

## Technical and Economical feasibility study on installation of turbo expander in Methanol synthesis unit

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### Abstract

Many chemicals, such as Methanol synthesis reactor productions, are produced under high pressure and temperature. The reactor operates at 80 (bar) pressure and 250 ( C) temperature. In a conventional process, high exergy in reactor outlet is not used. The high operating pressure of the reactor outlet can be exploited to produce electricity by integration of a turbo expander. Moreover, increasing in production would be the other result of this method. In this research, simulation has been done by applying HYSYS (Ver. 2006) and the results are in consistent with the outcomes of modeling technique. Economic analysis shows that we can generate about 6.5 ( MW) electricity and return of investment is less than 2 years.

**Keywords:** exergy, Methanol synthesis reactor, Integration, Turbo expander