

PV-supported Heat Pump System

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PV or Thermal Collectors?

- The most interesting question today is:
- PV or Solar Collector?
- They compete on the same roof area?
- IEA cannot handle this question!

PV or Thermal Collectors?

- In Sweden electric energy is often used for delivering domestic hot water
- This is an advantage for PV
- ***The Swedish answer to the question is PV!***

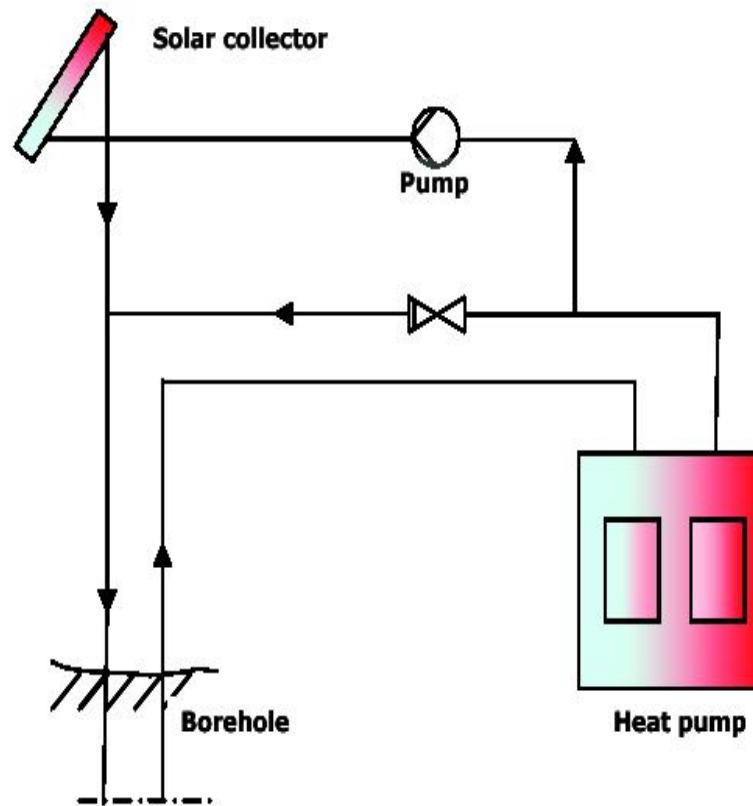
PV or Thermal Collectors?

- Solar thermal system can not compete in combination with heat pumps or district heating in Sweden
- PV and heat pumps or PV and district heating are good combinations

