

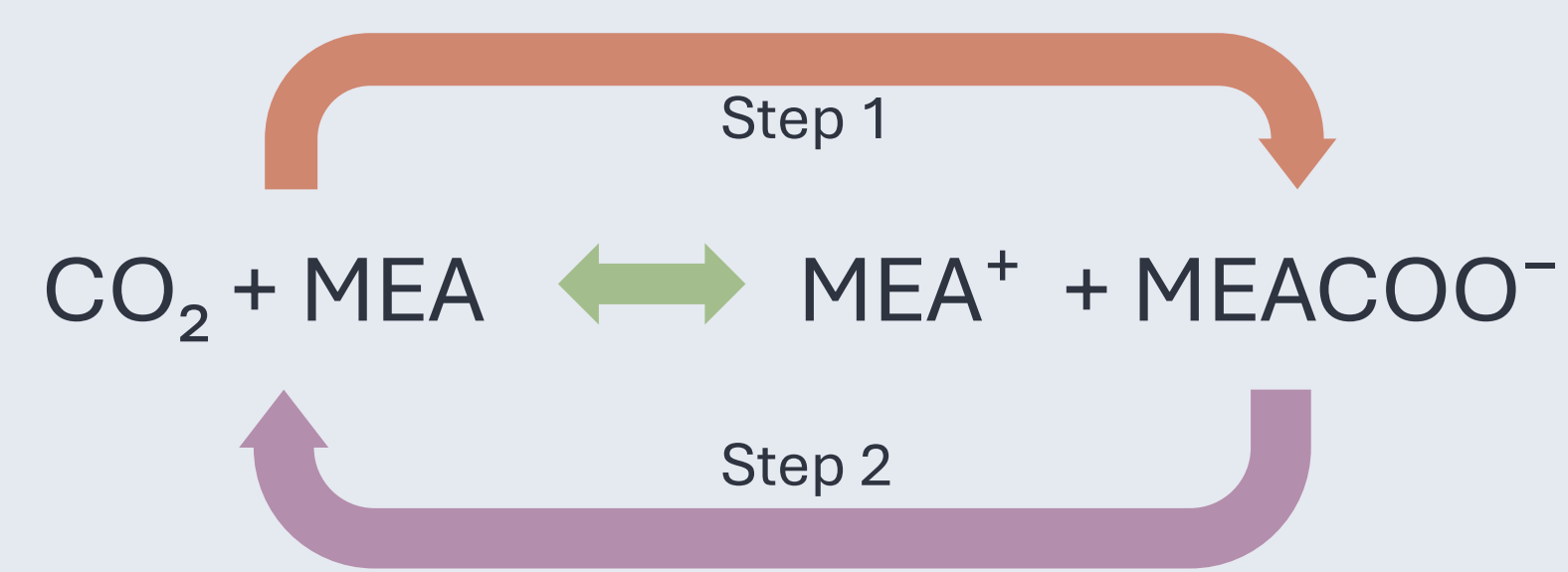
Blue Hydrogen Production Through Amine Carbon Capture

