Efficiency Enhancement at Upstream Surface Facilities Towards Circular Economy

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Abstract

The concept of Circular Economy is an important framework for companies to follow to make their operations more sustainable with more focus on ESG. The objective of this paper is to showcase the feasibility of a Circular Economy (CE) initiative for upstream surface facilities to recover, reduce, and reuse the wasted energy across different plant equipment, including throttling valves.

Several energy recovery and energy conservation technologies and processes are identified to minimize energy consumption in a Gas Oil Separation Plant. The optimum technology options are selected to minimize the modifications of the existing facilities, while maintaining the flexibility to meet the production. The study was conducted using the following methodology:

1- Create several process designs/layouts that will incorporate these technologies.
2- Conduct technical evaluation and lifecycle cost study, to compare different alternatives to meet the objective.

The comprehensive assessment revealed that there are several economically feasible projects to harness wasted energy in the plant. Hydraulic Power Recovery Turbine (HPRT) technologies were found to be one of the most promising technologies to harness the wasted energy with minimum modifications. HPRT is a Reverse Pump that will harness the wasted pressure drop across the liquid control/throttling valves and convert it into useful power. Recovering and utilizing the wasted energy will promote circular economy, minimize the imported power from the national grid, enhance efficiency and minimize CO₂ emissions, while extending the equipment lifetime.