

Ground Source Heat Pumps – Performance Data

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The Houses

House Name	Stone	Pill	Knight
Location	E.Montpelier VT	Charlotte VT	Hinesburg VT
Square feet	2,308	2,800	1,800
Design load, BTU/hr	25,000	28,000	26,000
Modeled annual heat load, MMBtu/yr	37	29	34
Renewable Electric	6 kW PV	10 kW Wind	3 kW PV

Pill - Maharam House



Pill - Maharam House



Knight House

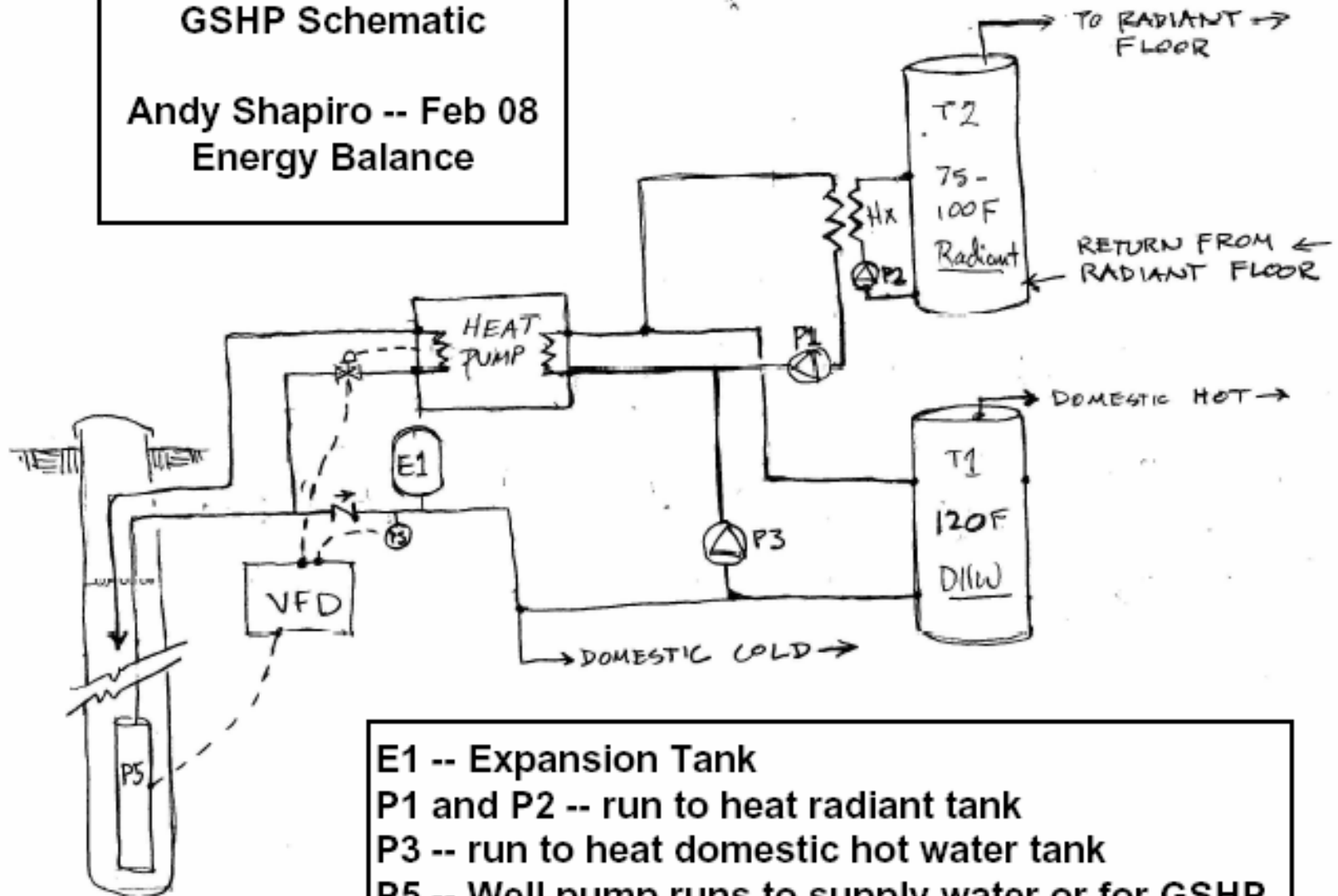


Atwood-Stone House



GSHP Schematic

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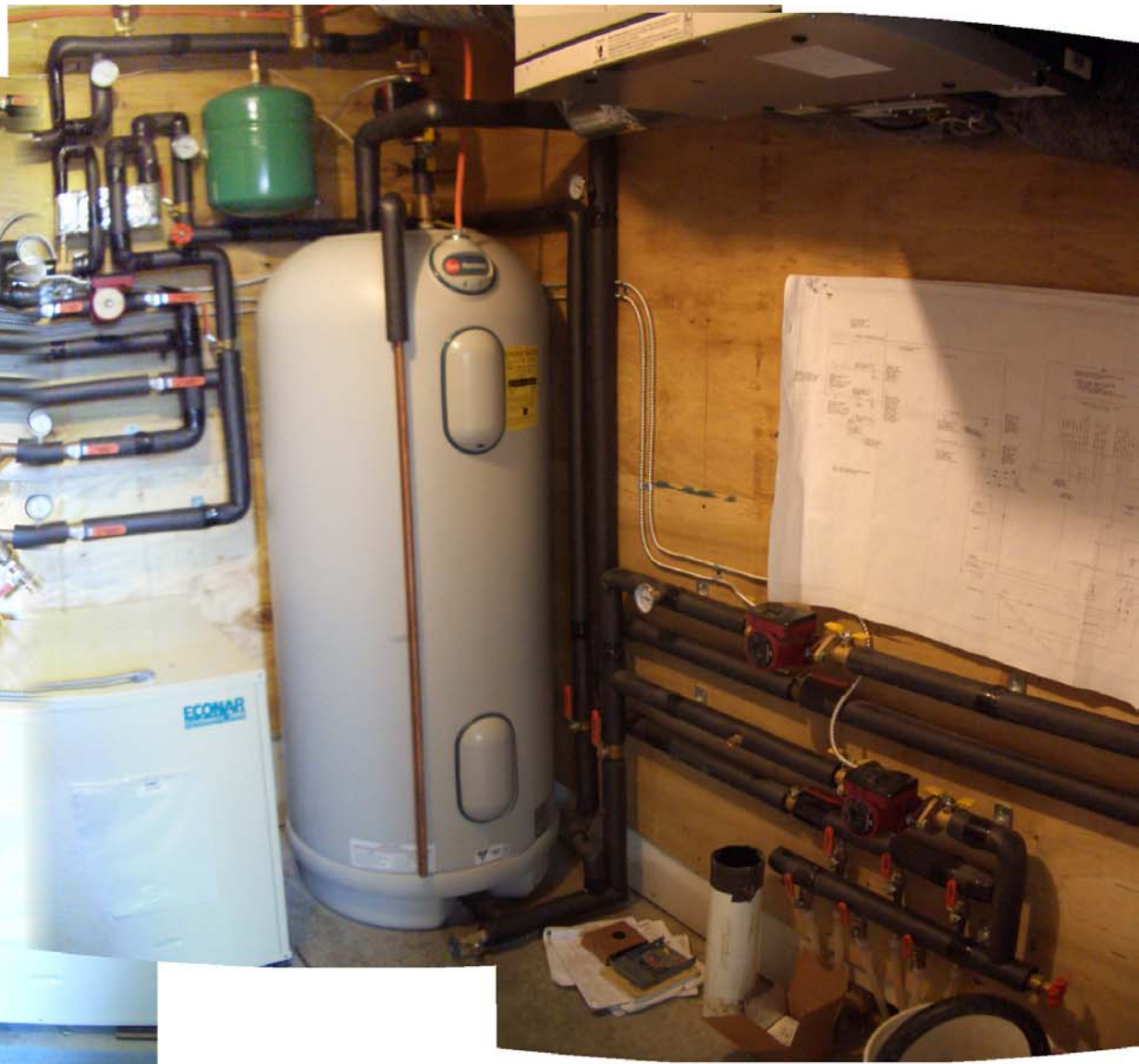
E1 -- Expansion Tank