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Background

CO₂ Contributes to Climate Change
CO₂ Needs to Be Sequestered Safely

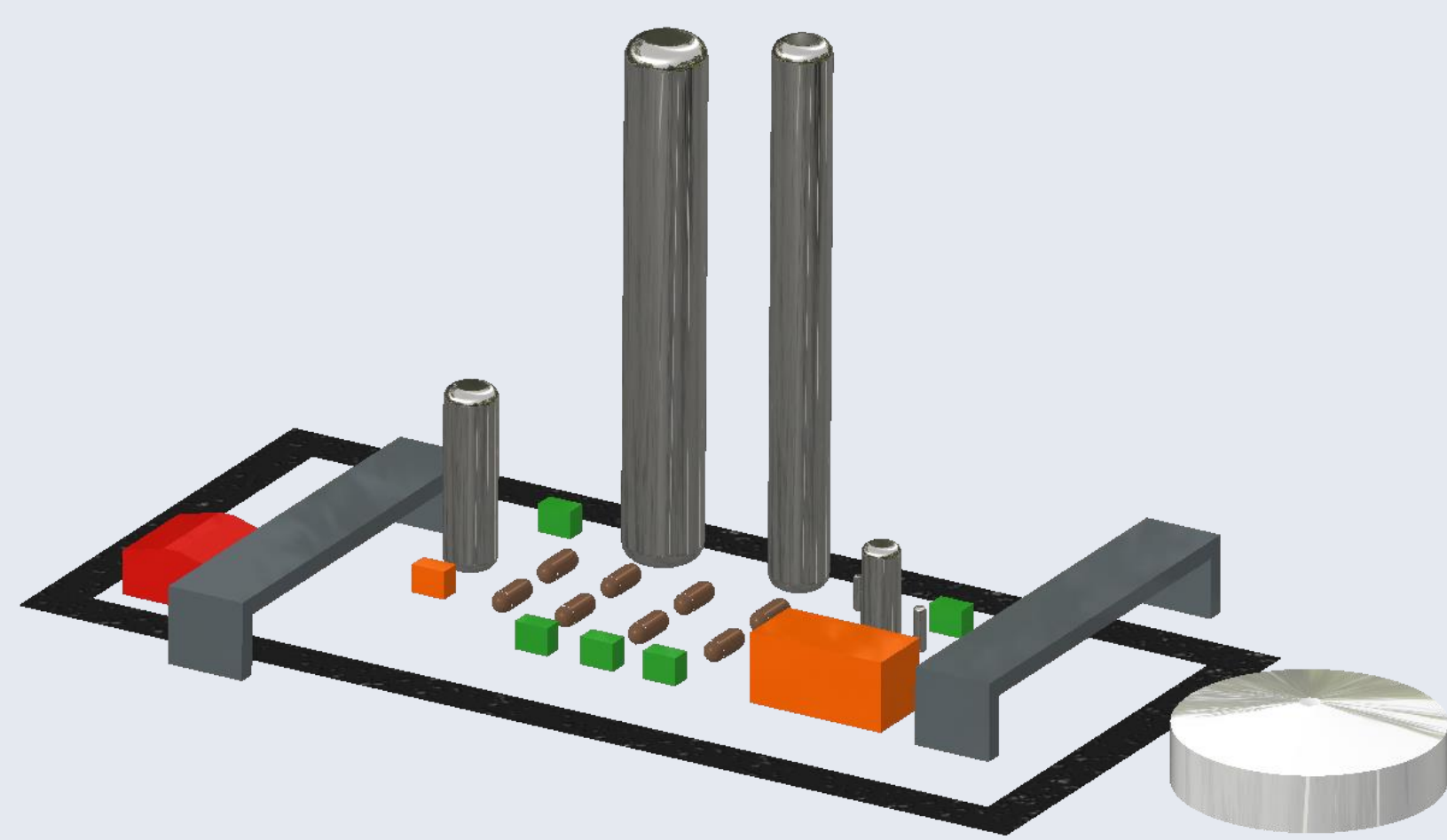


Amines like Monoethanolamine (MEA) work on a molecular basis
MEA is cheapest per molecule!

CO₂ needs to be supercritical, without impurities, to be stored underground

- > 31 °C
- > 7.4 MPa
- > 95% CO₂

Plant Layout



Each plant is added onto an existing SMR facility
High energy equipment is kept away from tankage and operator locations
Equipment is placed to allow for maintenance and minimal piping

Model to scale!

