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## SCIENTIFIC & RESEARCH PROJECTS

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**Project Field: Combined Heat & Power / Co - Generation**

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### Project Title:

**Design and Optimization of CCHP System Incorporated into Kraft Process, Using Pinch Analysis with Pressure Drop Consideration**

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### Abstract:

Combined Cooling, Heating and Power (CCHP) system is a cogeneration technology (CHP) that integrates an absorption cycle to produce power, heating and cooling, simultaneously. In this research, the implementation of a CCHP system in a pulp and paper industry is studied. We consider this system as two parts in design and optimization steps. One is a CHP system, which consists of a gas turbine cycle, and a HRSG system and another part is an absorption heat pump (AHP) driven by the discharged steam from a steam turbine. Pinch analysis is applied to find the appropriate placement of the proposed CCHP system. Aspen plus software is used to simulate the basic design of this CCHP system. Afterward, genetic algorithm is used for optimization of the proposed CCHP system with minimum total annual cost (TAC) and highest exergy efficiency. Having implemented the proposed CCHP system, both power and heating requirements of the pulp and paper mill can be supplied and cooling requirements can be reduced with the payback of 3.2 years.