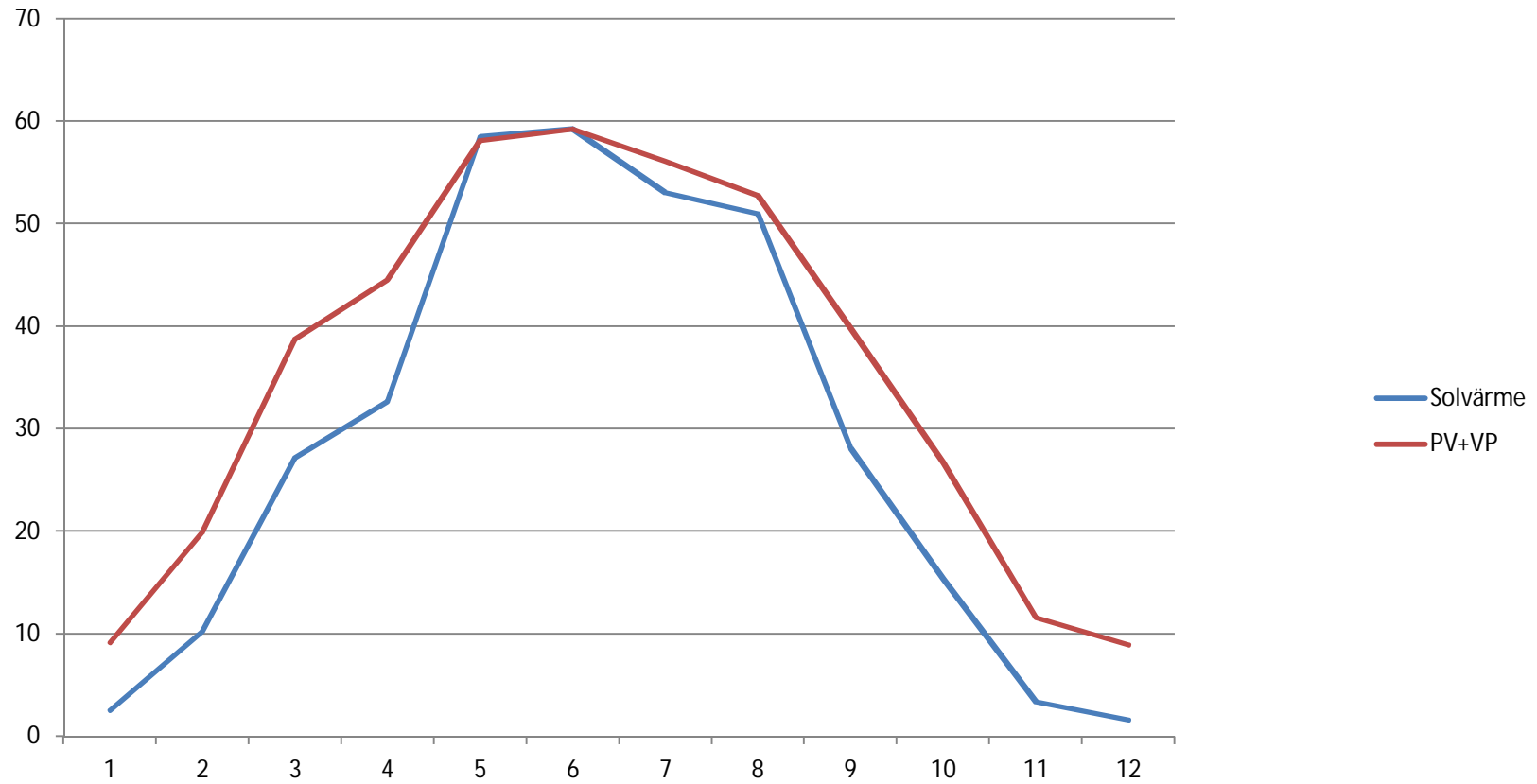
Bed rock Heat Pump

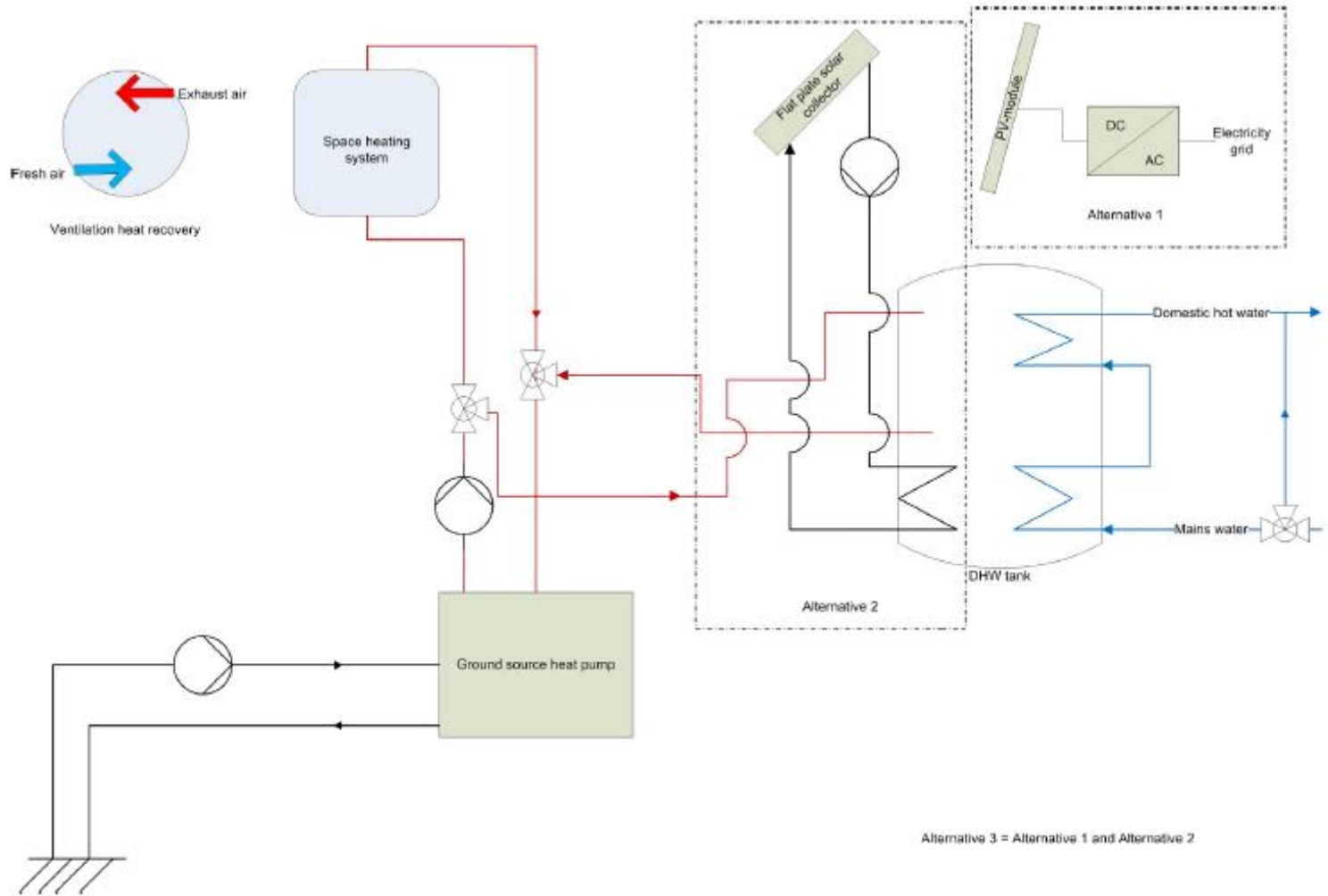


Heat pump and solar collectors?

