

Combined Heat & Power (CHP)

1 Introduction - heat production & applications within DH-systems

- CHP generates heat and power or power and heat
- The simultaneous generation of power and heat is increasing the energy efficiency as well as reducing CO₂-emissions and primary energy usage
- CHP has several opportunities to reduce dependencies on fossil fuels
- does not contradict with the general goal of integrating renewable energies into the heating sector

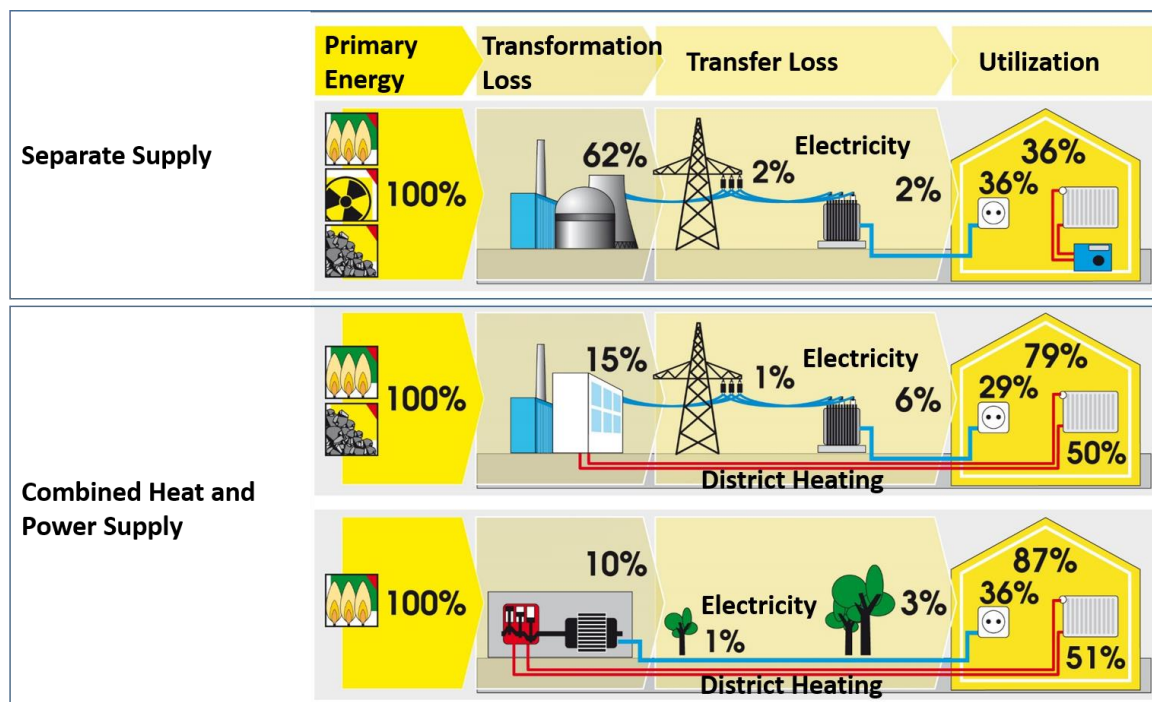


Figure 1: Energy flows and efficiency of central and decentral CHP-generation (Source: Asue 99 [1])

2 CHP-applications – an overview

- Combustion engines
- Gas turbines
- Steam / Condensing turbine
- Combined-cycle gas turbine (CCGT) plant
- Fuel cells

3 CHP differentiated in fuels and applications

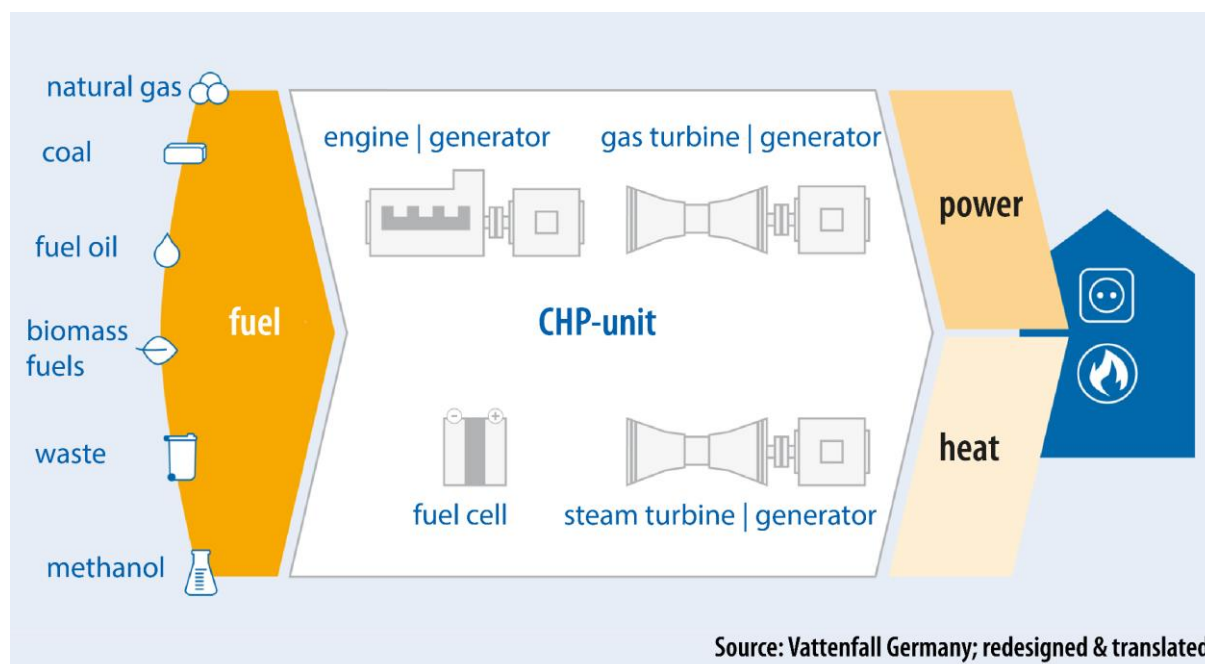


Figure 2: Supply chain of different incoming fuels to electricity and heat by utilize diverse CHP-devices (Source: Vattenfall Germany [2])

4 Future prospects of CHP-technology

Main advantages of this technology:

- CHP-plants have experienced rapid development in recent years
- CHP-applications contribute to energy and heat transformation in several ways
- flexible solution for accommodating an increasing amount of renewable energy sources in future
- Important interface for the sectors power, gas & heating

However:

- most CHP systems are still using fossil fuels
- alternatives are necessary, available and implementable - also in already existing plants
- E.g. biomass, sewage gas, synthetic gas

References:

- [1] Asue 99. https://asue.de/blockheizkraftwerke/grafiken/energieflu-esse_bei_der_reinen_stromerzeugung, Aufgerufen: 22.10.2020.
- [2] Vattenfall Germany. <https://group.vattenfall.com/de/zukunft/kraft-waerme-kopplung>