INTRODUCTION

Combined heat and power is also referred as Cogeneration, is defined as on-site electricity production and making usage of the heat which is produced as byproduct during power generation process. For different types of buildings, it considered as an economical option for obtaining and heat and electricity because it is also environmental friendly than conventional option. Apart from being an economical option it known reduced carbon dioxide emissions and low operating costs. Therefore, it should be a highly recommended option for majority of the builders, operators and architects instead of choosing traditional means for energy supply.

Wherever it is possible it is a better option to keep buildings connected in terms of heat network, for example community heating, to generate greater heat demand which could be fulfilled by a bigger CHP unit. The utilisation of Combined heat and power has got significant proven record of cost savings. In the UK, over the last decade the number of buildings that utilise CHP systems are almost doubled with hundreds of installations generating an electricity of 400MWe. Because of its compactness about 10 percent installations are only found in the communities and buildings, however buildings itself contributes about 90 percent of overall installations. Small scale combined heat and power units are being used by majority of the hospitals, military organisations, schools, leisure centers and hotels. Whereas large scale units are mainly used by community heating facilities, airports, prisons and multi-building hospitals.

The UK government has undertaken an initiative quite a while ago which is known as Kyoto protocol which aims to reduce greenhouse gasses emissions to significantly lower annual quantities. As a part of this protocol the government has started encouraging the utilisation of CHPs in their organisations and residential buildings which are capable of producing only about 20 percent of target Carbon dioxide savings. Since the environmental objectives and energy savings of CHP are quite transparent and proven, it has become vital for the government to make realise the potential of CHP among the people and encouragement is being given through various

OPERATING PRINCIPLE

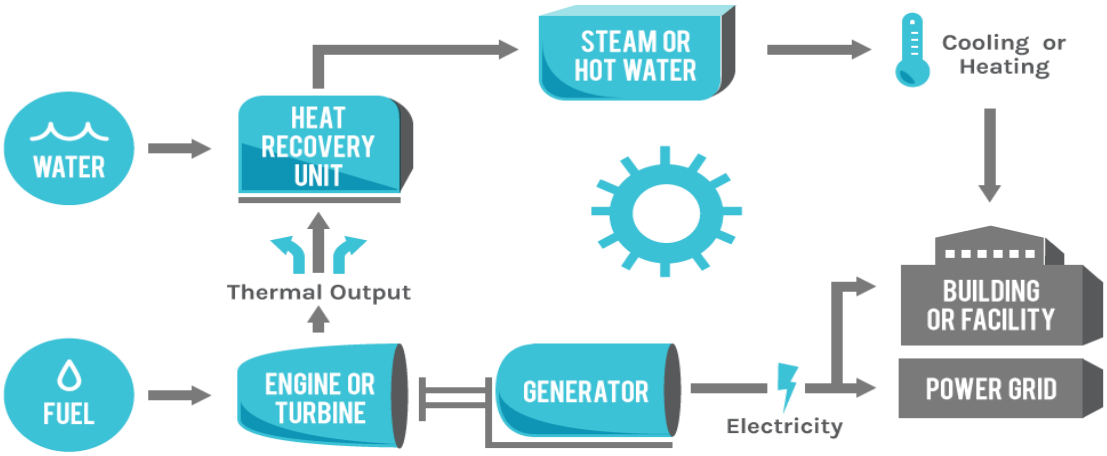

Fig.02 *CHP Principle (dynamicenergyusa.com,2016)*

The principle of CHP system is simple, defined as to make effective utilisation of the heat being wasted in power generation process.

The working of CHP system is defined by three thermodynamic cycles:

- Brayton Cycle:

It explains the working of Gas turbine CHP systems. In this systems the input energy is given by the fuel which is injected into the combustion chamber and the air-fuel mixture drives turbine emitting the high temperature exhaust gases. These high temperatures are used by CHP process to produce steam.

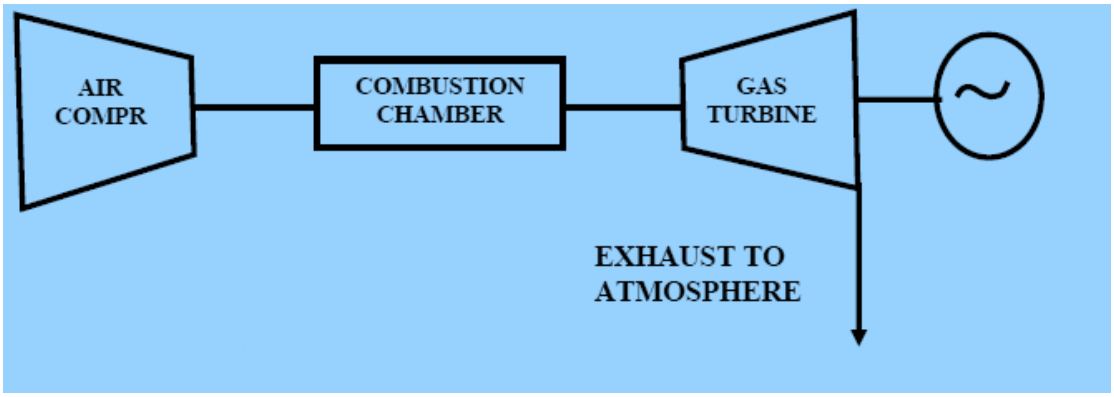

Fig.02 *Brayton Cycle*

- Rankine Cycle