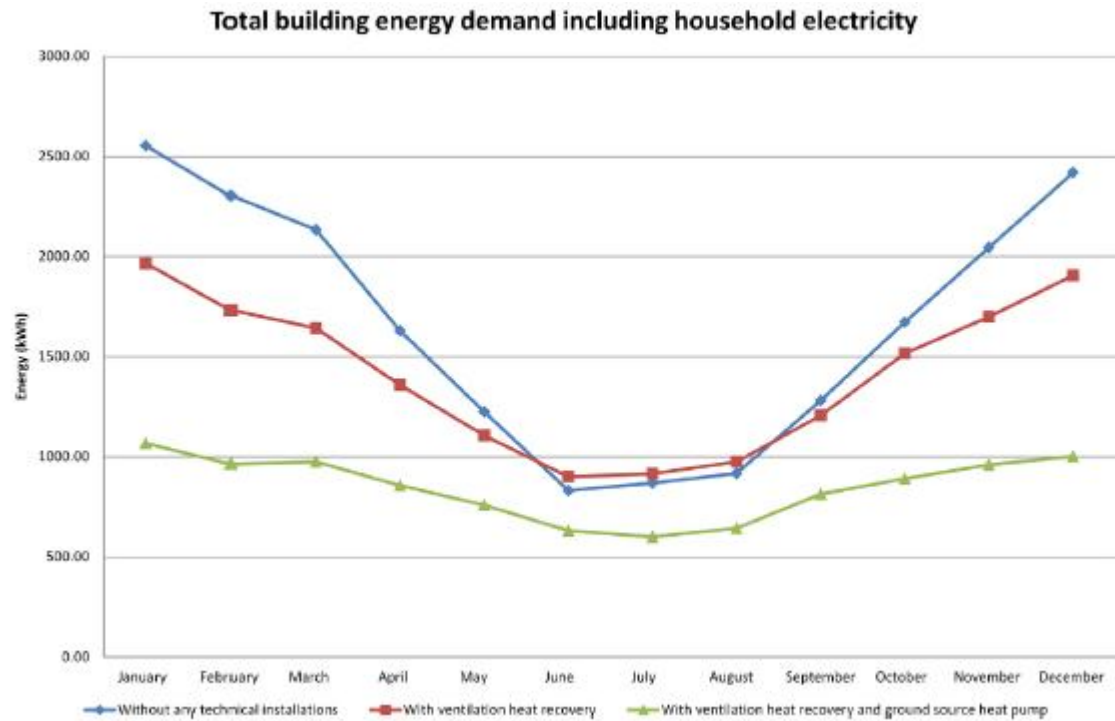


PV+Heat Pump or Solar Collector

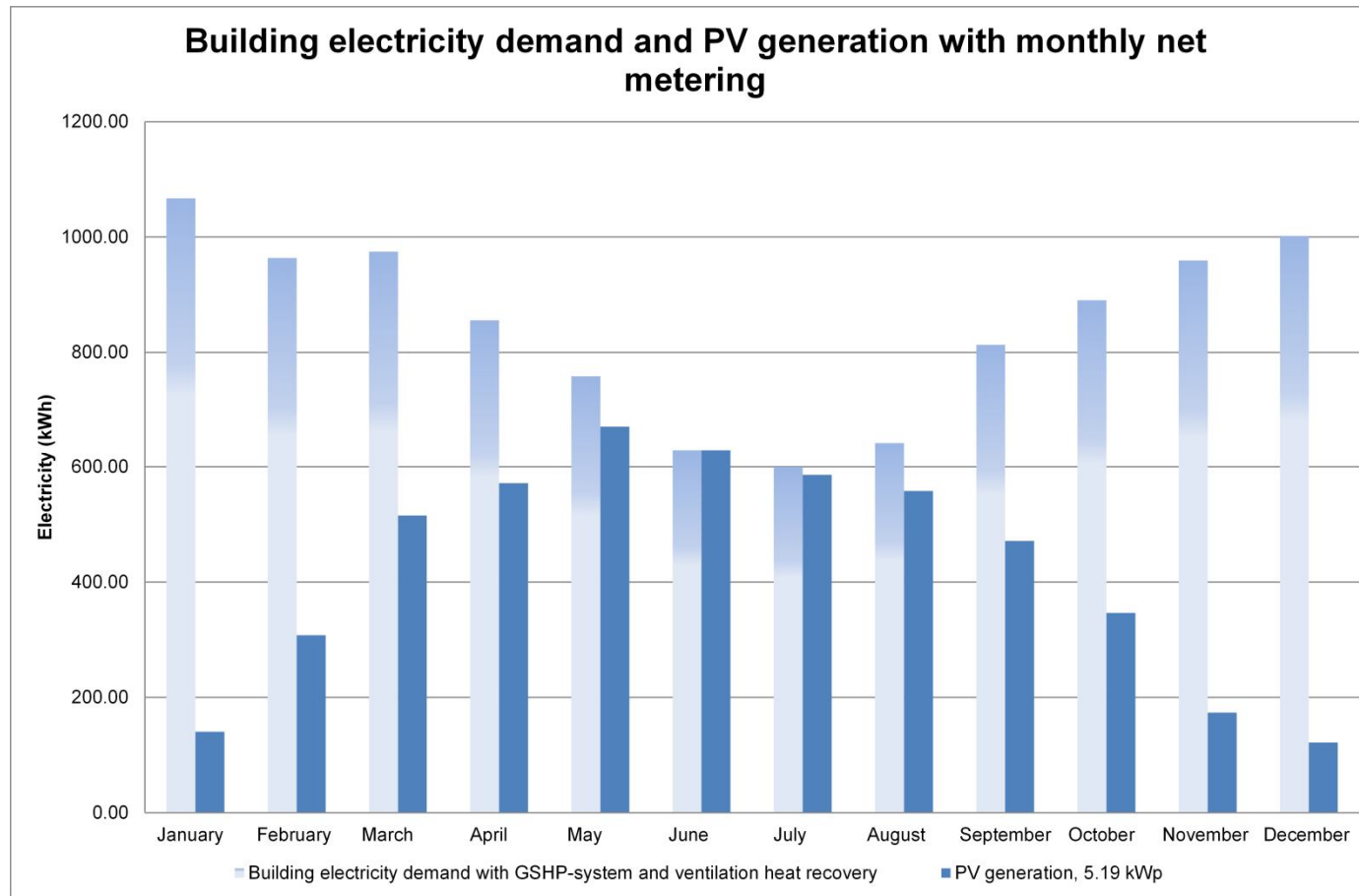




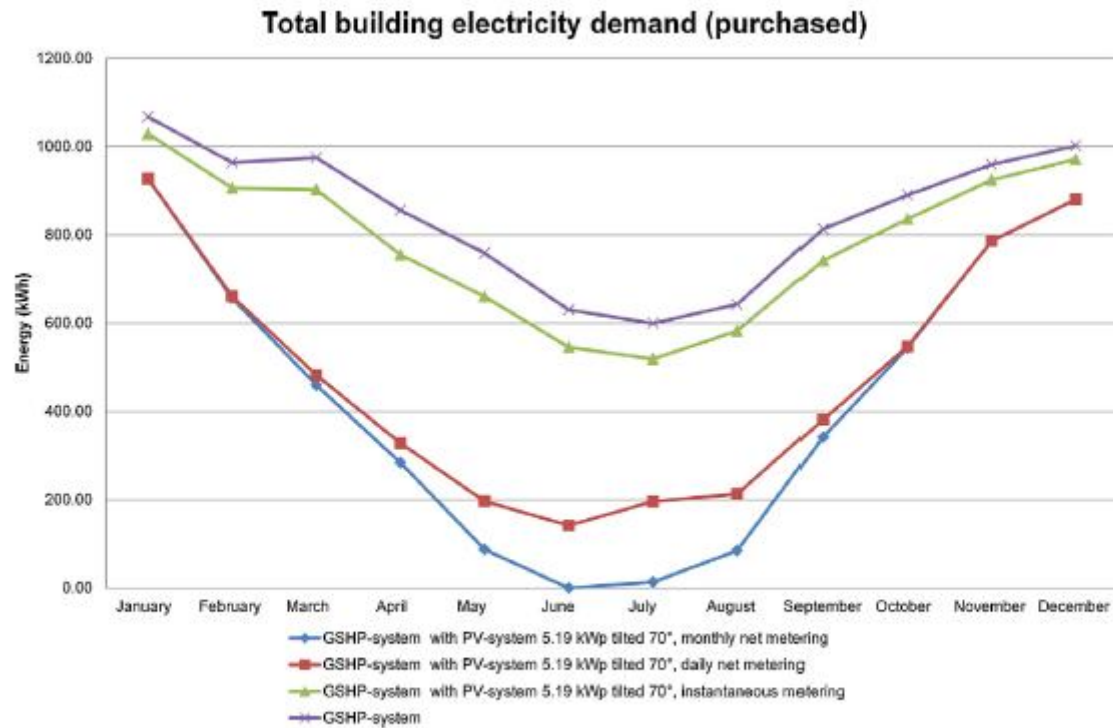
Energy demand of building



Monthly Net Metering

