Autor: OPET Austria – partners OEKV and E.V.A.
Companies: OEKV "Austrian Energy Consumer`s Association" and E.V.A. "The Austrian Energy Agency"
Representative of OPET Austria: DI Franz Urban, General Manager of OEKV

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Small Scale CHP in the Austrian Energy Landscape

The Austrian electricity market is since October 2001 100% liberalised. This has caused some changes for CHP – plants, the most important are:

- CHP – operators are equal with energy supply companies (ESCO`s)
- Supply by direct cables is possible
- Costs for stand-by and top-up supplies have decreased

Current frame conditions for SSCHP in Austria

Advantages:

- utilities are obliged to purchase electricity generated by renewable resources –i.e. biomass, biogas, dump or sewage gas, geothermal, wind and solar- which must account for 4 % of total end-users electricity consumption by 2007. If this obligation is not fulfilled, the electricity suppliers have to pay a penality which goes to a fond for subsidies of renewable energies plants.
- the amending electricity act contains the possibility to obligate the distribution networks to purchase electricity from CHP plants which deliver heat to the public heat network.
- supply by direct cables is possible
- costs for stand-by and top-up supplies have decreased
- CHP – operators are equal with energy supply companies (ESCO`s)

Disadvantages:

- according to the Electricity Act, only plants which deliver heat to the public heat network are cosidered as CHP plants
- low heat demand in summer
- due to the liberalisation, competition has become stronger which caused decrease of energy costs; this has a negative effect on the profitability of cogeneration installations,
- investors are hasitating to invest in cogeneration; Austria has at the moment over-capacity of electricity production;

- liberalisation of the gas market (in October, 2002) could also have considerable impact on the operational conditions of CHP plants; although the impact on the gas prices up to now has been very weak.
- there are not legal obligations for the distribution companies to purchase electricity from industrial CHP - plants

Example: Technico- economical analysis of Small Scale Cogeneration in Austria

Photo 1: Maschinenfabrik Pöttinger: Grieskirchen in Upper Austria

Methodology of the technical and economical analysis

1. Analysis of heat & electric demand per month (annual load curve):

Heat demand for residential heating and production is about 13.100 MWh. Demand for electricity of Maschinenfabrik Pöttinger is about 7.700 MWh. CHP unit may be controlled according to the electric requirement. The required electricity of the company is registered and produced. Above 800 kW of maximum output, the required remaining electricity is supplied from the public net. The peak load is about 1.400 kW. Electricity overproduction is less than 1% . The thermal output of the CHP is sufficient to supply the company up to about +4°C. Over +10°C, during summertime, there is a overproduction of heat. There are discussions to use this heat in the neighbourhood. The thermal peak is covered by gas boiler with 2.500 kW.

Analysis of heat demand and CHP unit sizing is presented in Figures 1 to 7.

