

FORM TITLE – Project Scope Development (PSD)

	Description	Provide Comments
Title	State of Knowledge of Scope 1 emissions from Sewage Treatment Plants	
Project Type	<input checked="" type="checkbox"/> State-of-knowledge <input type="checkbox"/> Problem Definition <input type="checkbox"/> Knowledge Generation <input checked="" type="checkbox"/> Knowledge Transfer <input type="checkbox"/> Knowledge Adoption <input type="checkbox"/> Benefit Realisation	
Problem	<p>Sewage treatment plants (STPs) produce carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) during the biological wastewater treatment processes and CO₂ is also emitted during the production of the energy required for the plant operation. Australian water utilities are required to report on greenhouse gas emissions through the NGER Scheme.</p> <p>What do utilities need to do to optimise their treatment plants to decrease emissions? Better information on the influence of operational practices on emissions from treatment processes, would enable process optimisation, potentially facilitate predictive modelling to estimate the greenhouse gas emissions, and inform decision making around process selection for upgrades to treatment trains.</p>	
Background/ Description:	<p>The greenhouse gases that are reported under the NGER Scheme include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O). Greenhouse gas emissions are measured as kilotonnes of carbon dioxide equivalence (CO₂-e). This means that the amount of a greenhouse gas that a business emits is measured as an equivalent amount of carbon dioxide which has a global warming potential of one. For example, one tonne of methane released into the atmosphere will cause the same amount of global warming as 25 tonnes of carbon dioxide. Further to this nitrous oxide has a 300-fold stronger effect than carbon dioxide. Although nitrous oxide from wastewater treatment is currently considered a small component of Australia's overall greenhouse gas inventory at around 0.5%, its influence will increase proportionally as electricity and transport networks transition to renewable sources and reduce their greenhouse emissions.</p> <p>Scope 1 greenhouse gas emissions are the emissions released to the atmosphere as a direct result of an activity, or series of activities at a facility level. The water industry as a whole has a very strong interest in improving environmental performance, sustainability and reducing emissions. A study into the key operational variables and changes that could be made at STPs to reduce Scope 1 emissions would go a long way to assisting water utilities in reducing their greenhouse gas footprint. In particular, further industry</p>	

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	research is needed to understand actual variation in N ₂ O generation and find ways in which generation could be minimised in treatment of sewage and discharge of effluent.	
Objectives:	<p>The objectives of this project are:</p> <ul style="list-style-type: none"> - Undertake a global literature review of available information on the influence of; STP treatment technology selection and operational parameters, on the production of Scope 1 greenhouse gas emissions. -To review previous work done in Australia, looking into the operational influences on the production of scope 1 emissions from STPs. -Analyse and interpret data from global literature review and Australian studies. Determine key variables that influence production of scope 1 emissions. -Report on the outcomes of the global and national literature and data review, and implications for optimisation of operation of various treatment processes, to reduce the formation potential of Scope 1 emissions. 	
Scope/ Deliverables:	<ul style="list-style-type: none"> • Critical Global literature review of Scope 1 emissions studies undertaken at STPs • Critical Review of previous Australian research done on this topic to identify researchable knowledge gaps. • Report on the operational and treatment process selection implications for reduction of scope 1 emissions. 	
Stakeholders	<p>Melbourne Water, South East Water, TasWater expressed interest at Horizon workshop. SA Water have done previous work done on Scope 1 emissions. Meeting with members of Intelligent Water Network (IWN) Wannon Water, Barwon Water regarding project in Feb 20 to discuss scope & objectives. Icon Water have expressed interest in project as N₂O now major component of greenhouse gas emission profile. Sydney Water have provided comment to preliminary project description.</p> <p>Involvement from state EPAs?</p>	
Investigative or Research approach	The research is a desk top study involving investigation, collation and interpretation of national and international literature.	

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Indicative Funding required:	<input type="checkbox"/> Small (<\$100k) <input checked="" type="checkbox"/> Medium (\$100-\$500k) <input type="checkbox"/> Large (>\$500k) Around \$100-150K required to conduct a complete international and national study and prepare a comprehensive report and recommendations for Australian water utilities.	
Duration/Start	<input type="checkbox"/> Short (<6 months) <input checked="" type="checkbox"/> Medium (6-18 months) <input checked="" type="checkbox"/> Long (>18 months) Start: July 2020	