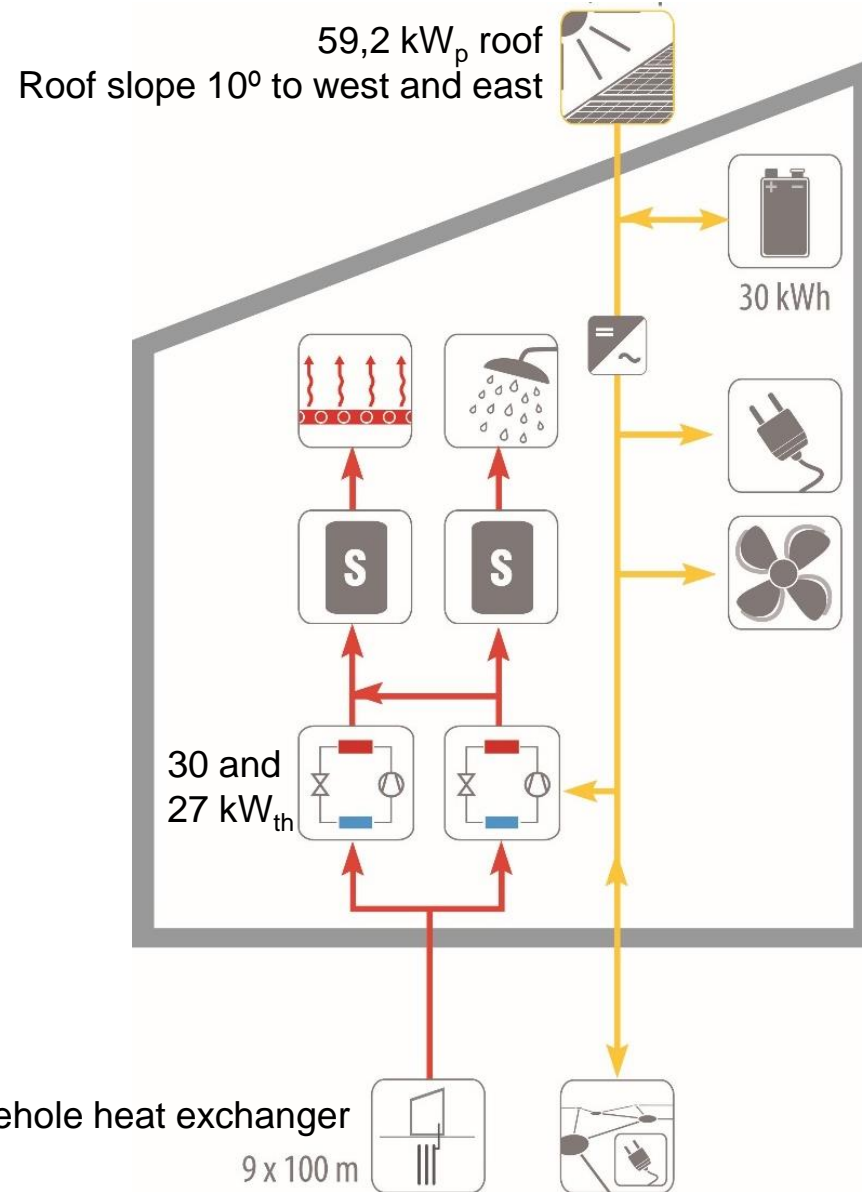


Building Blocks in Germany (Konstanz and Wolfsburg)



2 buildings (2016)
12 apartments (total)
3 floors (each)
NFA 1.140 m² (total)