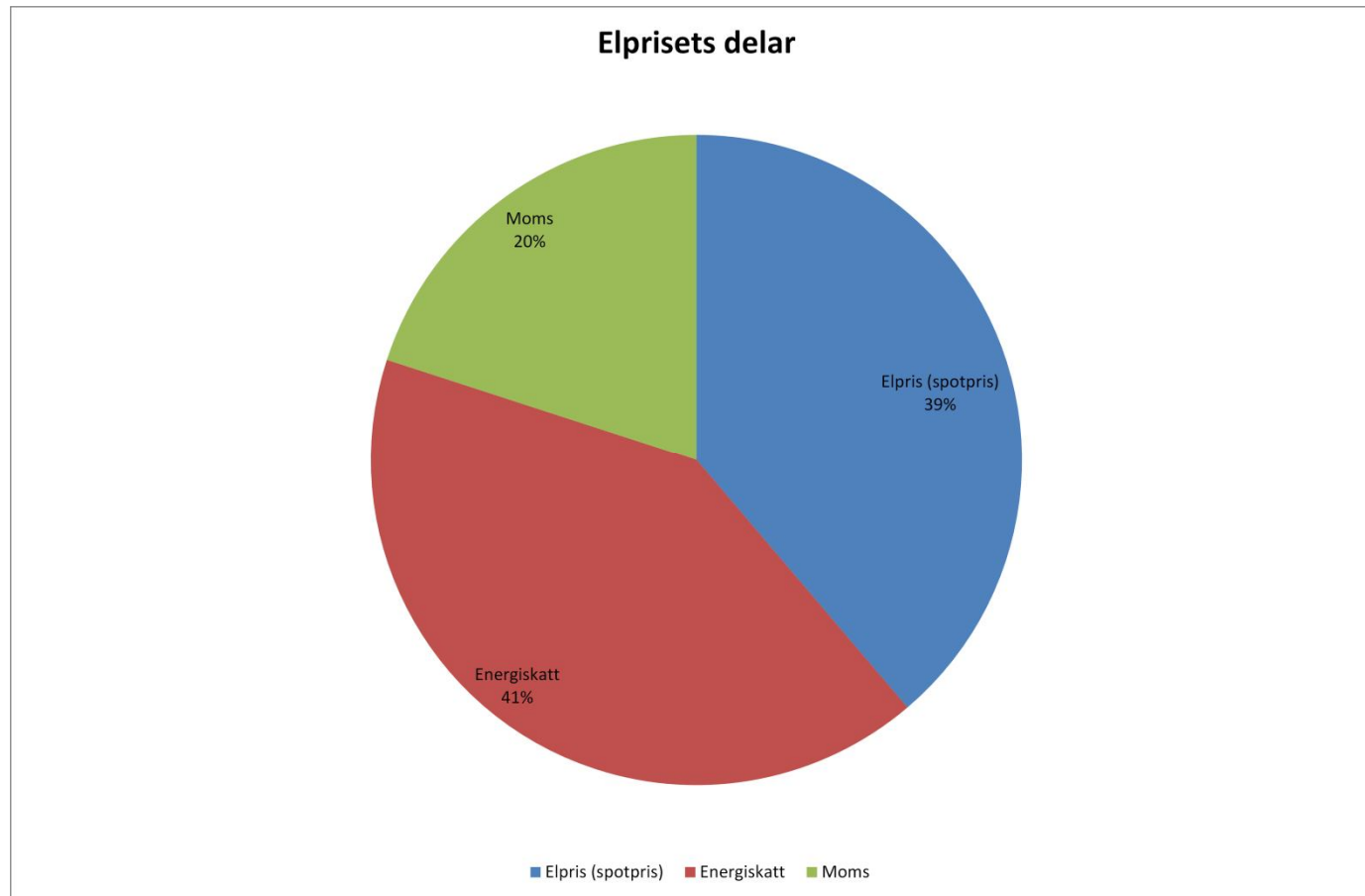


Purchased Electricity

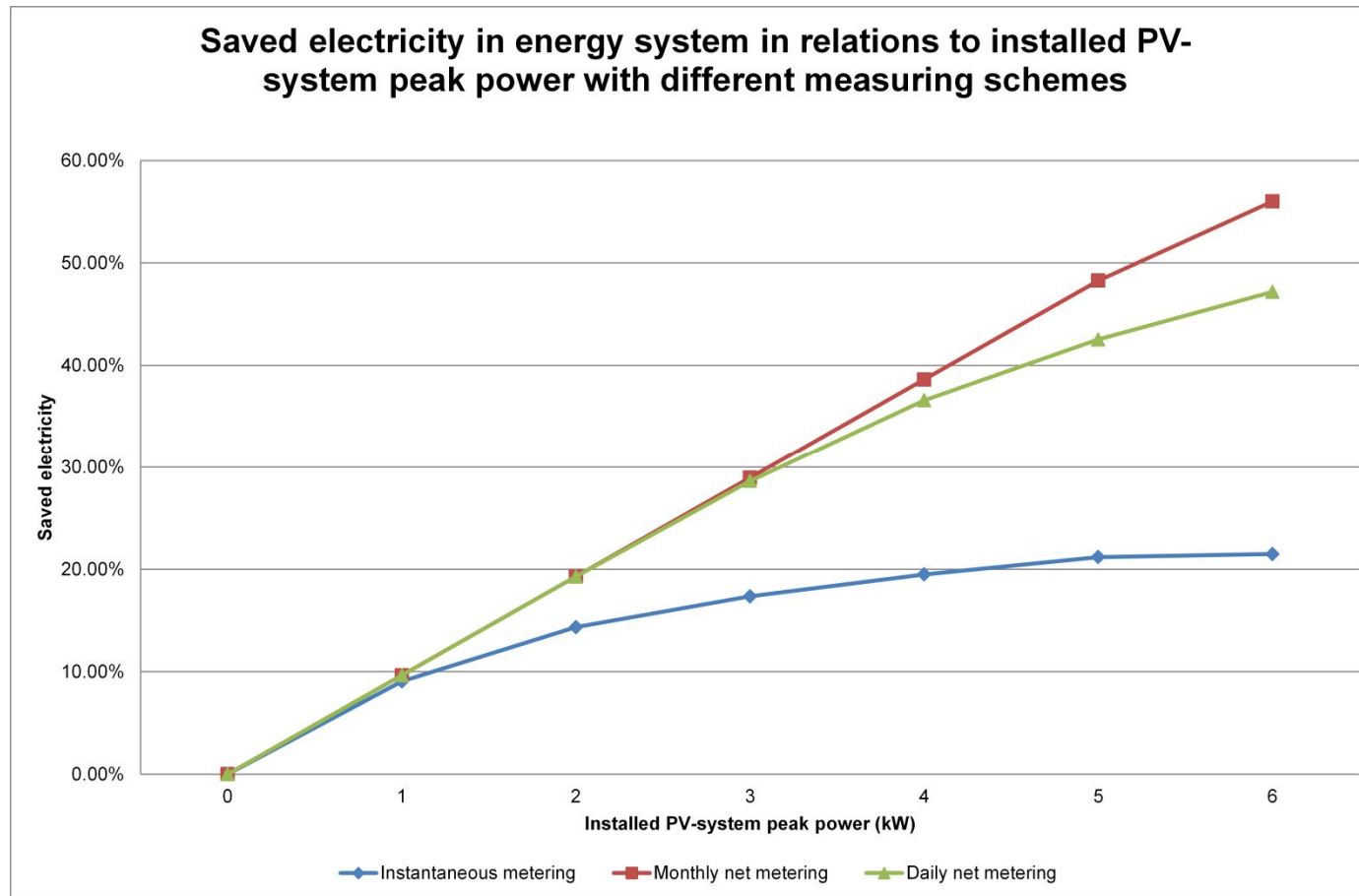


l. Total building electricity demand with and without PV-system with instantaneous metering, daily net metering and monthly net metering.

