

EXERGETIC ANALYSIS OF A THERMAL STATION IN A DISTRICT HEATING SYSTEM

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INTRODUCTION

Any block of flats or district of houses needs hot water, heating during winter, electricity and cooling for air conditioning. These types of utilities are energy in different forms. Energy, which is entirely convertible into other types of energy is exergy (high valued energy such as electricity and mechanical workload). Energy, which has a very limited convertibility potential, such as heat close to room air temperature, is low valued energy [1].

The way the utilities are produced and provided to the customer is analysed in several studies [2-7]. The careless utilization of energy resources on economics and ecology require careful analysis and planning for proper energy management [2]. Therefore the primary energy transformation chain of fuel to the final product, together with losses should carefully analyzed. The efficiency of the energy transfer from the producer to the final user is pointed out step by step. To put to the same level different kinds of energy i.e. heating, cooling or electrical energy, the analysis is carried out based on the concept of exergy [8]. Taking into account any kind of energy, the exergy is the only measure that accounts not only for the quantity, but also for the parameters of quality in relation with the parameters of the environment that the system is interacting with [9,10].

The study provides detailed exergy analysis of a district heating system that supplies the heat in a neighborhood of Bucharest, using a cogeneration plant. The system is analysed for the winter period.