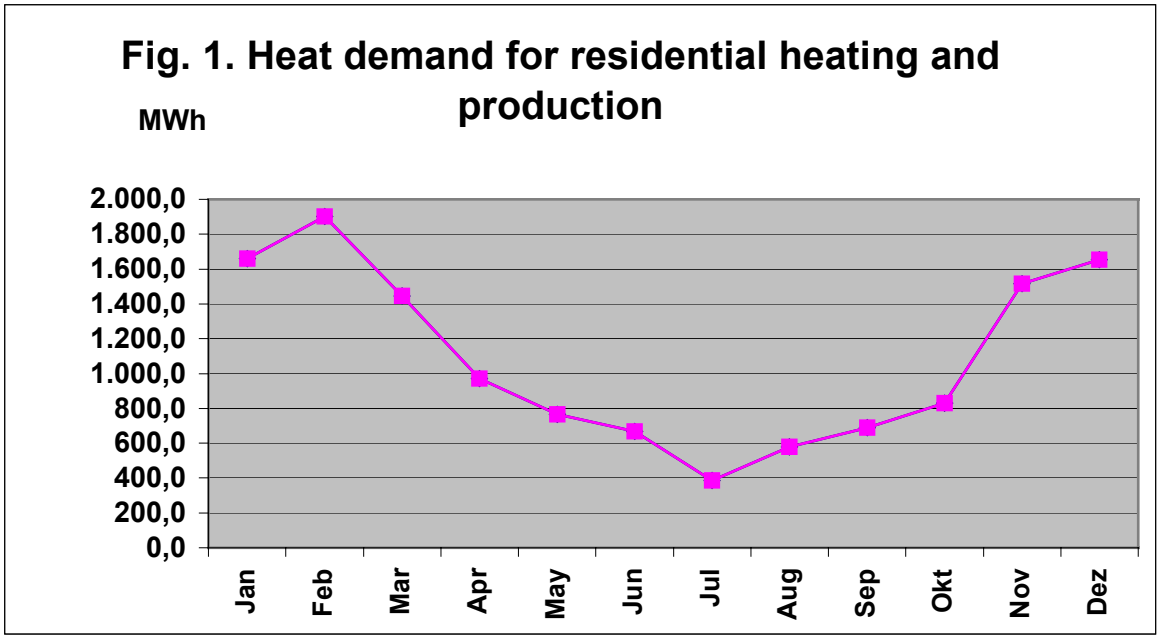


Fig. 1. Heat demand for residential heating and production
MWh
2.000,0
1.800,0
1.600,0
1.400,0
1.200,0
1.000,0
800,0
600,0
400,0
200,0
0,0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Okt
Nov
Dez

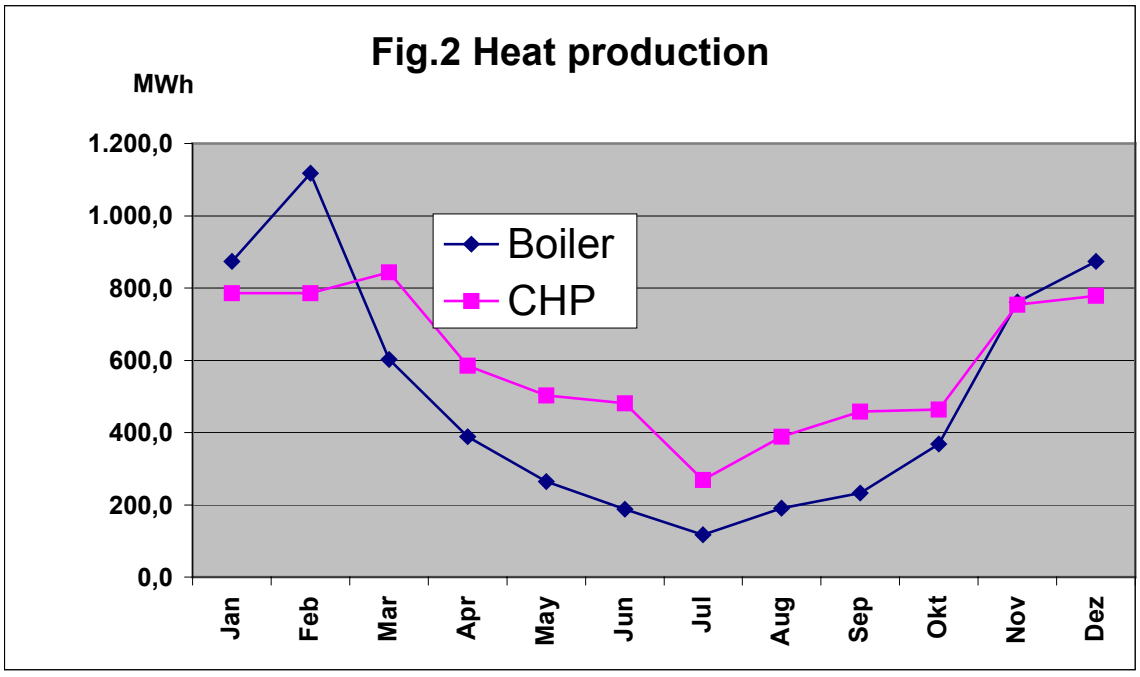


Fig.2 Heat production
MWh
1.200,0
1.000,0
800,0
600,0
400,0
200,0
0,0
Boiler
CHP
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Okt
Nov
Dez