30.01.2023

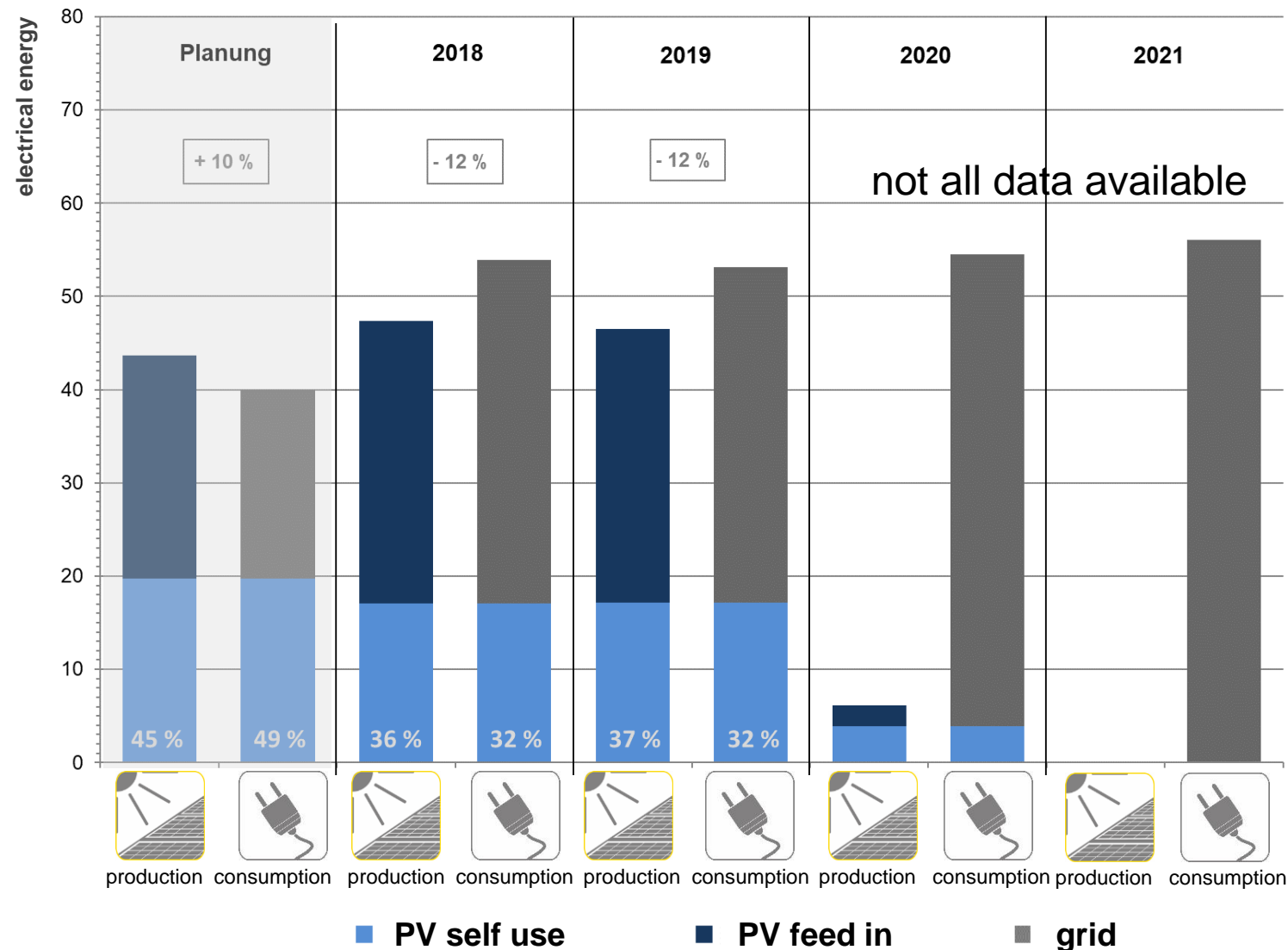


Bockelmann | PED in Germany



No PED available in practice because

- the user electricity demand has increased compared to the planning assumptions.
- the hot water demand has doubled compared to the planning assumptions.



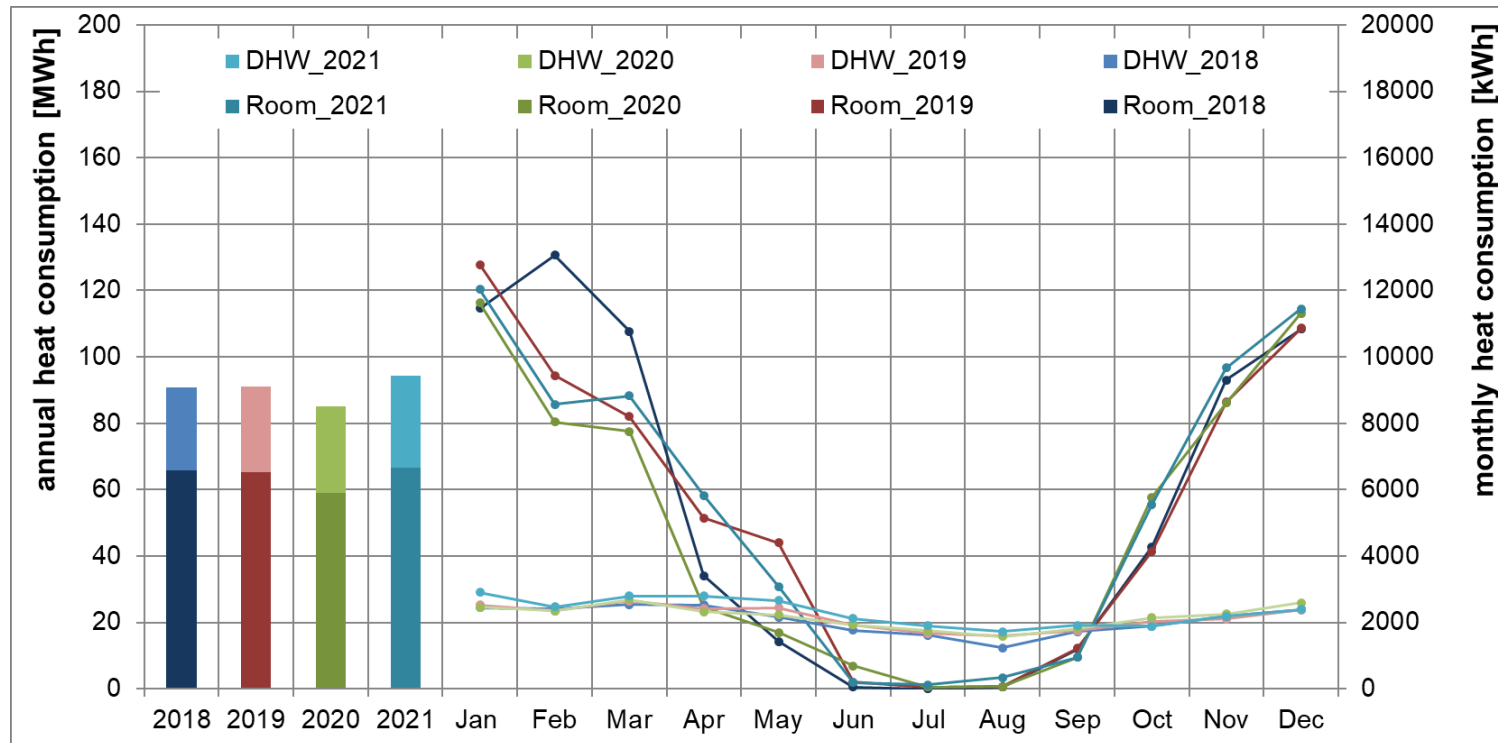


Heating (space heating and domestic hot water) – annual and monthly consumption

Heat consumption

SH 56,3 kWh/(m²a)
71 %

DHW 23,0 kWh/(m²a)
29 %
(design 12,5 kWh/m²a)



