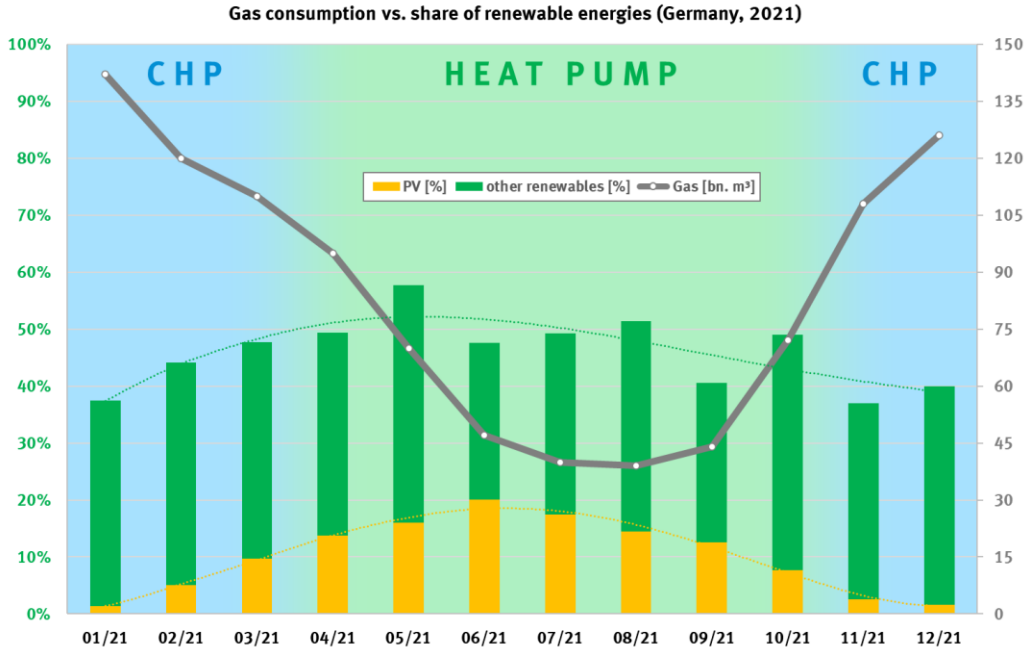
Cogeneration units and Heat Pumps
for sustainable heat and power supply

SOKRA® therm

Cogeneration and heat pump: perfect match for the thermal transition

The course of natural gas consumption reflects the heat demand supplied by gas heating systems as well as the provision of residual load by gas-fired power plants. The share of renewable energies in the electricity grid runs diametrically opposite to this. This contrasting profile will even increase with the growing expansion of photovoltaic systems (PV). Providing sufficient green electricity to be utilised in the heating market is a major challenge.



Conclusions:

- Heating with heat pumps preferably in the transition season with a relatively high share of PV electricity. During this time, heat pumps with air as a heat source have a high level of efficiency (coefficient of performance COP = 4 and higher).
- Use of CHP units for heating at low ambient temperatures. At that time of the year the COP of heat pumps drops in addition with high heating water temperatures required. Simultaneously CHP then covers electric residual load while especially PV electricity falls into short supply.

Scalable system solution with CHP unit, heat pump and master control system

CHP designed for about 40 % of the building's nominal heat requirement for grid-responsive operation.

nominal heat requirement (Q_{max})	heating power CHP	electric power CHP
up to 250 kW	107 kW	50 kW
up to 350 kW	139 kW	70 kW
up to 450 kW	171 kW	100 kW
up to 550 kW	216 kW	140 kW
up to 800 kW	323 kW	200 kW
up to 1.000 kW	394 kW	260 kW
more than 1.000 kW		individual design

Add-on air/water heat pump, compact unit for outdoor installation. Two delivery charts from 50 - 700 kW thermal, examples:

