

[ADVANCING ENVIRONMENTAL STEWARDSHIP THROUGH CIRCULAR ECONOMY IN OIL & GAS FACILITY]

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Overview

Oil and Gas remain critical components of the world's energy supply mix and there is an increasing need for minimizing the environmental impact associated with hydrocarbons. To address the trilemma of sustainability issues, including resources depletion, waste accumulation and ecosystem degradation, Abqaiq Plants, where over 5% of global oil production is processed, has established and embedded a systematic Circular Economy program for identifying business opportunities to reduce environmental impacts and GHG while improving economic and environmental sustainability.

Methods

A robust program, driven by an empowered team, developed initiatives covering the entire life cycle of plant operations. These initiatives target how systems are designed, promote and leverage circular economy processes, encourage sustainable consumption, and aim to ensure that waste is prevented and assets used are kept in service for as long as possible. The plan is built on PDCA model to drive constant improvements and is comprised of various steps starting from establishment of CE charter and ending with continuous improvement through Circularity assessment.

Results

A comprehensive, multi-pronged implementation of circular economy has led to a transformation of the facility and yielded economic benefits alongside environmental benefits. These include:

- Re-utilizing Closed drain vessels resulting in reduced raw material requirements, associated emissions and savings of \$30MM
- Re-purposing mothballed piping to achieve process flexibility and savings of \$3 MM
- Implementing repair vs replace strategies to extend asset life and yielding \$1.5 MM in savings
- Reducing gas combustion by utilizing available waste streams to modify compressor drivers resulting in fuel gas and emission reductions.

Conclusions

The success of the program hinged on key enablers including developing human capital through awareness, training and upskilling as well as robust strategic planning embedded in energized work processes. This submission showcases the challenges and successes of adopting circular economy into a 70 year old facility to achieve the highest levels of environmental stewardship.