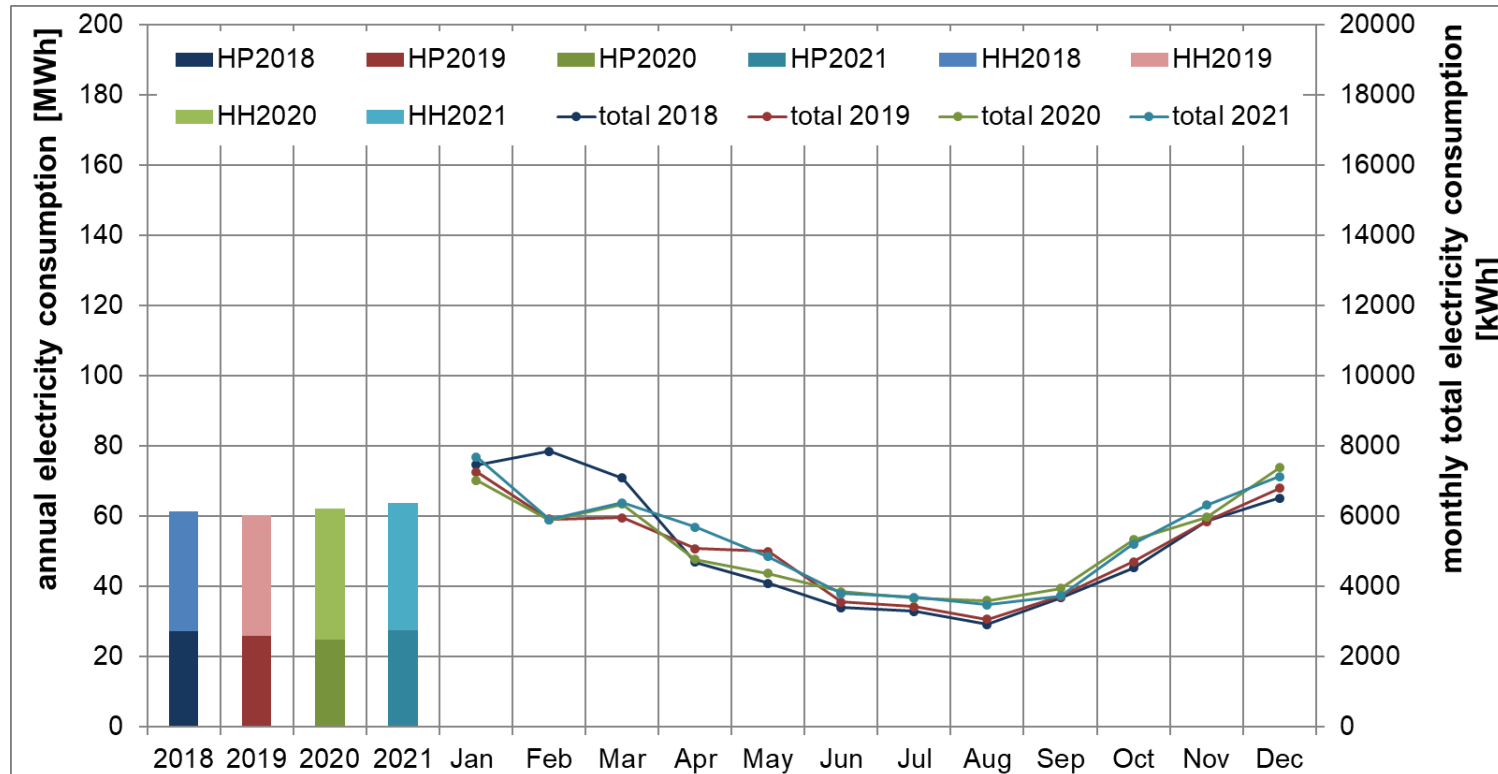


Electricity (heat pump and household plus technical part) – annual and monthly consumption

Electricity consumption

HP 23 kWh/(m²a)
43 %

HH+ other technicals 31 kWh/(m²a)
57 %
(design 15,4 kWh/m²a)





