating environment under the Victorian Government
[3] Statement of Obligations (Emission Reduction), March 2018

processes. Melbourne Water will seek to materially reduce Scope 1 emissions rather than relying on emission offsets to achieve targets and so a large program of work has been initiated to further investigate direct emissions measurement and reduction. To date these include:

- Measurement of nitrous oxide and methane emissions from the surface of aerated lagoons and tanks forming part of an activated sludge process;
- Measurement in air of methane emissions downstream of a covered anaerobic lagoon; at surface and at elevation
- Measurement of methane dissolved in partly treated wastewater
- Review of literature for emission measurement technologies suitable for large diffuse emission sources
- Monitoring of wastewater constituents at a large number of points within the treatment process
- Trialling of alternate sewage treatment methods such as the use of algae, short-cut nitrogen removal, etc.
- Ensuring combustion of captured biogas, rather than release to atmosphere

Melbourne Water hosted an international "Emissions Impossible" workshop in March 2018, bringing together global and local expertise to identify innovative concepts to reduce methane and nitrous oxide gas emissions from wastewater treatment plants. More than 60 International and Australian participants attended the workshop, which was followed by two days of site visits and individual discussions. The workshop focused on identifying and fostering novel treatment and resource recovery ideas to reduce Scope 1 emissions and lead to the development of this Innovation Competition to help foster further innovation.

Scope

Innovation Competition

Melbourne Water is seeking innovative, workable and affordable ideas that will result in lower greenhouse gas emissions while treating Melbourne's wastewater to its current high standard, now and into the future. The Innovation Competition is about thinking creatively around how sewage is treated and what changes would result in reduced Scope 1 greenhouse gas emissions. Through the Innovation Competition we are encouraging ideas to be submitted that embrace the concept of sustainable emission reduction.

Melbourne Water will use the outcomes of this Innovation Competition in the following ways:

- To inform, test and contribute to reducing Scope 1 emissions at its wastewater treatment plants;
- To promote Competition outcomes to reduced greenhouse emissions in the wider water industry; and
- To promote, or be included in, discussion papers and articles produced by Melbourne Water.

Call for solutions

Submissions should demonstrate a high level of innovation in one or more of the following areas- A, B and C.

A. Emissions measurement and modelling

Quantification of greenhouse gas emissions is regarded as a necessary step in the aim to reduce emissions. The ability to measure nitrous oxide and methane in either the aqueous or gaseous phase enables the benchmarking and validation of any process optimisation. The data also provides a basis for

calibrating process modelling, which is an essential step, as accurate models of the processes allow predictions to be made of any process changes.

Example opportunity areas:

- Atmospheric measurement of emissions from the treatment plant
- Measuring dissolved methane or nitrous oxide in wastewater
- Identifying in a computer model the key influences in the process on emissions.

B. Optimisation of existing wastewater treatment processes

There is already an understanding of the processes that produce emissions and their locations within the treatment process. This information can be used to find more immediate mitigation solutions. These solutions may use existing control systems, technologies and equipment to reduce or eliminate the emissions.

Example opportunity areas are:

- Process covers, emission capture and treatment
- Real time control system for process optimisation to minimise emissions
- Alternative process configurations
- Side-stream nutrient removal that result in emission reduction.

C. Wastewater treatment processes of the future

In the long term, it may be that wastewater treatment will fundamentally have to be rethought. In conjunction with the need to develop processes that eliminate greenhouse gas emissions, future treatment processes may also need to be energy efficient; adaptable to climate change (i.e. complete water recycling when in drought); as well as scalable with population growth.

Example opportunity areas:

- Decoupling nitrogen removal from aerobic processes
- Algae processes
- Decentralised treatment
- Anaerobic processes.

Out of Scope

The following area is not within the scope of this competition:

- Emissions from sewers.

Intellectual property

The provisions regarding intellectual property and moral rights for the submissions made by entrants are set out in Clause D.10 of the Competition Terms and Conditions.

Intellectual property developed within submissions to the Innovation Competition is retained by the party who developed it, allowing Entrants the potential to access broader commercial opportunities.

The Funding Pool

The Funding Pool is $200,000 AUD. The pool will be allocated to winning entries in two phases. The first phase will be awarded to the top (up to 5) shortlisted entries as selected by the Competition Jury. These shortlisted entrants will be engaged to produce a Detailed Solution for a fee of $10,000 each. The Competition Jury will select the best Detailed Solution(s) (up to 5) and the remaining prize pool will be allocated between these winners to undertake scopes of work as defined in their Detailed Solutions.

Program benefits

Melbourne Water is awarding a Funding Pool of $200,000 AUD total.

Winning entrants may have the opportunity to work with Melbourne Water to further develop their ideas and bring them to life.

The winner's ideas will receive promotion within the water industry.

In addition to immediate opportunities for selected Entrants to collaborate on this challenge, reduction of greenhouse emissions is a challenge for Australia and the globe.

Submission process

This is a two-stage competition that opens on **22 October 2018** and ideas must be submitted before **5pm on 3 December 2018**. All ideas will be assessed by the Competition Jury on merit according to the evaluation criteria. Shortlisted entrants will be announced in February 2019. These selected entrants will be invited to submit a Detailed Solution. The final winners will be announced in mid-2019.

Briefing webinars

Briefing events for interested entrants will be held on **30 October - 1 November 2018** to highlight main features of the contest and explain the submission process.

Note: All deadlines are at 5pm Australian Eastern Daylight Saving Time

Key dates

Competition opens	22 October 2018
3x Briefing webinars	30 October -1 November 2018
Q&A period	22 October – 26 November 2018
Deadline for submissions	3 December 2018, 5pm

Evaluation criteria

The Competition Jury will assess and rank all submissions based on the following evaluation criteria:

- Being conceptually and technically sound
- The solution's effectiveness in measuring, capturing and/or reducing Scope 1 emissions
- The solution's relevance and ease of integration into the existing infrastructure and/or operations of Melbourne Water's Eastern and Western Treatment Plants
- Any added value provided by proposed solution
- The financial viability of the proposed solution
- The Entrant's track record and/or experience.

Questions and Answers Process

All questions relating to this competition should be submitted before **5pm, 26 November 2018** to Melbourne Water via email at innovationcontest@melbournewater.com.au. An update on questions submitted as part of this Competition will be posted weekly until the end of the Competition. All entrants will be able to see the responses to all questions.

More information

To apply for this Competition you must first register with us. You can do this by going to our web page for this competition at www.melbournewater.com.au/innovation-competition. When you register you will get access to all the supporting information you need to read before you apply, including the Guidance for Entrants and the submission form.

Emails

Please send any emails to:

innovationcontest@melbournewater.com.au

Publicity

Melbourne Water reserves the right to publicise the outcomes of the Innovation Competition, including the title and a short description of submitted ideas and solutions.

Keep up to date with what's happening

For more information about this project or our other activities please email innovationcontest@melbournewater.com.au or visit www.melbournewater.com/innovation-competition

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