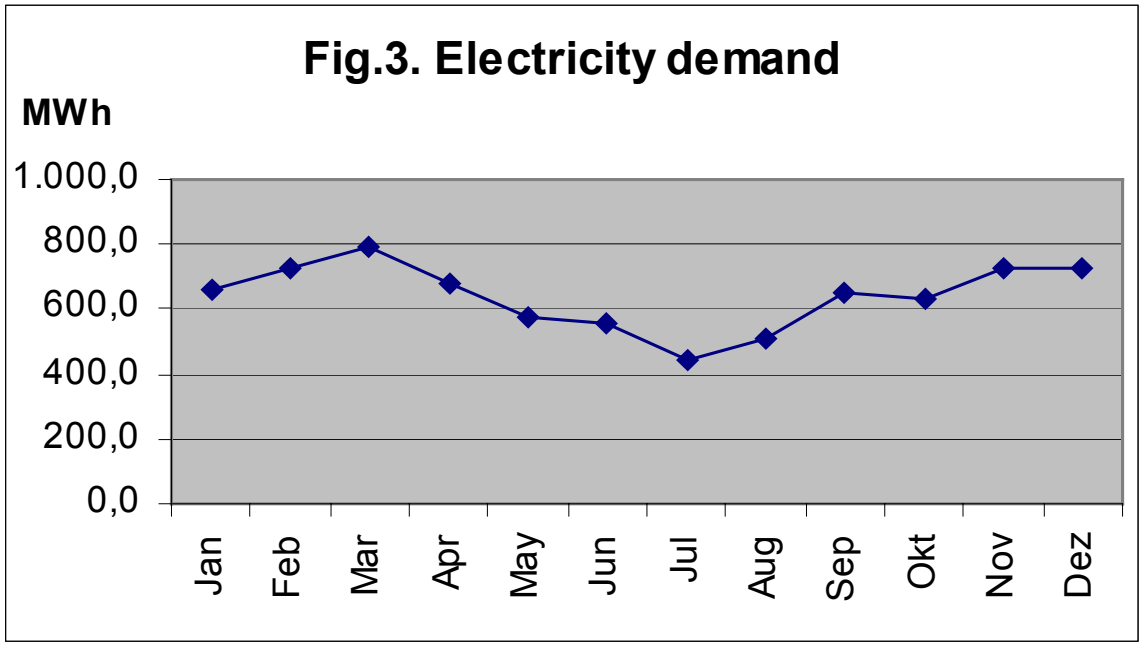


Fig.3. Electricity demand
MWh
1.000,0
800,0
600,0
400,0
200,0
0,0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Okt
Nov
Dez