PV-System – annual and monthly yield

PV-yield ~ 904 kWh/kWp

monthly values

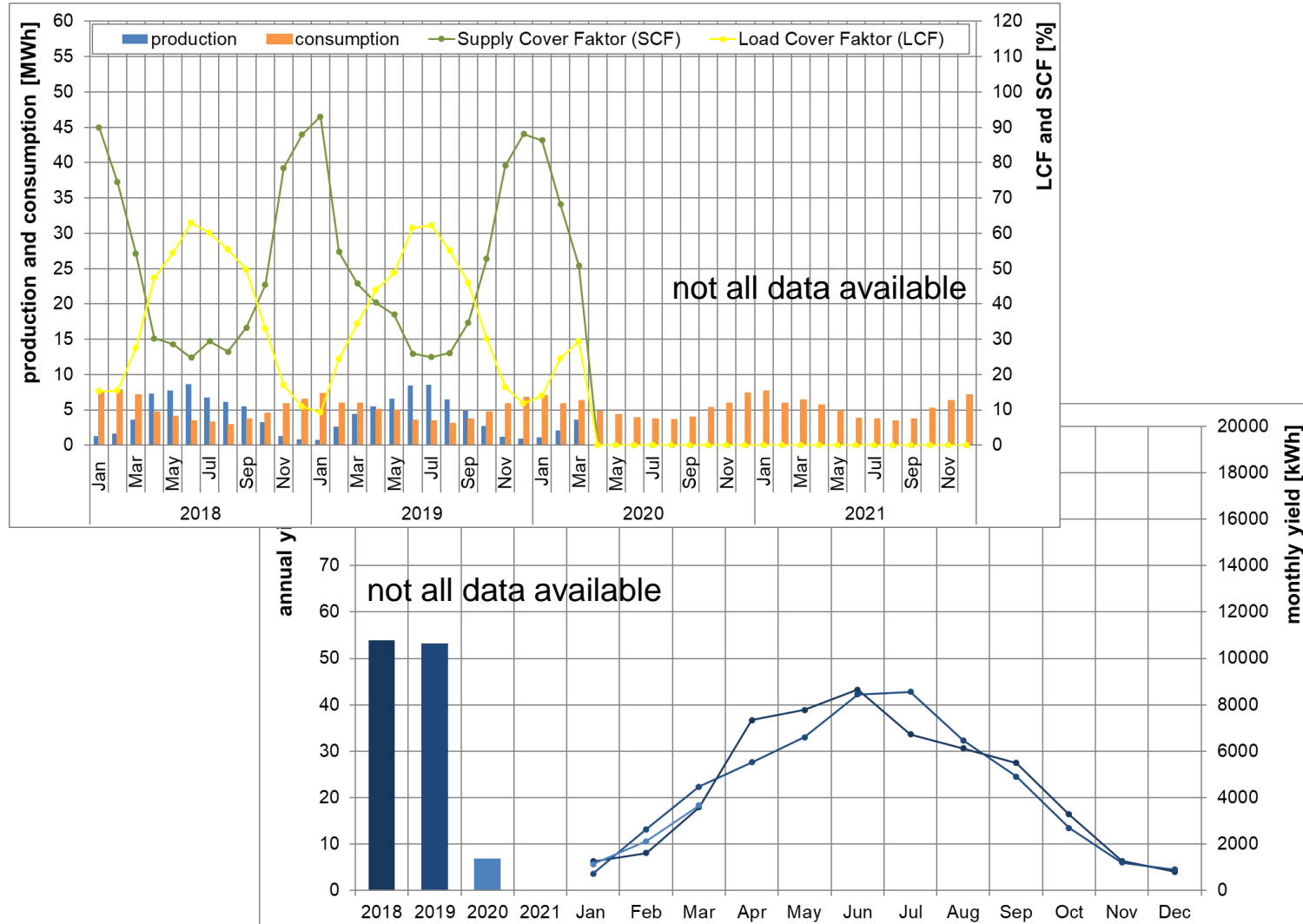
LCF 9 - 63 %

SCF 25 - 93 %

yearly average

LCF 32 %

SCF 37 %



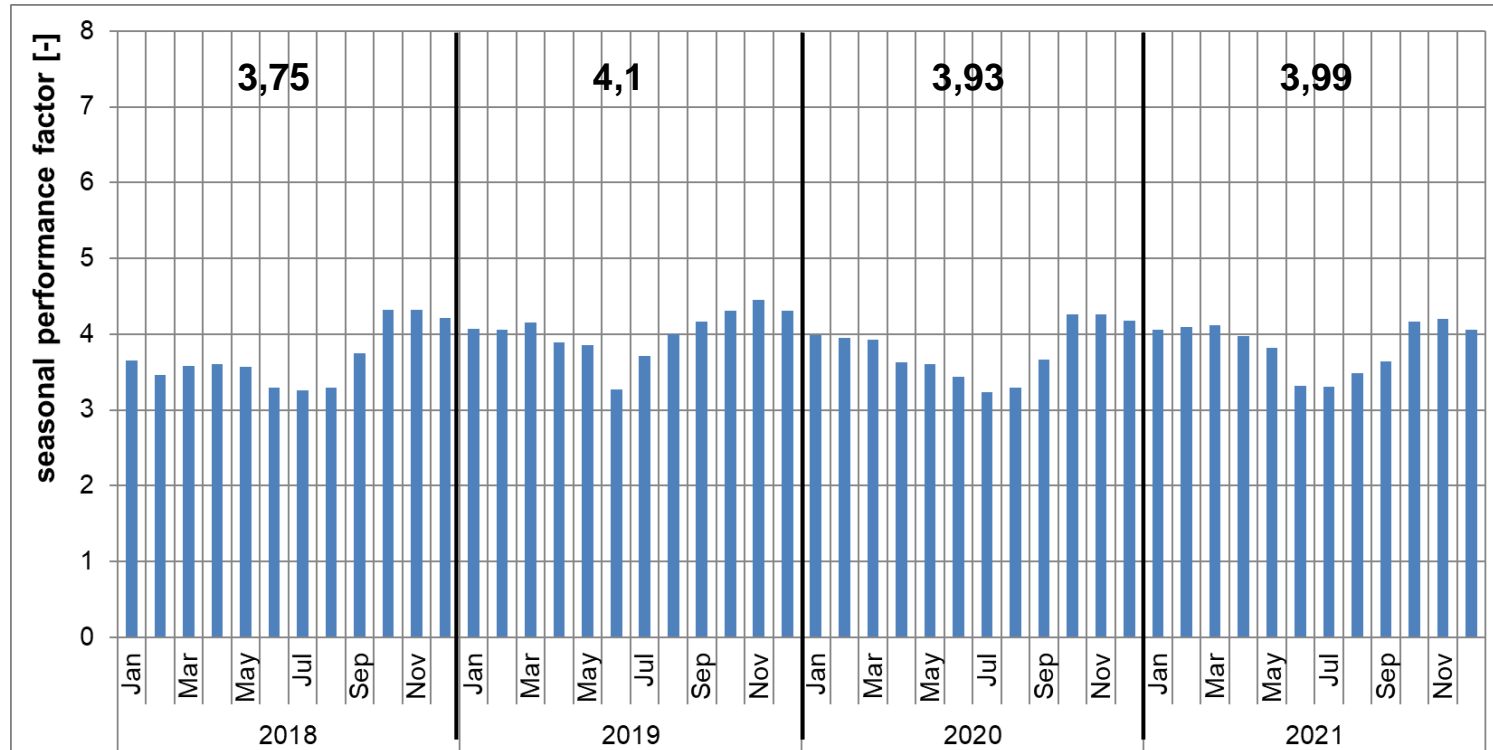