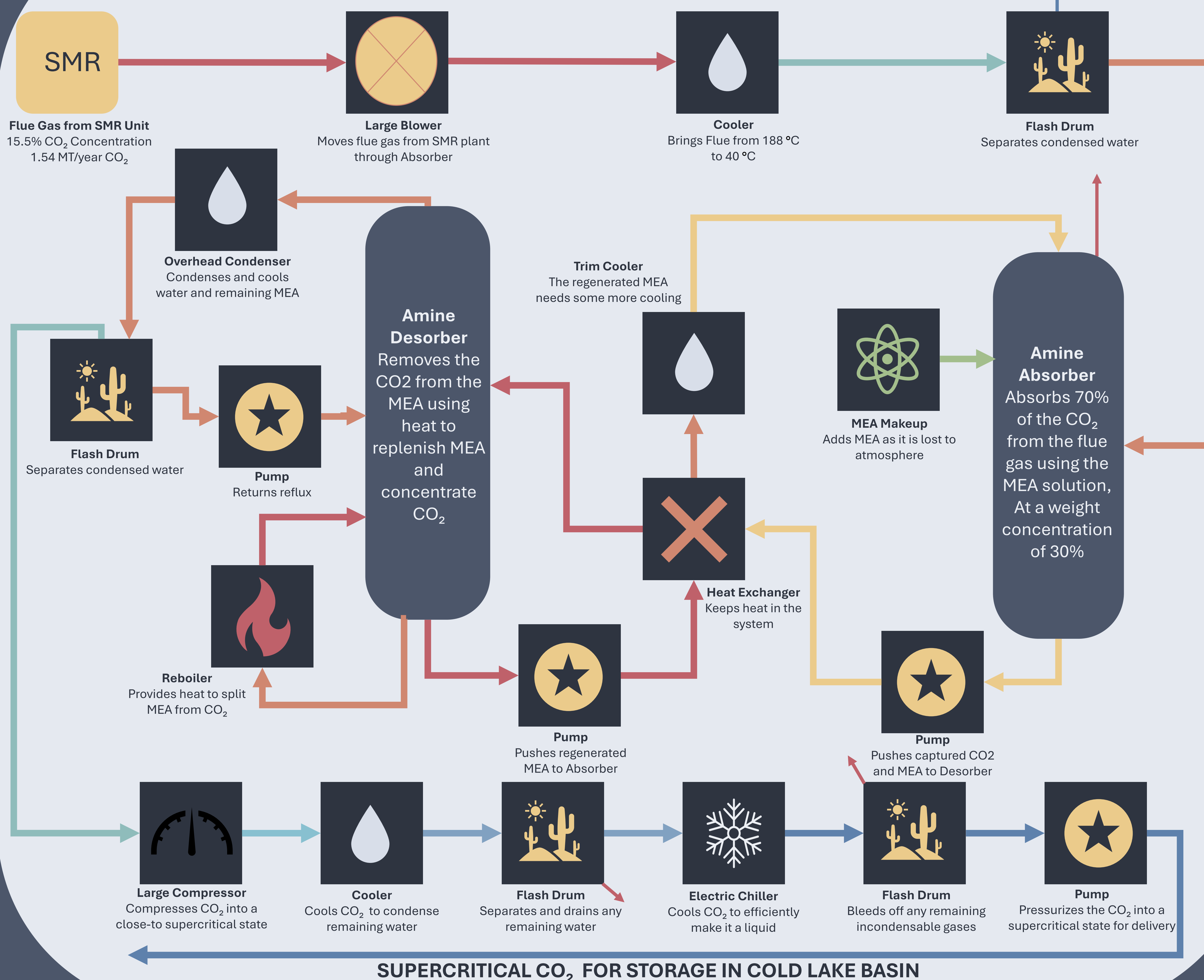
Acknowledgements

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Objective

Assess the technical and economic feasibility of adding a solvent-based carbon capture unit to a steam methane reforming plant

