

Selecting the Prime Movers and Nominal Powers in Combined Heat and Power Systems

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Abstract

Combined Heat and Power (CHP) systems have many economical and environmental benefits. Generally, selection of these systems is being performed using the time-dependent curves of the required electricity and heating load during a year. In the selection of a CHP system, the operation of this system at off-design point also should be studied. In this paper, a new and relatively quick method for selecting the number of each type of prime mover, and determining their nominal power and operational strategy considering specific electrical and heating loads is presented. Three types of prime movers which are studied in this paper are gas turbine, diesel engine, and gas engine. It was found that the ambient conditions, electricity and heating loads, fuel type, its heating value and price, and price of buying and selling electricity, affect the results considerably.

The operational strategy was also studied in two economical and electricity tracking modes. In the former case it was allowed to sell the excess electricity to the network. In the latter, the engine had to operate to supply just the required electricity. The appropriate required boiler heat capacity was estimated in the two above mentioned cases.

Keywords: "Combined Heat and Power", "Cogeneration", "Prime movers"

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