

CHAPTER I INTRODUCTION

Nowadays, energy conservation has become increasingly important due to the depletion of natural resources and environment impact of process system. The high cost that companies incur in these days for energy consumption makes it necessary to seek alternative ways for energy savings and cost reduction.

In the process integration, pinch analysis has been proved to be efficient in developing the best integrated process designs for both new design and retrofits. Pinch technique, which has evolved as an energy-saving technique, presents simple and easy ways of optimization based on complex thermodynamics rules. The technique gives the process engineer a clear picture of the optimum energy needed for any process. Heat exchanger networks (HENs) is the best-known subject, because it helps minimize energy usages, capital cost and pollutant emissions. Moreover, it is now universally applied to design of continuous processing plant. The performance of the HENS in the plant is an important aspect of energy conservation. However, one of the major energy-intensive units in chemical process is the distillation column. Column targeting thermal analysis is useful to identify design targets for improvements in energy consumption and efficiency. This capability is based on the concept of minimum thermodynamic condition for distillation column.

Gas separation plant of PTT Company is considered as a case study in this research work. Three subtopics are indicated to minimize energy consumption in the process. The first two topics are the retrofit of gas separation unit and the new design of stabilizer unit. Both topics are related with pinch's concept by using the combination of heat exchanger network and column targeting technique to find the best alternative design. Studying sensitivity of propane and LPG production is the last topic. The minimum duty of distillation column is the goal of the topic which can be achieved by varying side drawn tray and pressure of the column.