HYDROTHERMAL LIQUEFACTION OF MUNICIPAL WASTEWATER SLUDGE
Commercialisation of Renewable Crude Oil Production

$4m
Funded by ARENA

$12.29m
Total project cost

**Project overview**

<table>
<thead>
<tr>
<th>Lead Organisation</th>
<th>Start Date</th>
<th>Project Partners</th>
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<tbody>
<tr>
<td>Southern Oil Refining Pty Ltd</td>
<td>April 2019</td>
<td>Melbourne Water Corporation, Queensland Urban Utilities</td>
</tr>
<tr>
<td>Location</td>
<td>Status</td>
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<tr>
<td>Claddington, Queensland</td>
<td>Current</td>
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<tr>
<td>ARENA Program</td>
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<td>Advancing Renewables</td>
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Project Objectives

- To develop continuous processes for HTL of municipal wastewater sludge that optimise separation, yield and quality of renewable crude
- Economic reality (presently) an acceptable RoI (<5 year payback) would require a tipping fee of $160/dry tonne
- Need to valorise all product streams
Project Objectives

- To quantify the affect of polymer on the renewable crude oil composition and aqueous fraction under continuous HTL operation.
- What is the optimum re-circulation conditions of the aqueous phase for subsequent feed preparation that achieves optimum renewable crude yield in terms of quality and quantity?
- What is the optimum blow-down rate for removing the recycled aqueous fraction and the subsequent characteristics of the resultant fraction for anerobic digestion (AD) treatment?
- Details biological and chemical characterisation on the resultant renewable crude oil and aqueous fraction composition of each re-circulation cycle?
Project Objectives

• HTL renewable crude is not close enough to fuel oil properties.

• Nitrogen and sulphur content, instability due to high acidity, high viscosity and high char yields, are limiting its application.

• Development of suitable catalysts are needed that can produce renewable crude of sufficient quality and to limit formation of aqueous and solid phase organics.
Project Objectives

• Valorisation of the aqueous phase to produce biogas via AD treatment, and solid phase:

• Is coagulation treatment using aluminium sulphate (Al₂(SO₄)₃) able to remove the accumulated toxic and rate limiting compounds (e.g. phenols and cyclic hydrocarbons) prior to anaerobic digestion?

• What is the optimum concentration of Al₂(SO₄)₃ required?

• What is the biogas yield produced from AD treatment of the aqueous fraction?

• What is the raw and final composition of the aqueous phase treated by AD treatment?

• Can the resultant AD digestate be recycled to the HTL feed? This to minimizes the level of waste handling required as part of commercialisation of this process

• Downstream solids composition
Project Objectives

- To develop a piping system integrity monitoring technique that can overcome the fundamental challenges of existing techniques by achieving non-destructive evaluation (NDE) of early damage and non-contact inspection for high temperature and high-pressure metallic pipes.
Status

- Q1-Q3 2019 FEED Completed
- Q4 2019 Detailed design commenced
- Q1 2020 Construction
- Q2 2020 Commissioning