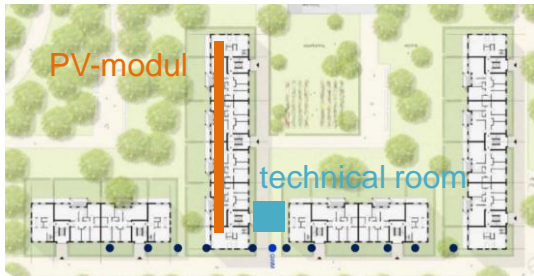
Heat pump (SPF) – monthly efficiency

Heat pump (total)

SPF 3,2 – 4,4
(monthly values)

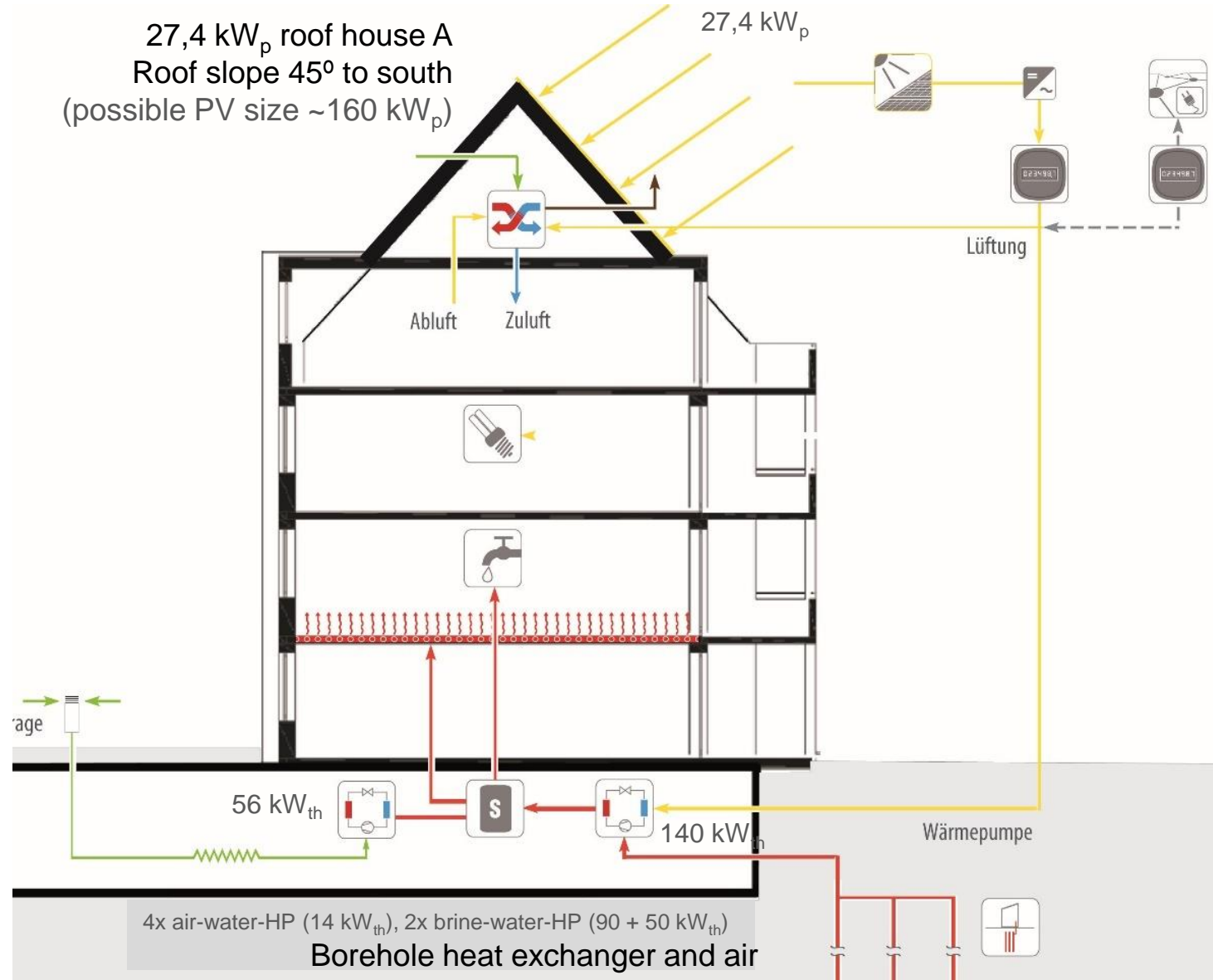
SPF 3,94
(annual mean value)