Use or export PV-power?



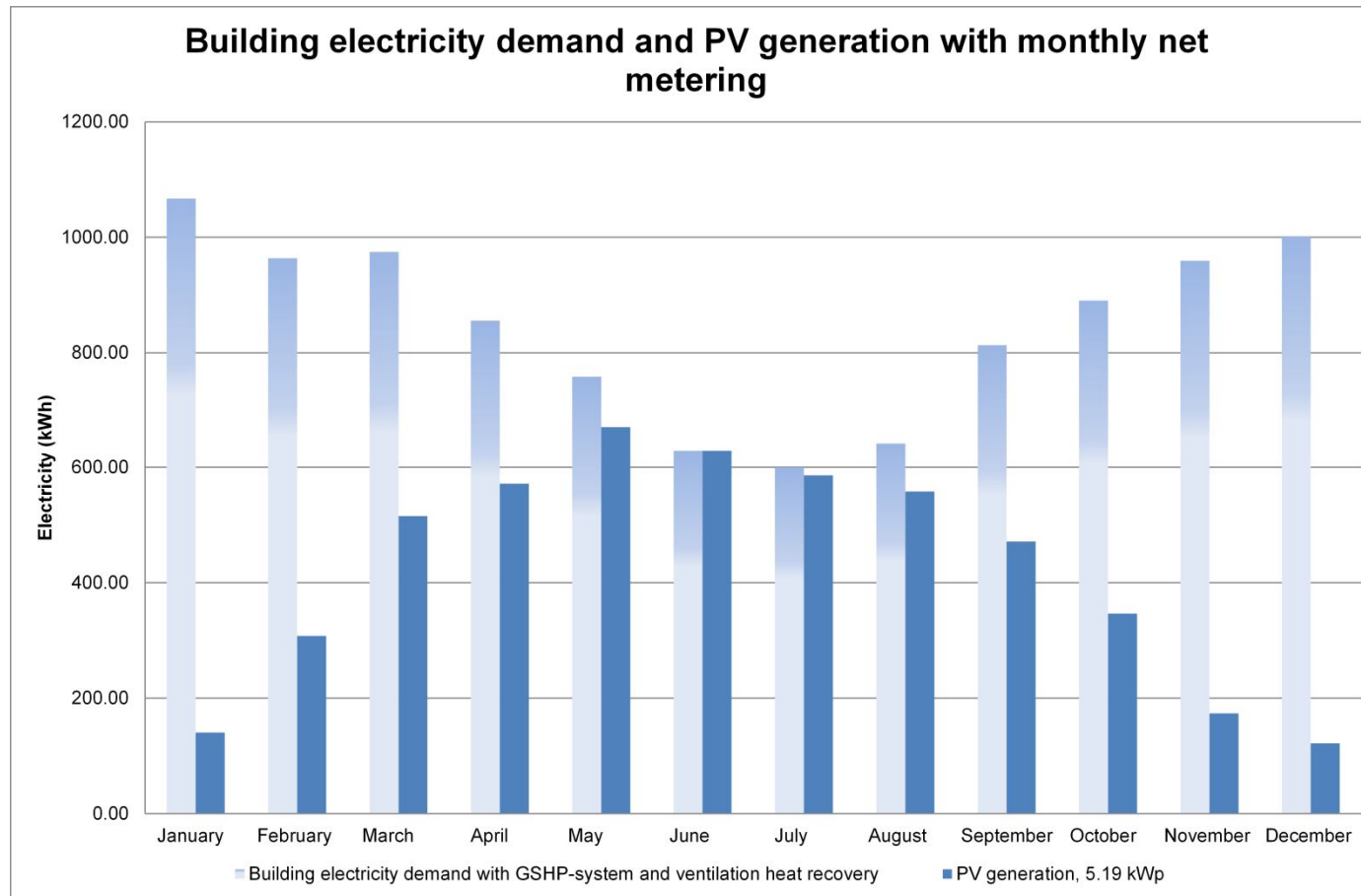
Saved fraction with net metering



Increasing self consumption

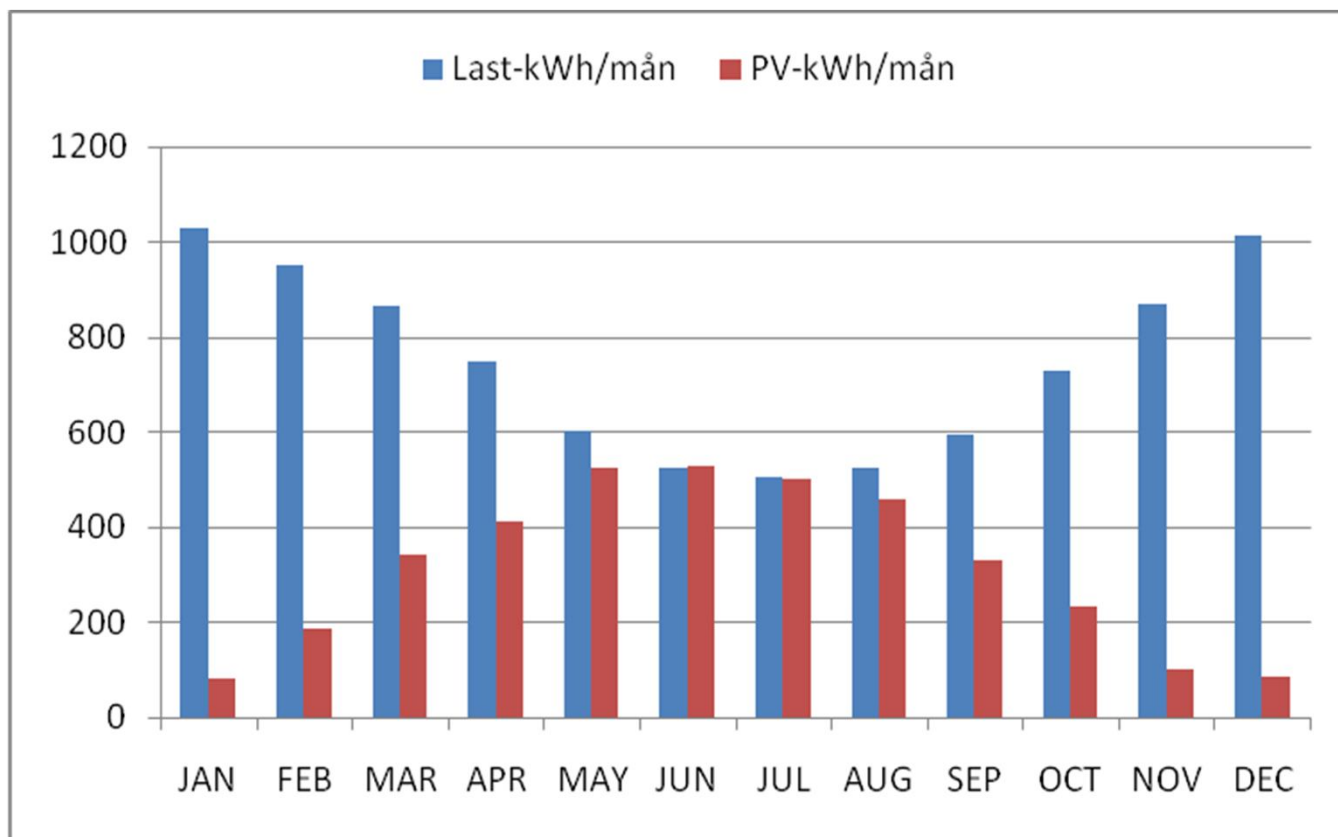
- Net metering
- Storage in water volume
- Storage in Batteries

Administrativt (nettodebitering)



