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## SCIENTIFIC & RESEARCH PROJECTS

**Project No.: 03**      **Year: 2022**

**Project Field: Total Site**

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### Project Title:

**Pressure Drop Optimization in Total Site Targeting - A More Realistic Approach to Energy- Capital Trade-off**

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### Abstract:

In this study, a novel methodology is extended for the Total Site minimum energy requirement and area targeting, in which streams' optimum pressure drops are used for each individual process. Two case studies on Total Site systems are investigated by two different approaches to approve the accuracy of the mentioned methodology. The conventional approach addresses the streams' assumed heat transfer coefficients, while the new approach considers streams' optimum pressure drops. A three-way trade-off between energy requirement, area demand, and pressure drop is developed for each individual process in the new approach, assessing the replacement of new pumps/compressors within the context of heat exchanger networks. The optimized results are then applied at the Total Site targeting stage. The outcome is the Total Site optimum point for a grass-root problem regarding optimized minimum temperature difference between processes and through processes and utilities specified for two approaches. The optimum outcome of the first case study indicates that Total Site total annualized cost can be different up to 12% for the modified method compared to the conventional approach. The results emphasize the necessity of performing the suggested modified technique for the targeting stage to have more practical and consistent results in the detailed design stage.