Combined heat and power

Combined heat and power (CHP), often referred as co-generation, is the joint production of heat (steam or hot water) and electricity from a single fuel source, which can result in the overall efficiency up to 70 – 90%. Some CHP systems produces also chilled water from the heat. This is often called tri-generation. Conventional electricity production plants convert about 30 to 40% of fuel energy into electricity, while the rest is lost as waste heat.

Combined heat and power systems can be implemented on many different levels. At the largest scale, utility heat production can cover a whole city through a district heating system and generated power is supplied into national electricity grid. Large scale CHP installations, typically hundreds of MWth and MWe, are found in process industry and in district heating of large cities, mainly in northern Europe. Small-scale CHP installations, typically below 1 MWe are installed within the buildings that they serve, are relative common in the middle and south Europe. Dimensioning of the CHP plat will be made according to the heating load. The electricity output will be used first in house and secondly sold to the electricity grid.

Power-generation technologies, which can be applied in small scale CHP systems, include advanced turbine systems, reciprocating engines (Otto and Diesel), micro turbines and fuel cells.

In large scale CHP systems back-pressure turbines, gas turbines and diesel engines are typically used in power generation. Practical uses for co-generated thermal energy include process heating, space heating, water heating, absorption chillers, engine driven chillers, desiccant dehumification, compressed air and industrial processes. In traditional CHP/DH plants heat is extracted from major power plants and supplied to city district heating networks or for industrial use.