"Vanligt hus "+ VP och PV

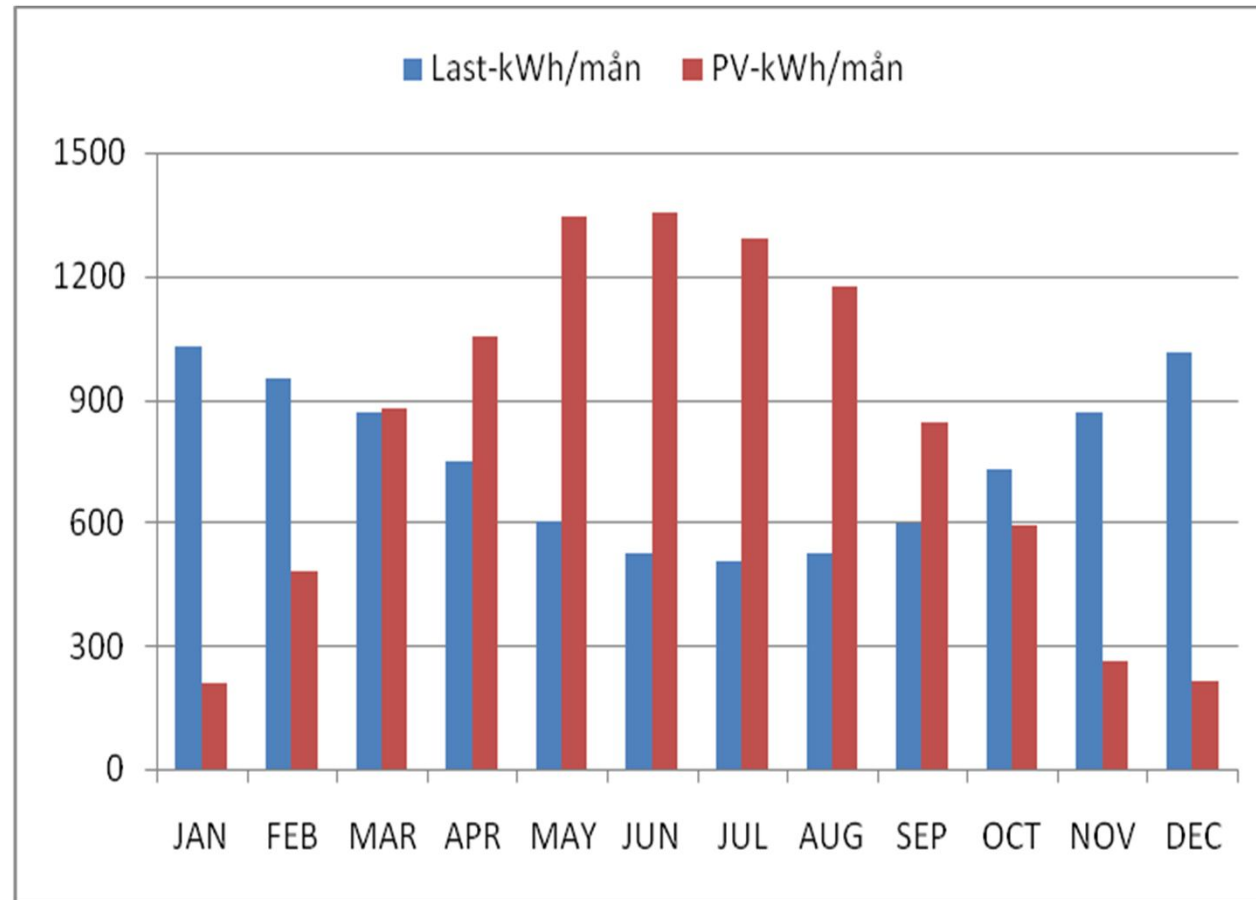
f=0,42, X=0



Elbehov=17280 kWh/år, 3,2 kWp PV, 21m²

"Vanligt hus "+ VP+PV

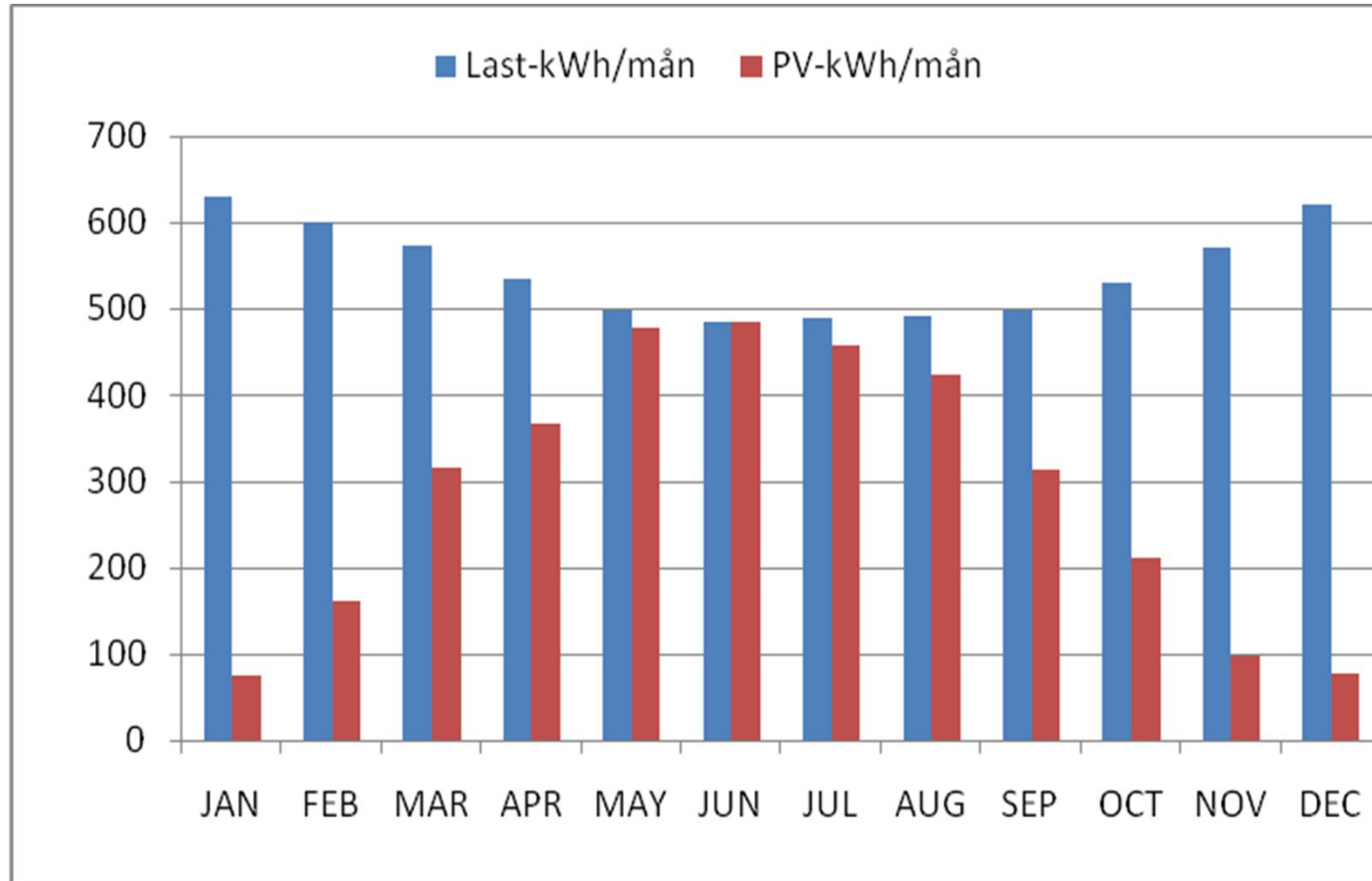
f=1, X=0,37



Elbehov=17280 kWh/år, 8 kWp PV, 55m²

"Välisolerat hus "+ VP+PV

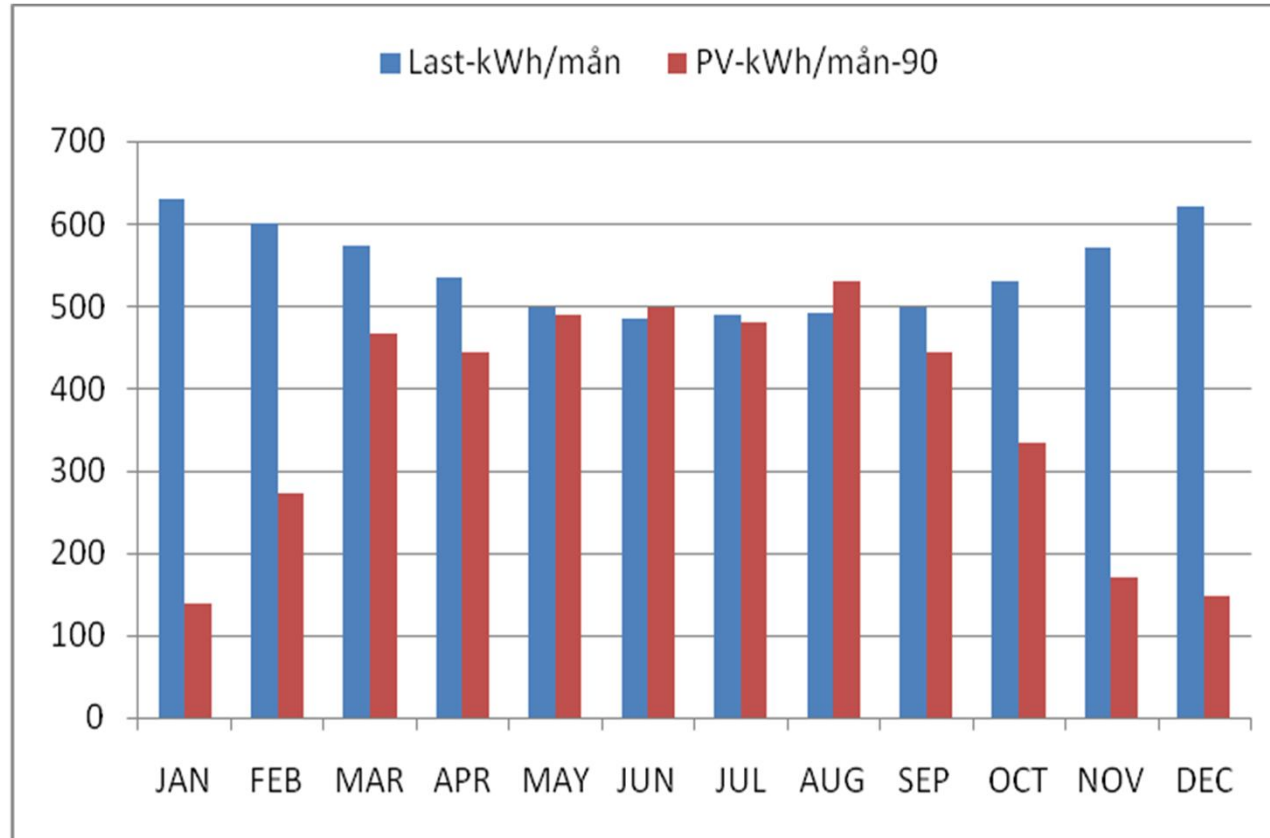
f=0,53, X=0