4 buildings (2016)
68 apartments (total)
4 floors (each)
NFA 9.500 m² (total)

27,4 kW_p roof house A
Roof slope 45° to south
(possible PV size ~160 kW_p)

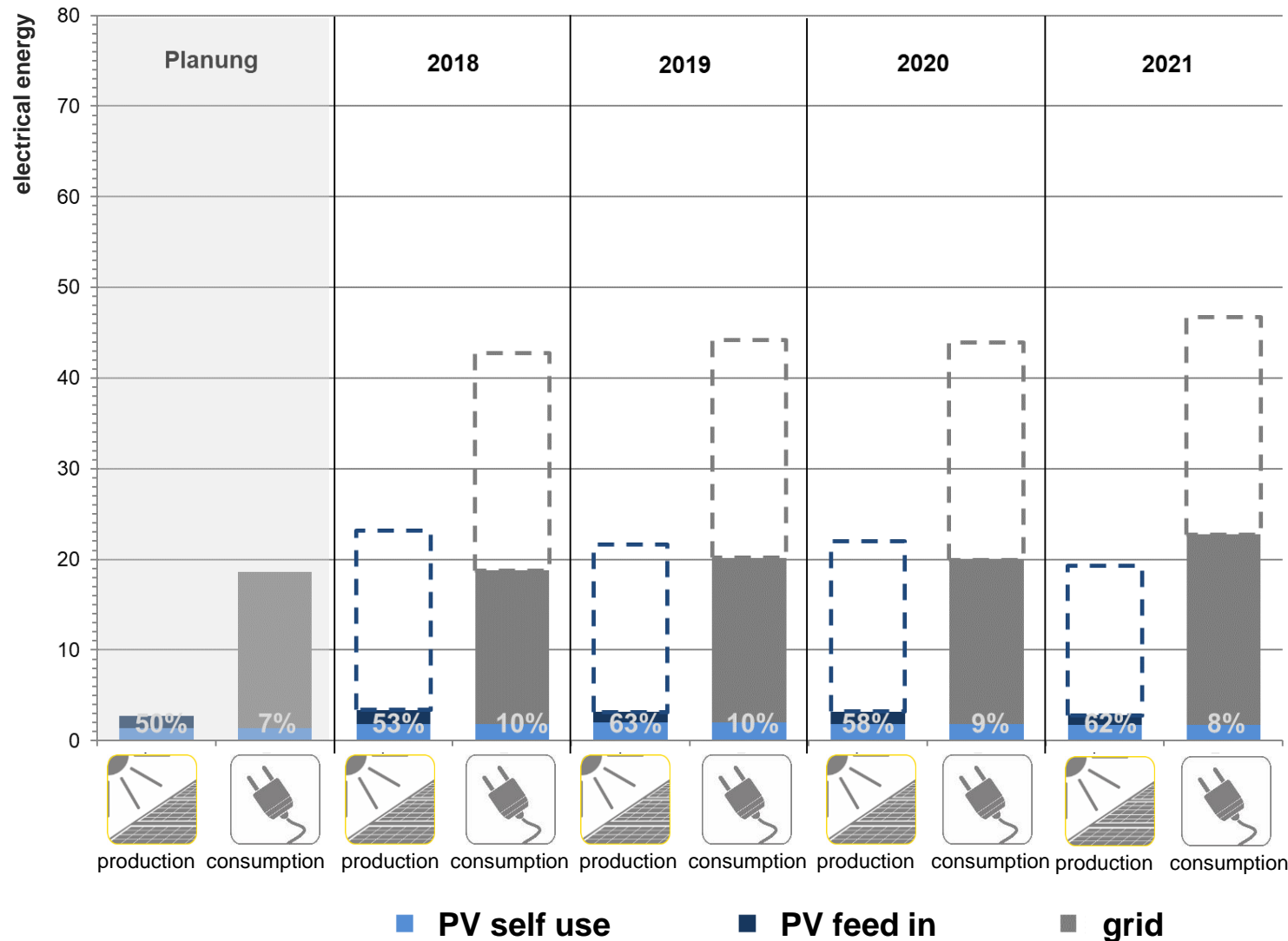




Balance sheet only via heating system/production; PV yield only for heating system.

No PED available because the possible PV area on the roofs is too small for the total demand.

Dotted bars:
Possible PV yield for total PV on the roof and additional electricity for household.