The Process

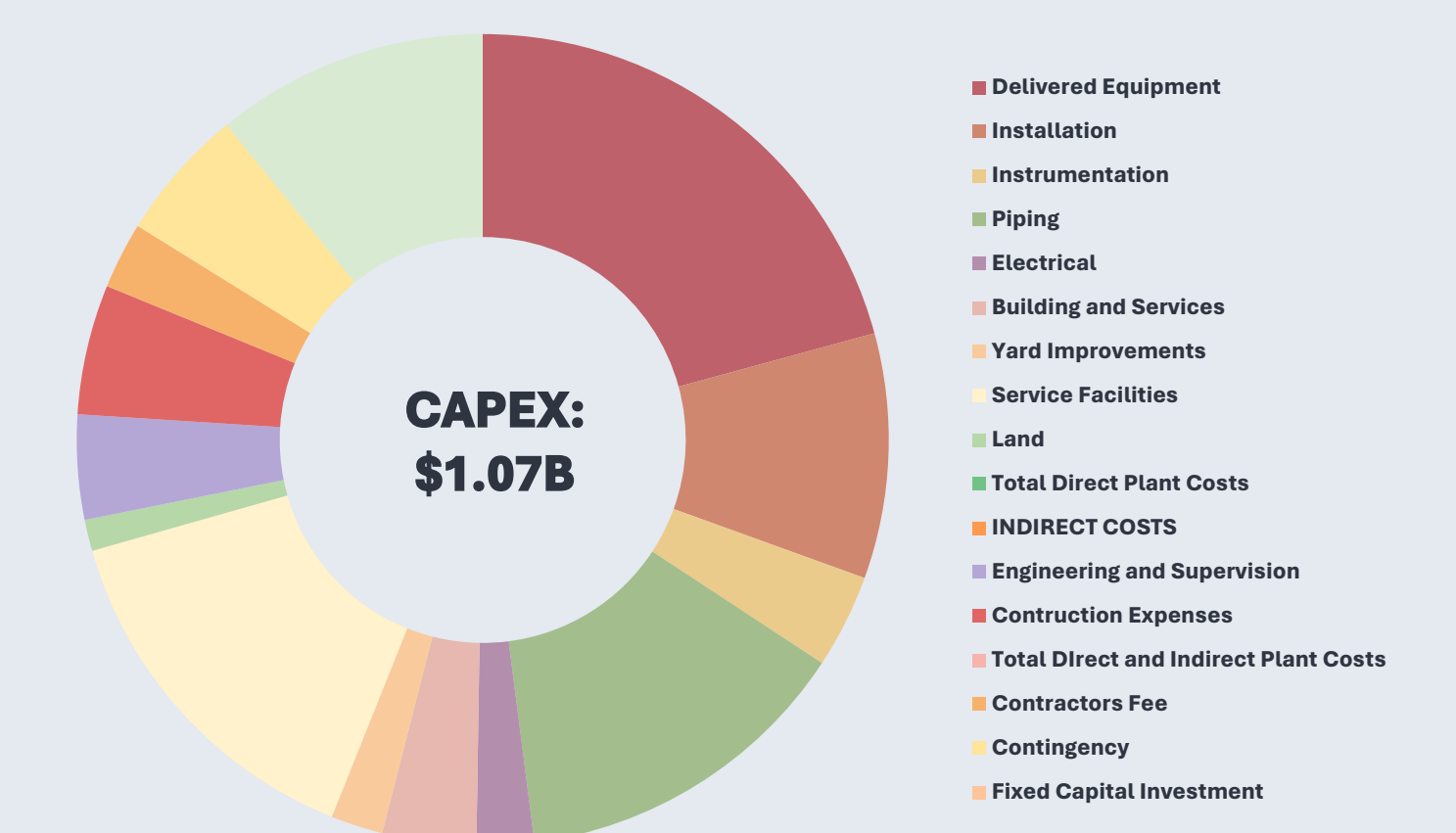


Location

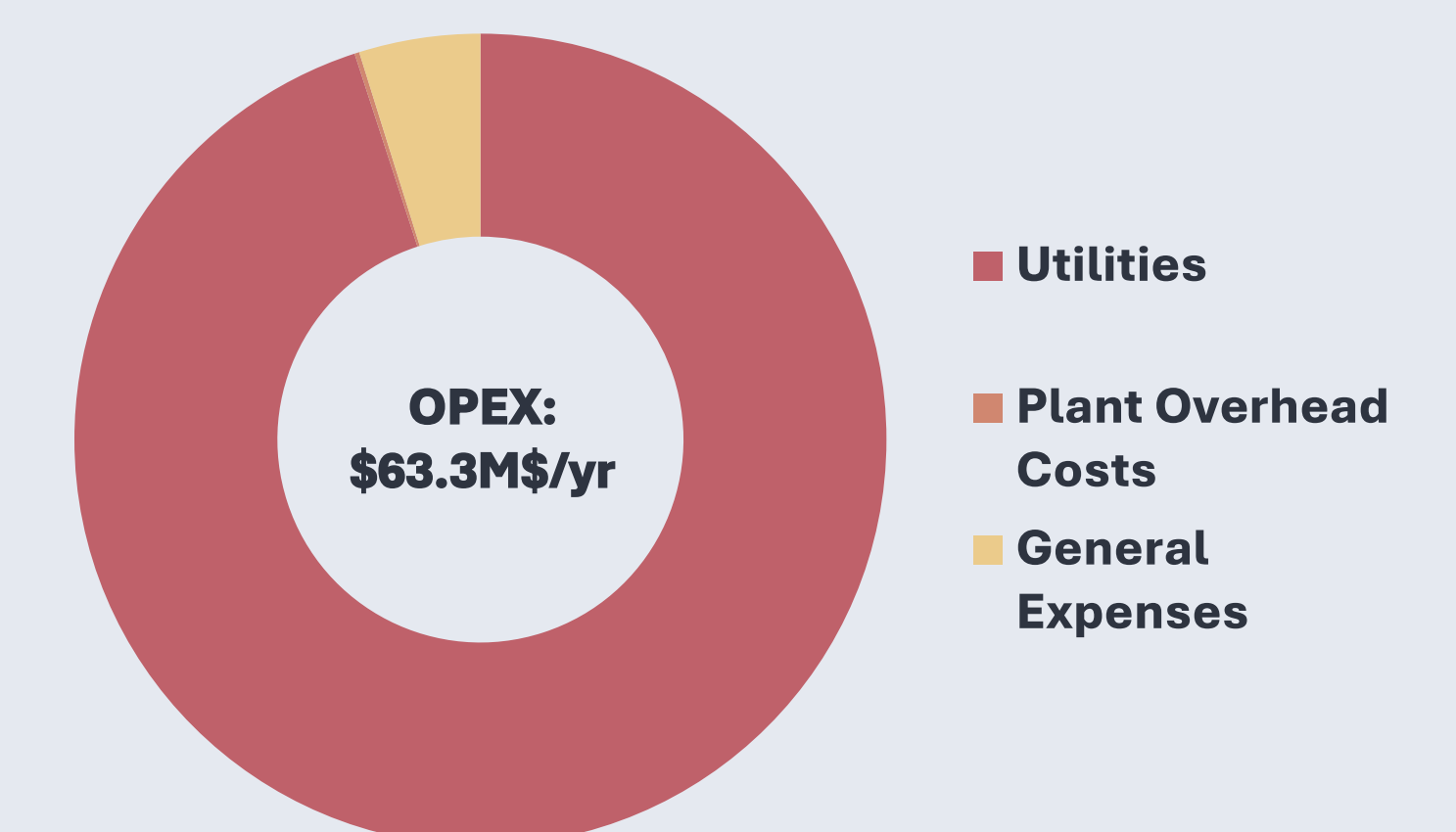
Located in the Albertan Oil Sands, near Fort McMurray
The Pathways Alliance pipeline sends the CO₂ to Cold Lake for Sequestration

Economics

Capital Costs



Operating Costs



Cost of Capture : 156 \$/t CO₂
Cost of Financing : 91 \$/t CO₂
2030 Carbon Tax: 170 \$/t CO₂

Environment

875,000 t/year CO₂ captured = emissions reduced

This is 0.15% of Canada's Total CO₂ Emissions

However, MEA is toxic and can convert to nitrosamine



It is discharged to a safe location in the presence of water to mitigate this