



## SCIENTIFIC & RESEARCH PROJECTS

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**Project Field: Sub-Ambient Processes (Cryogenics)**

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### Project Title:

**Benchmarking of Olefin Plant Cold-End for Shaft Work Consumption, using Process Integration Concepts**

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### Abstract:

The olefin plant is all about separating cracked gas into ethylene, propylene and other heavier byproducts using low-temperature gas separation processes. This process is energy-intensive and hence retrofitting for energy saving would be desirable. However, a full retrofit study requires a lot of time and costly engineering work. So, a novel method is introduced in this paper for benchmarking of shaft work consumption in olefin cold-end, which is based on process integration concepts. In developing this method, the amount of shaft work required in refrigeration cycles was first targeted via application of Pinch Analysis to six different olefin plants followed by the calculation of feasible and achievable energy saving potential. When doing so, the effect of predominant factors such as plant capacity, feedstock (naphtha or natural gas), products specification and type of technology being used was investigated as well. Finally, a mathematical model was developed for rapid estimation of energy saving potential using the above key factors. This model was verified through case studies and was proved to be accurate enough for shortcut calculations.