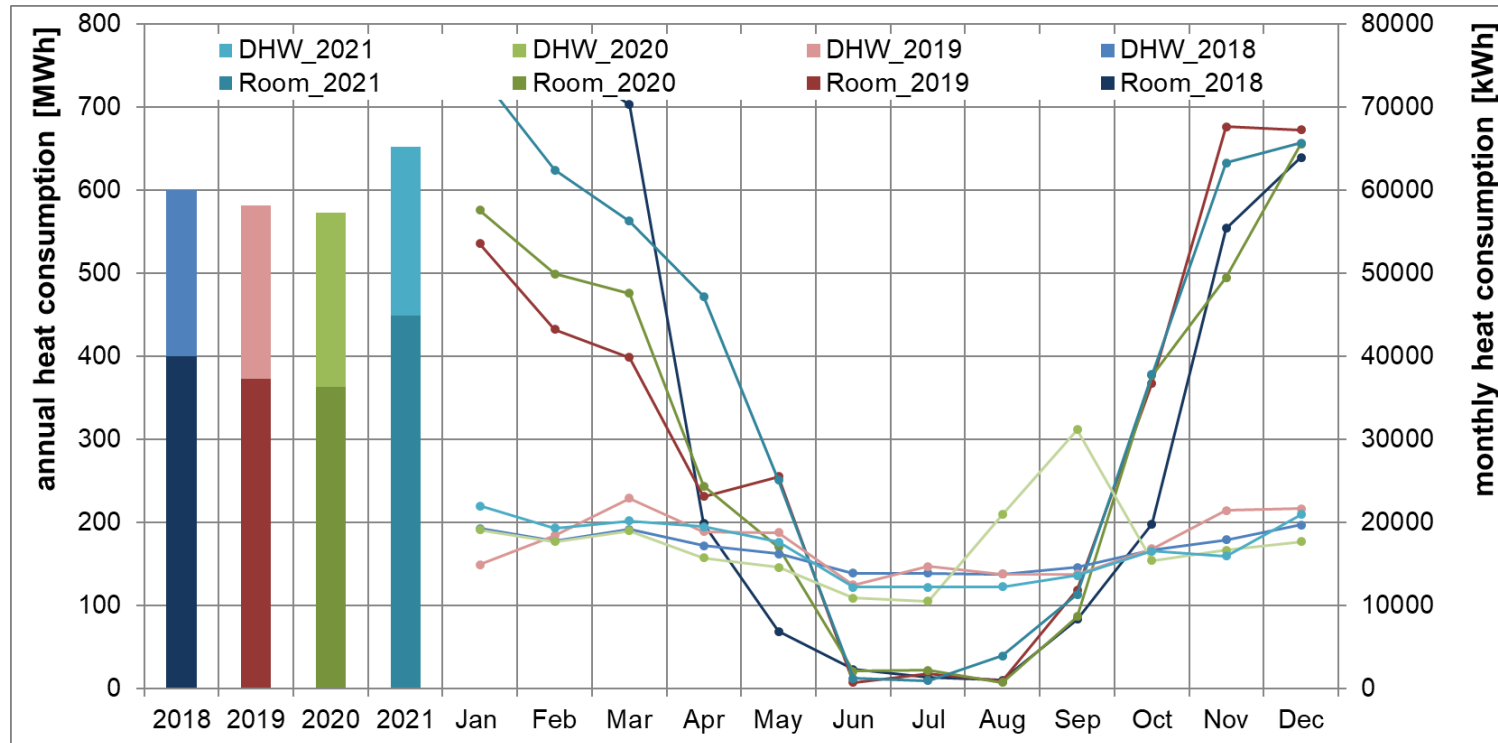


Heating (space heating and domestic hot water) – annual and monthly consumption

Heat consumption

SH 41,7 kWh/(m²a)
66 %

DHW 21,6 kWh/(m²a)
34 %



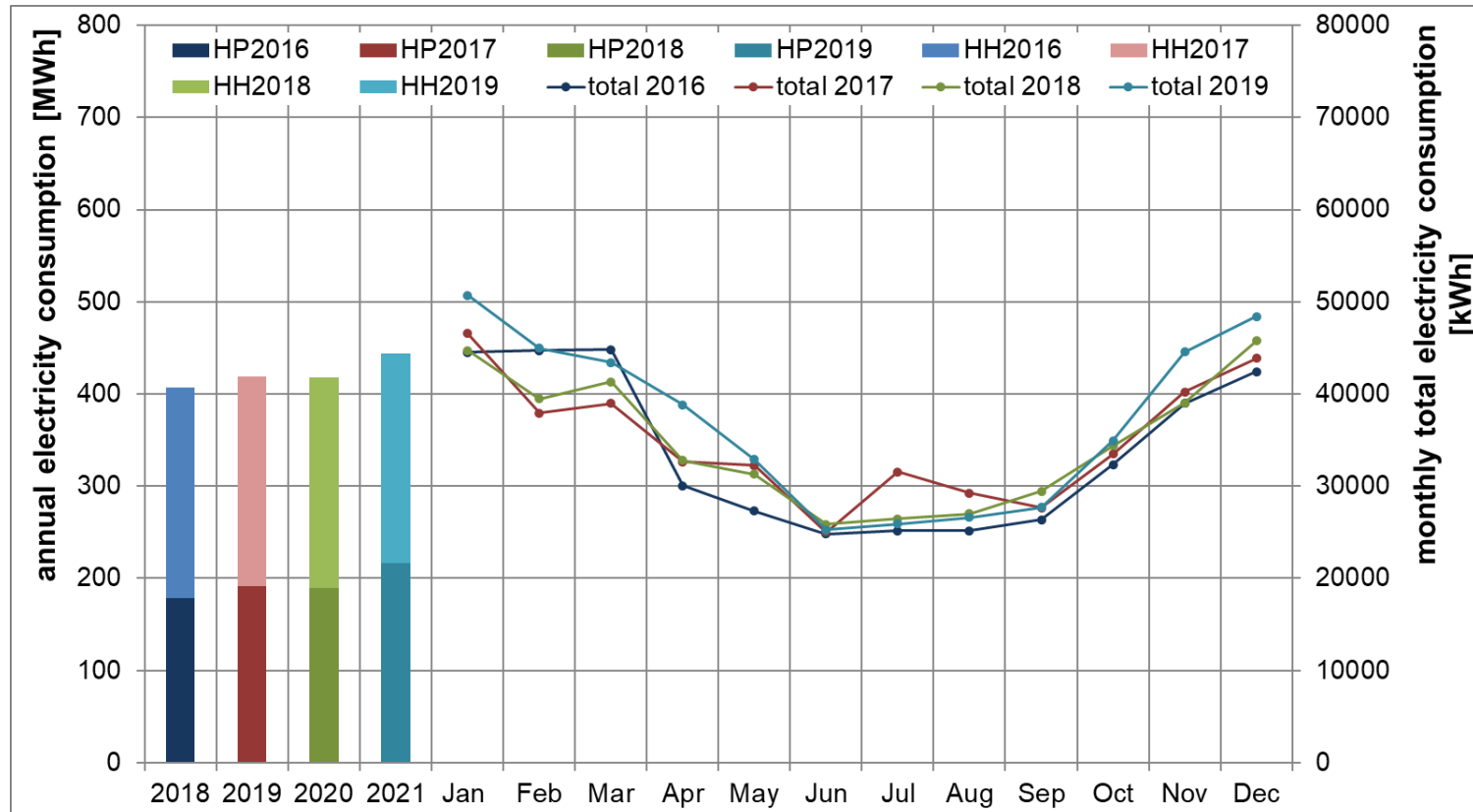


Electricity (heat pump and household plus technical part) – annual and monthly consumption

Electricity consumption

HP (incl. all electr.) 20,0 kWh/(m²a)
46 %