SOKRATHERM WP 80 M

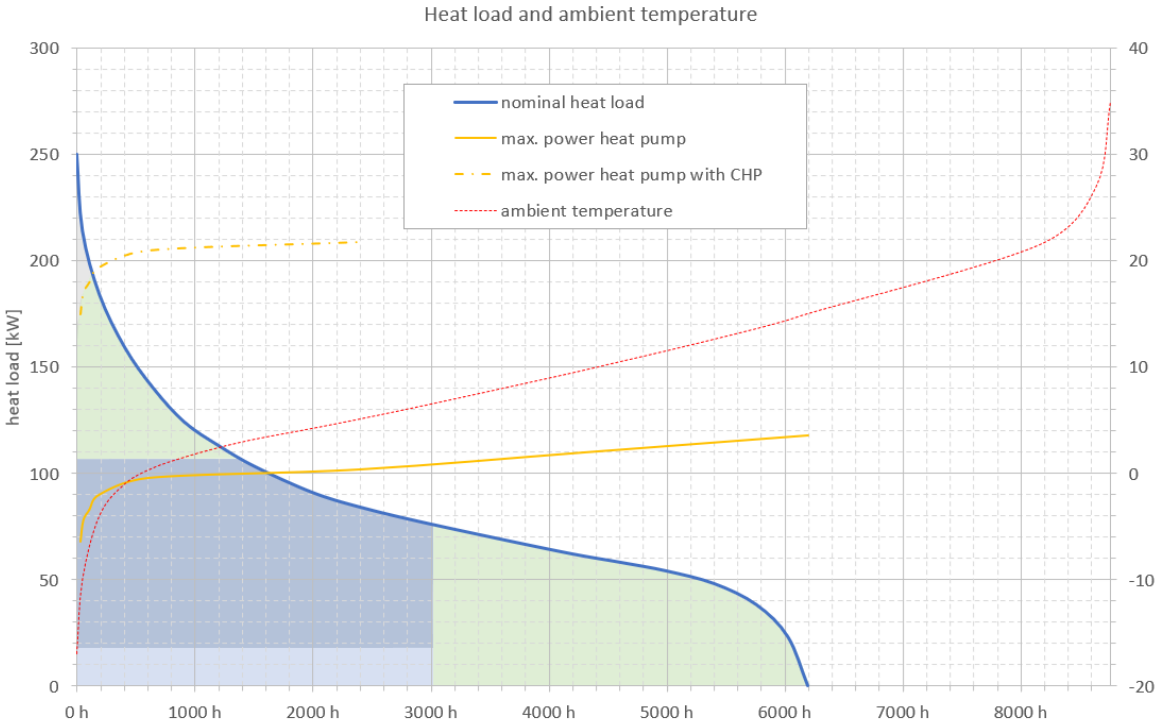
- low-GWP refrigerant R454B
- 82 kW heating power at COP 2,56 (A7/W55)
- max. flow temperature: 55 °C

SOKRATHERM WP 80 H

- organic refrigerant R290
- 82 kW heating power at COP 2,87 (A7/W55)
- max. flow temperature: 70 °C

Scalable system solution with CHP unit, heat pump and master control system

Heat supply shares of the system solution, example:
250 kW nominal heat requirement without hot water preparation, flow/return temperature = 55/40 °C.



more than 45 % share from
heat pump WP 130 M
with 102 kW heating power
(at 7 °C ambient temperature)

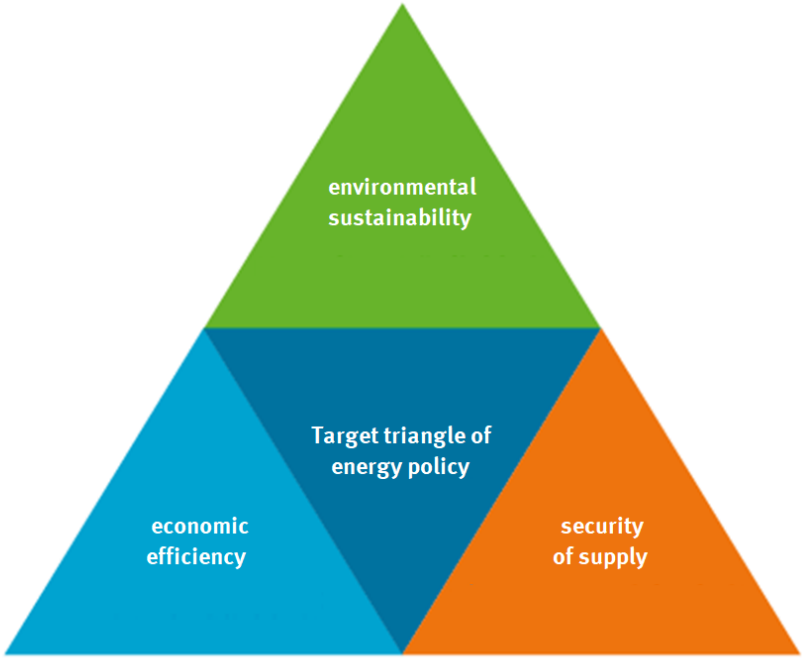
more than 45 % share from
CHP compact unit GG 50 6VRS
with 89 kW heating power with

