



## SCIENTIFIC & RESEARCH PROJECTS

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

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### Project Title:

**Retrofit of Ammonia Plant for Improving Energy Efficiency**

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### Abstract:

The aim of this work is to perform a retrofit study of an ammonia plant, in purpose of improving energy efficiency. As a common practice, one can divide an ammonia plant into two parts: the hot-end and the cold-end. In the hot section, two different options are investigated that both lead to a threshold condition and achieve maximum energy saving. The first option covers only process-to-process energy integration, while the second option considers some modification in the convection section of the primary reformer through a new arrangement of the heating coils. Thus, a considerable reduction in cooling water, HP steam and fuel gas consumption is achieved. In the cold section, retrofit study is dominated by reducing the amount of shaft work or power consumption in the refrigeration system. Application of the Combined Pinch & Exergy Analysis revealed that part of the shaft work, which was originally being used, was inefficient and could have been avoided in a well-integrated design. Therefore, by proposing optimum refrigeration levels, reasonable saving (15%) in power consumption was observed without the need for new investment.