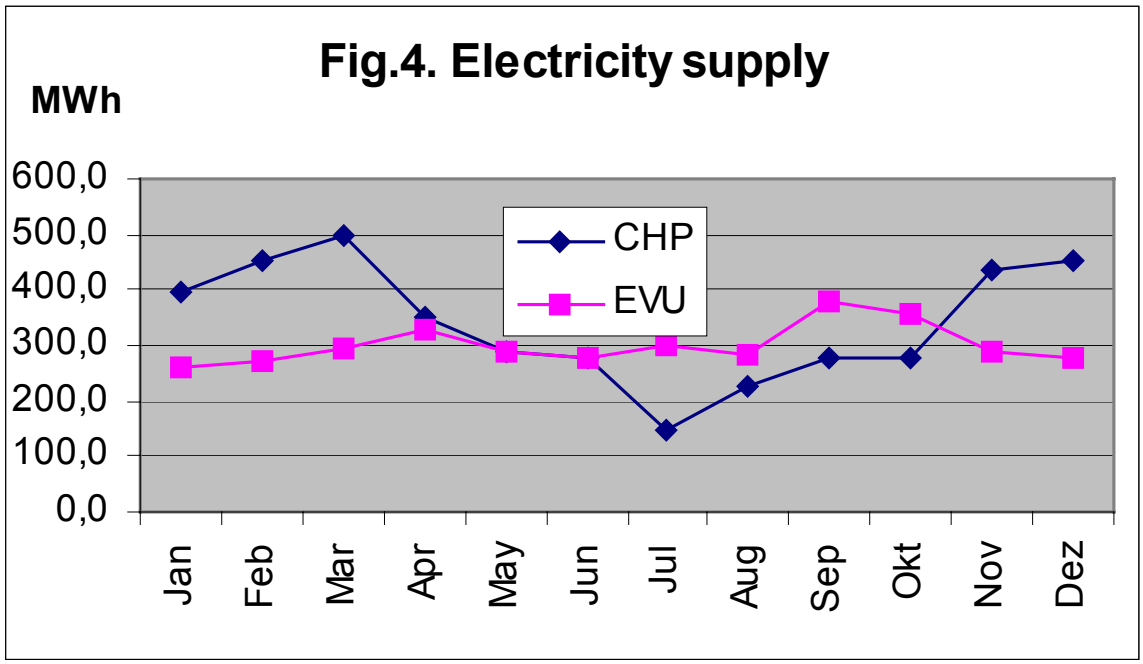
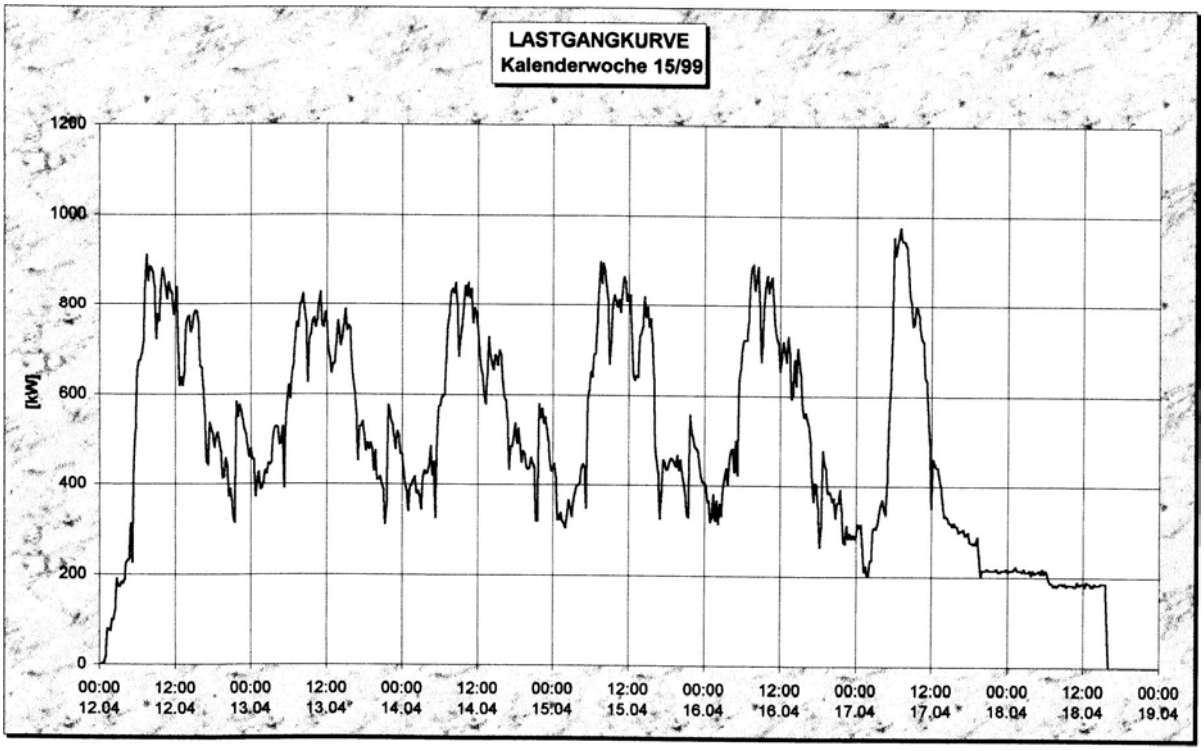


