SIZING OF COMBINED HEAT & POWER SYSTEM & ENERGY COST OPTIMISATION OF DOMESTIC BUILDING

BY

MUHAMMAD MAJID FAROOQ

01-244162-011

SUPERVISED BY

DR. ASAD WAQAR

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ABSTRACT

Many Combined Heat and Power (CHP) units are installed in local buildings to get both heat and electricity at a same time which further increases energy efficiency and thus cost of energy reduces. The basic function of CHP is to provide heat and electrical power simultaneously by using single fuel source. In CHP waste heat is recovered by using heat recovery techniques, which later utilize for household heating purpose. Energy cost may increase due to inappropriate sizing of a CHP which further reduces energy efficiency. Here batteries are not affordable because of its high manufacturing cost. Therefore, our attempt is to select optimal size of CHP which reduces cost and increases efficiency. Normally, the efficiency of our conventional system is about 40 to 45 percent, however by installing CHP system we can achieve 60 to 80 percent efficiency easily. By installing many small CHP units in domestic and industrials areas the overall energy efficiency increased and cost of energy decreased. Still inappropriate sizing of CHP makes it costly and less efficient. Therefore, sizing of CHP is a very important factor. For sizing of CHP, we use different approaches to meet the optimal size of CHP at least cost. The sizing of CHP is done by using GA and ABC algorithms to estimate the appropriate size of CHP which reduces the daily energy cost. For sizing criteria heat and electricity loads are firstly used to find the finest size regarding capacities of different types of CHP. Later for cost optimization both algorithms will be. Thus, by the combination of both heat and electricity loads we can estimate sizing for different types of CHP.

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ABBREVIATIONS

ABC…….. Artificial Bee Colony

BCO…….. Bee Colony Optimization

CHP…….. Combined Heat and Power

CHPED……Combined Heat and Power Economic Dispatch

ED…… Economic Dispatch

ELD…….. Economic Load Dispatch

EP…… Evolutionary Programming

GA…….. Genetic Algorithm

MINLP…….. Mixed-Integer Non-Linear Programming

MPSO…….. Modified Particle Swarm Optimization

PSO…….. Particle Swarm Optimization

RCGA…… Re-Code Genetic Algorithm

SIMO…….. Single Input Multi Output