

COGENERATION

Cogeneration (also combined heat and power, CHP) is the use of a heat engine or a power station to simultaneously generate both electricity and useful heat. It is one of the most common forms of energy recycling.

Conventional power plants emit the heat created as a by-product of electricity generation into the environment through cooling towers, flue gas, or by other means. By contrast CHP captures the by-product heat for domestic or industrial heating purposes, either very close to the plant, or—especially in Scandinavia and eastern Europe—as hot water for district heating with temperatures ranging from approximately 80 to 130 °C. This is also called Combined Heat and Power District Heating or CHPDH. Small CHP plants are an example of decentralized energy.

In the United States, Con Edison distributes 30 billion pounds of 350 °F/180 °C steam each year through its seven cogeneration plants to 100,000 buildings in Manhattan—the biggest steam district in the world. The peak delivery is 10 million pounds per hour (corresponding to approx. 2.5 GW). This steam distribution system is the reason for the steaming manholes often seen in "gritty" New York based movies.

By-product heat at moderate temperatures (212-356°F/100-180°C) can also be used in absorption chillers for cooling. A plant producing electricity, heat and cold is sometimes called trigeneration or more generally: polygeneration plant.

Cogeneration is a thermodynamically efficient use of fuel. In separate production of electricity some energy must be rejected as waste heat, but in cogeneration this thermal energy is put to good use.