Elbehov=9964 kWh/år, 2,9 kWp PV, 20m²

"Välisolerat hus "+ VP
Vertikala PV

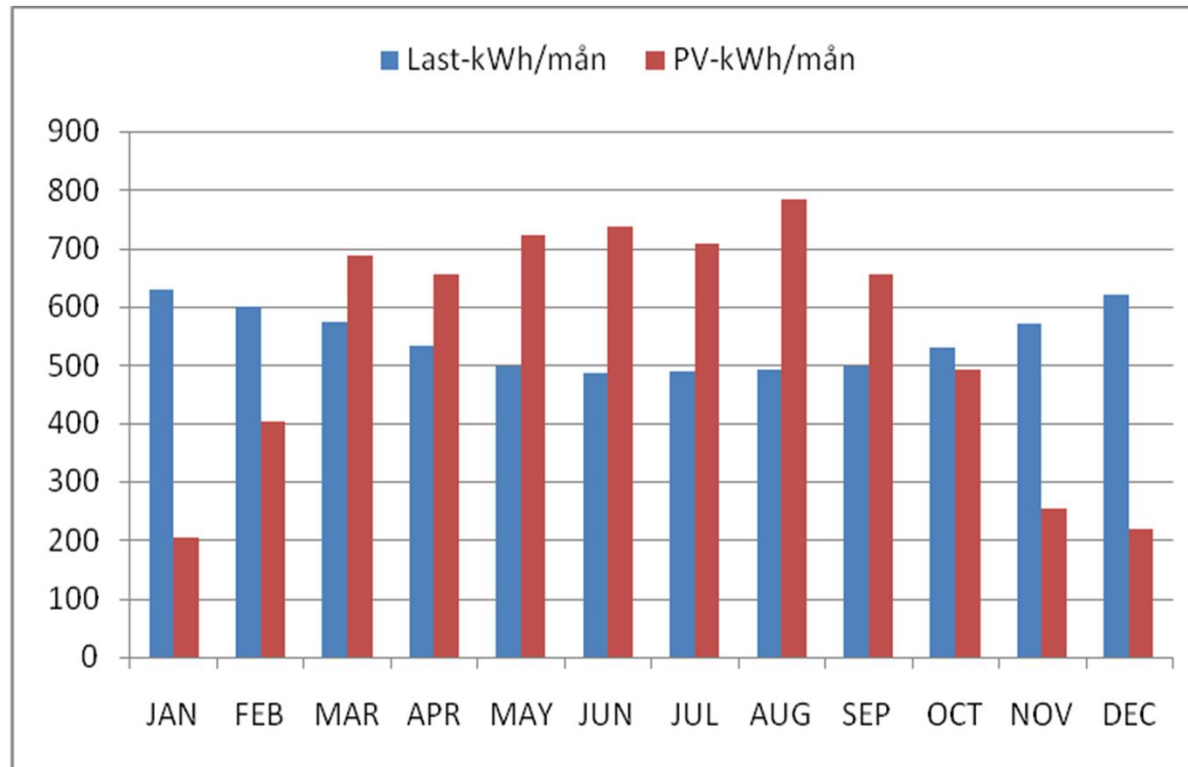
f=0.68, X=0



Elbehov=9964 kWh/år, 4,7 kWp PV, 31m²

"Välisolerat hus "+ VP
Vertikala PV

f=1, X=0.21



Elbehov=9964 kWh/år, 7 kWp PV, 46m²

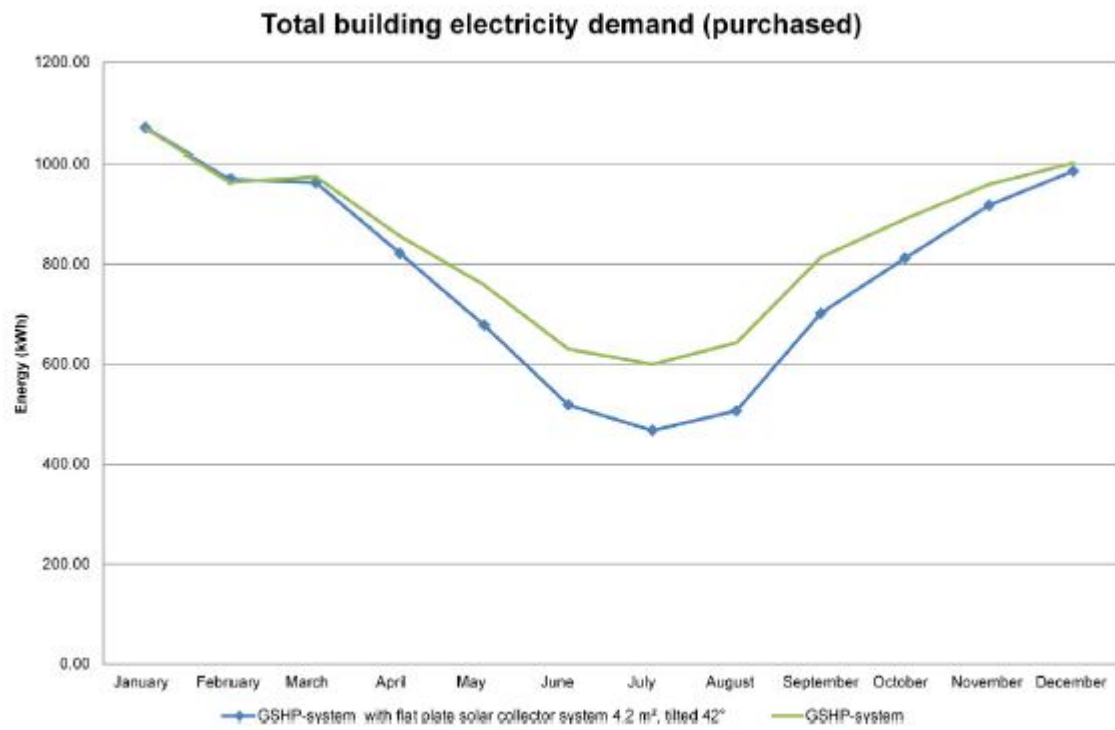


Fig. 10. Total building electricity demand with and without flat plate collector system.

Sammanfattning

Hus	PV (kWp)	f-Andel Sol	X-Nätutbyte
Standard	3,2	0,42	0
Standard Nollenergi	8	1	0,37
Välisolerat	2,9	0,53	0
Välisolerat	4,7-vertikala	0,68	0
Välisolerat Nollenergi	7,0-vertikala	1	0,21

Large Collectors with Reflectors



Utbyte i kWh/månad i olika lutning