HH (assumption) 24,0 kWh/(m²a)
54 %





PV-System – annual and monthly yield

Evaluation for existing PV system (27,4 kW_p) and heating system

PV-yield ~ 1.090 kWh/kWp

monthly values

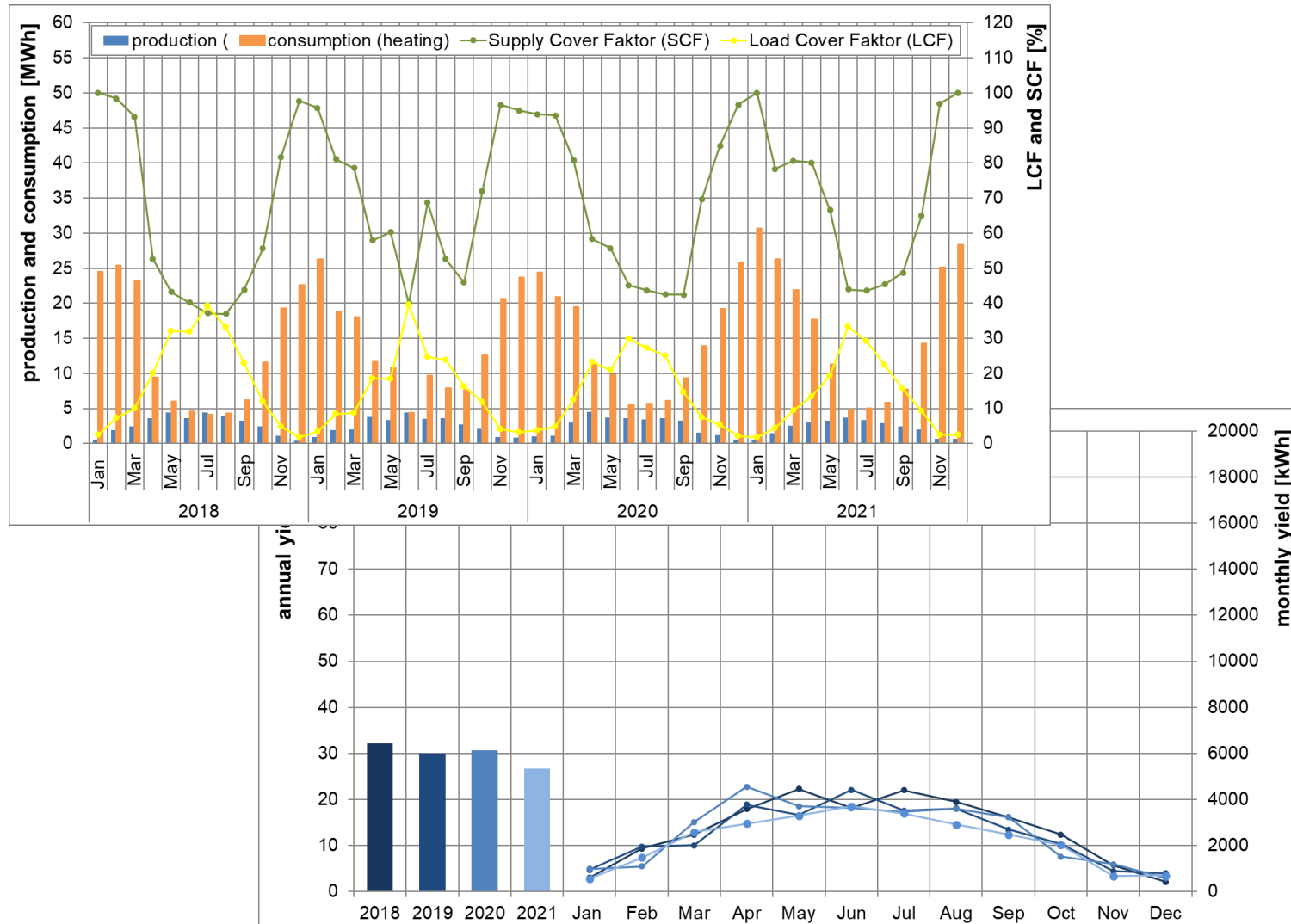
LCF 2 - 40 %

SCF 37 - 100 %

yearly average

LCF 10 %

SCF 60 %





Heat pump (SPF) – monthly efficiency

Heat pump (total)

SPF 2,7 – 6,2
(monthly values)

SPF 3,96
(annual mean value)