Fig.4. Electricity supply
MWh
600,0
500,0
400,0
300,0
200,0
100,0
0,0
CHP
EVU
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Okt
Nov
Dez

Fig. 5: Load curve week 15/99



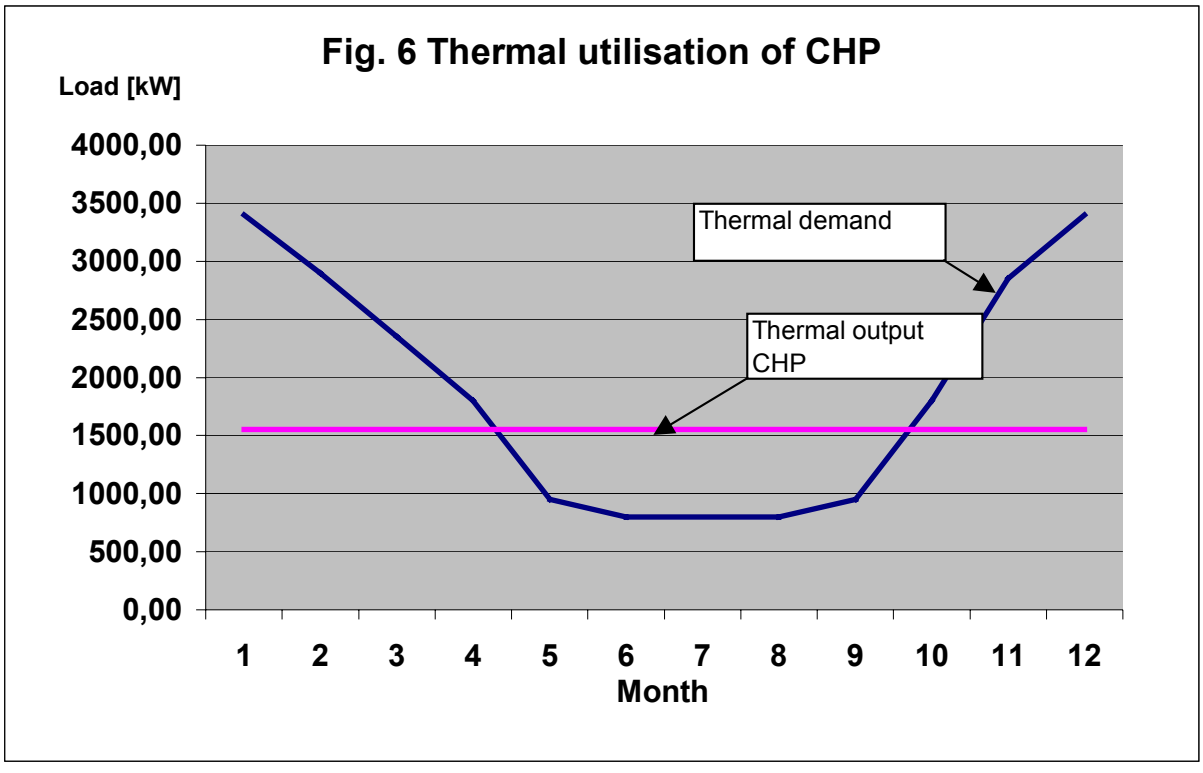


Fig. 6 Thermal utilisation of CHP
Load [kW]
4000,00
3500,00
3000,00
2500,00
2000,00
1500,00
1000,00
500,00
0,00
Thermal demand
Thermal output CHP
1
2
3
4
5
6
7
8
9
10
11
12
Month