additional 18 kW from
condensing heat exchanger

less than 10 % share from peak load
gas or electric boiler

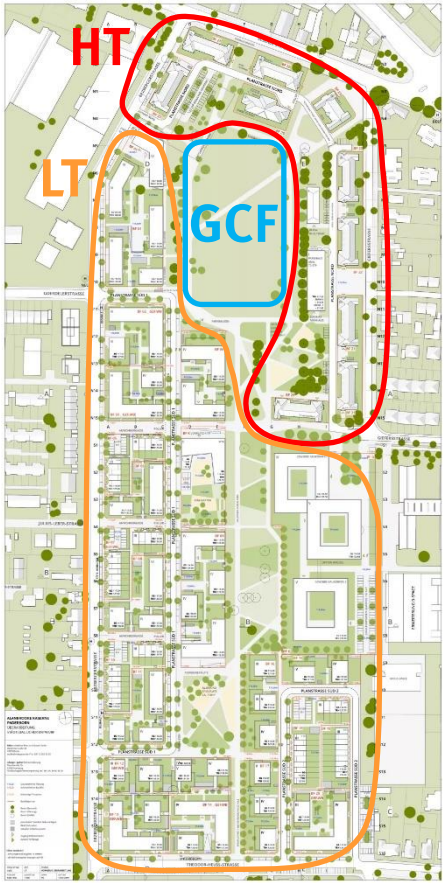
Target triangle of energy policy

By combining CHP unit, heat pump and peak load heat generator with an optimised design and intelligent operation management, the target triangle of energy policy is being considered in all three aspects.



Best Practice Project: Paderborn, conversion of a former British Army Ground

Best Practice Project: Paderborn, Alanbrooke Quarters, individual design



Two separate heating networks are being set up:

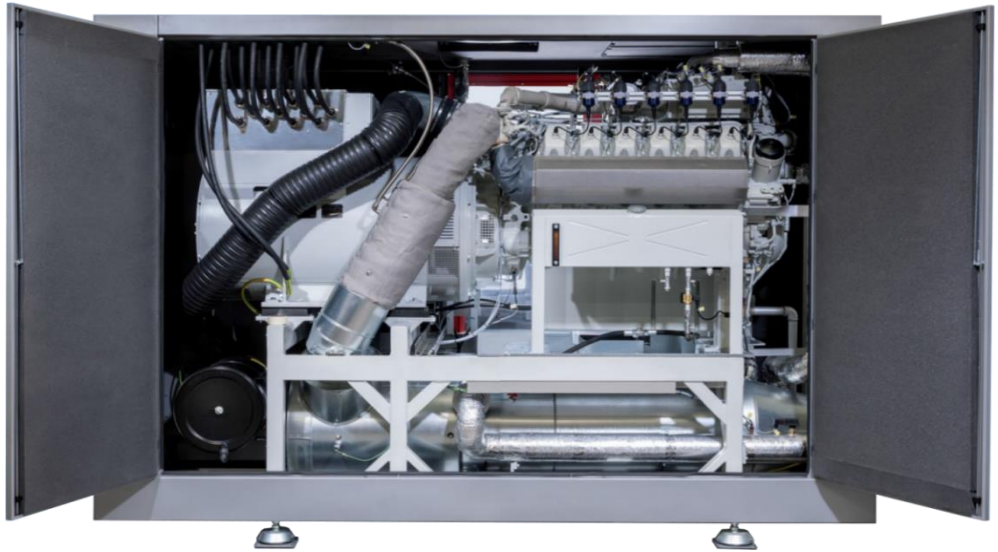
One network with a higher temperature (HT, flow/return = 85/55 °C) is supplied by a SOKRATHERM GG 202 compact CHP unit with 205 kW electrical and 323 kW thermal output and a peak load gas boiler.

The second low-temperature network (LT, flow/return = 45/36 °C) supplies the new development area from two heat pumps.

A large brine/water heat pump (645 kW) utilises the source heat from a ground collector field (GCF) and from the condensing heat exchanger of the CHP unit. Due to the extremely low brine temperature (4/8 °C), another 97 kW are being extracted on part of the CHP unit so that the exhaust heat is completely utilised.

A smaller air/water heat pump (176 kW) covers the load during the transition season so that the ground collector field can regenerate.

We are open to your questions!



competence in CHP ... and Heat Pumps!