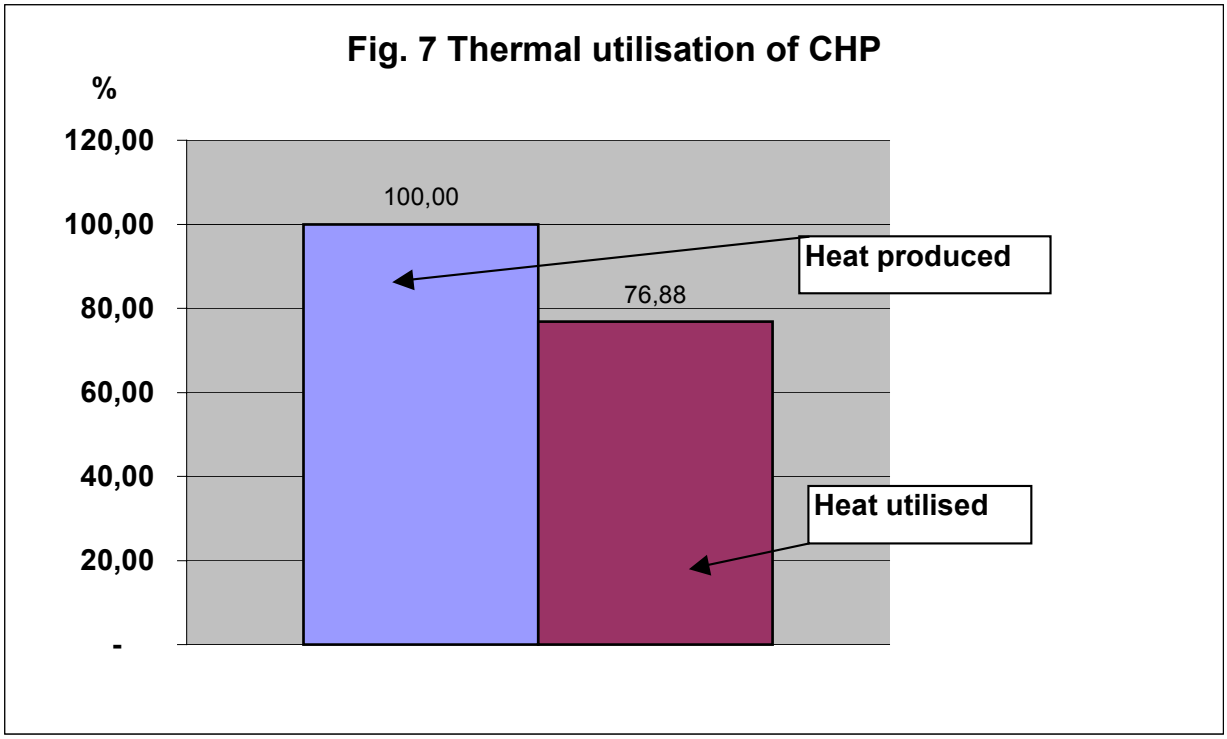


Table 1.: Economical analysis of CHP installation for the company

No.	Parameter	unit	CHP unit
1	thermal output	[kWth]	1500
2	electrical output	[kWe]	800
3	number of hours of operation	[h/year]	5000

4	maintenance cost	[€ / year]*	48.000
5	functioning cost - CHP fuelled by natural gas	[€ / year]	273.000
6	total functioning cost	[€ / year]	321.000
7	electricity produced by CHP	[kWhe/year]	4,000.000
8	value of electricity produced by CHP	[€ / year]	262.000
9	thermal energy produced by CHP	[kWhth/year]	6.500.000
10	value of thermal energy produced by CHP	[€ / year]	189.000
11	total value of energy produced by CHP (thermal + electricity)	[€ / year]	451.000
12	savings	[€ / year]	130.000
13	SPBT (simple pay back time)	[years]	5,5
* Exchange rate used 1 € = 13,7603 ATS			