P1 and P2 -- run to heat radiant tank

P3 -- run to heat domestic hot water tank

P5 -- Well pump runs to supply water or for GSHP

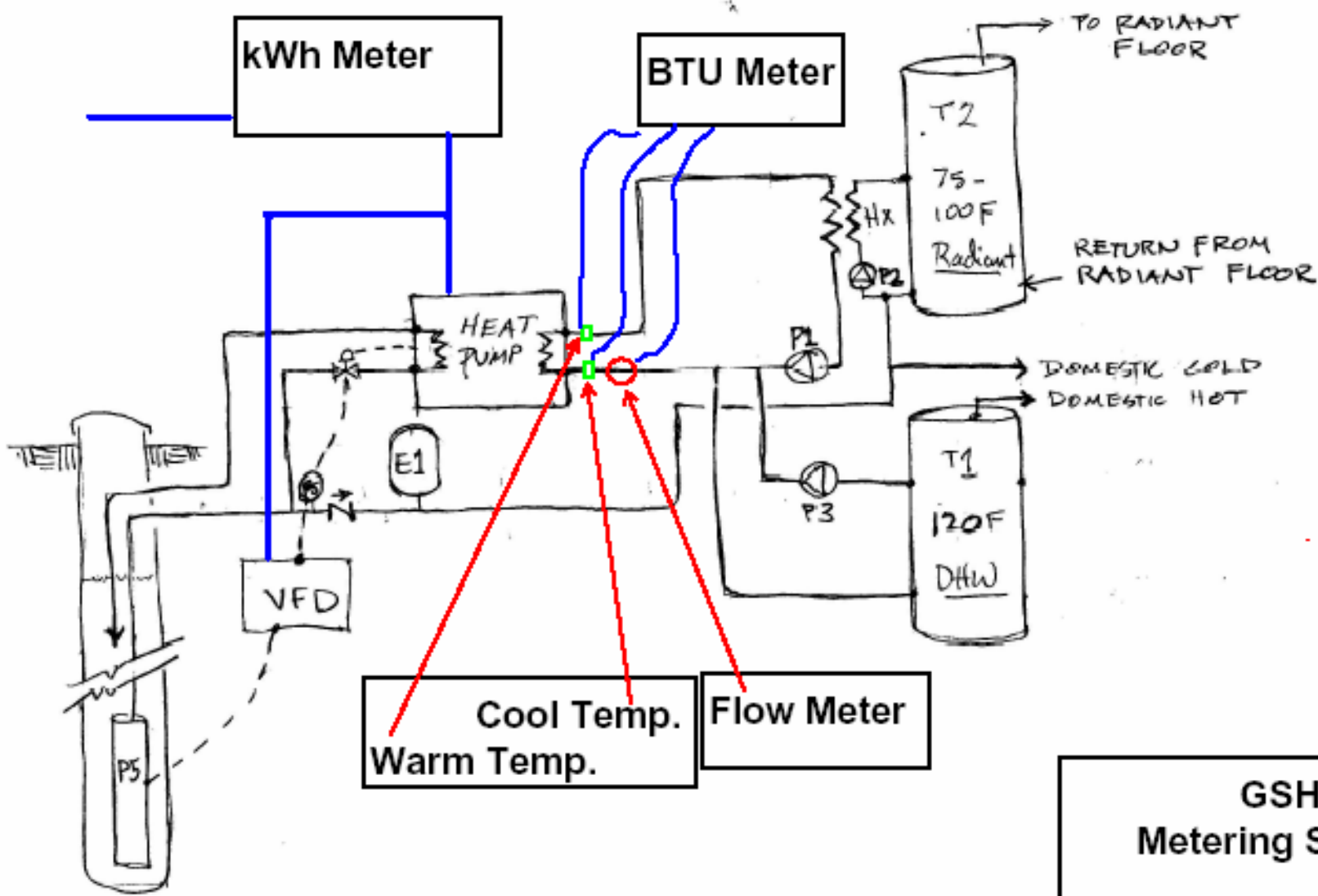
Hx -- Heat exchanger



Data Summary

Measured:

- BTU meter on output of GSHP
- kWh meter on input to entire GSHP system
 - Heat pump
 - Well pump
 - Circulators
 - Controls (VFD, Tekmar controller, GSHP, thermostats, dump valve, transformers)



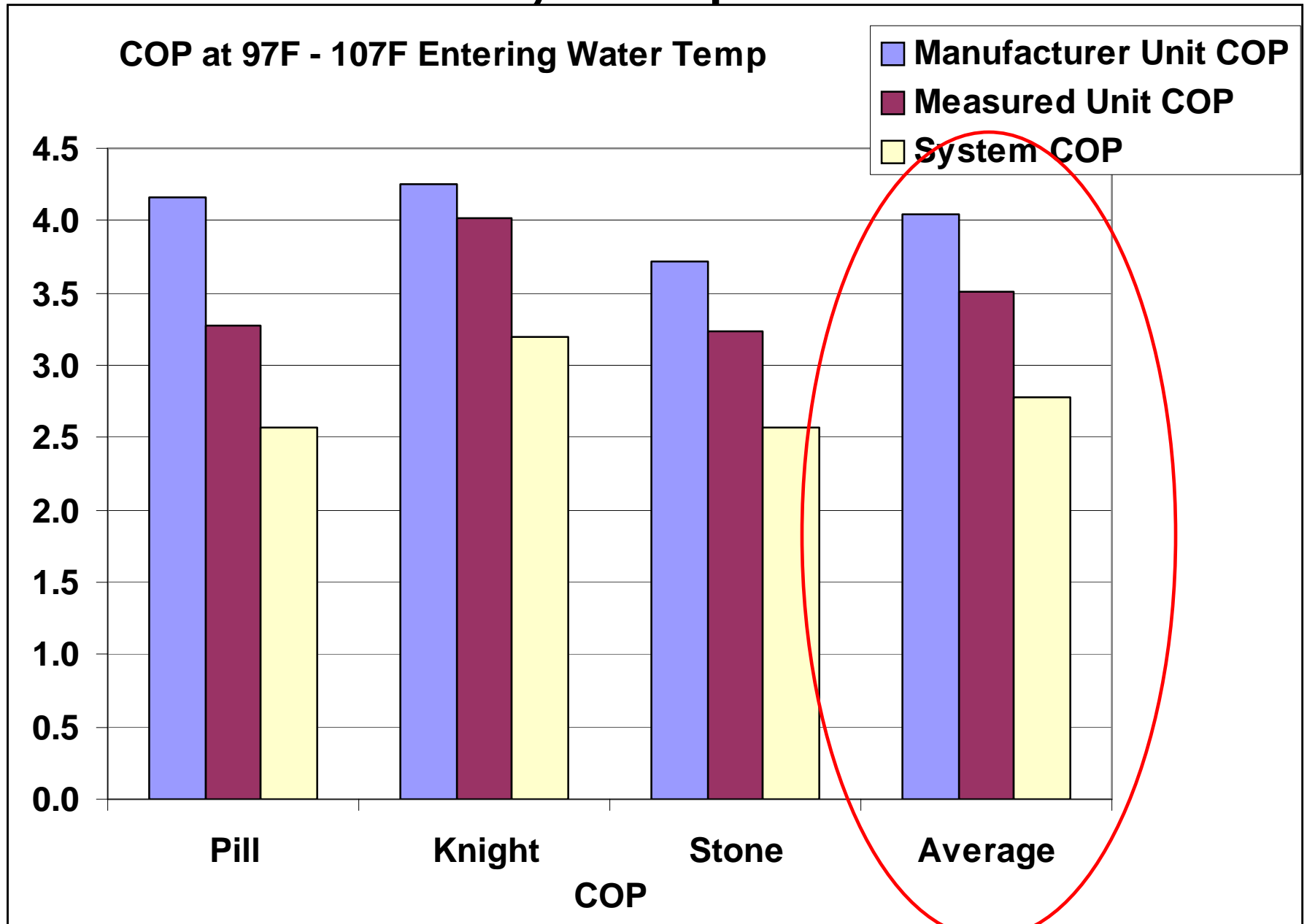
Cool Temp.
Warm Temp.

Flow Meter

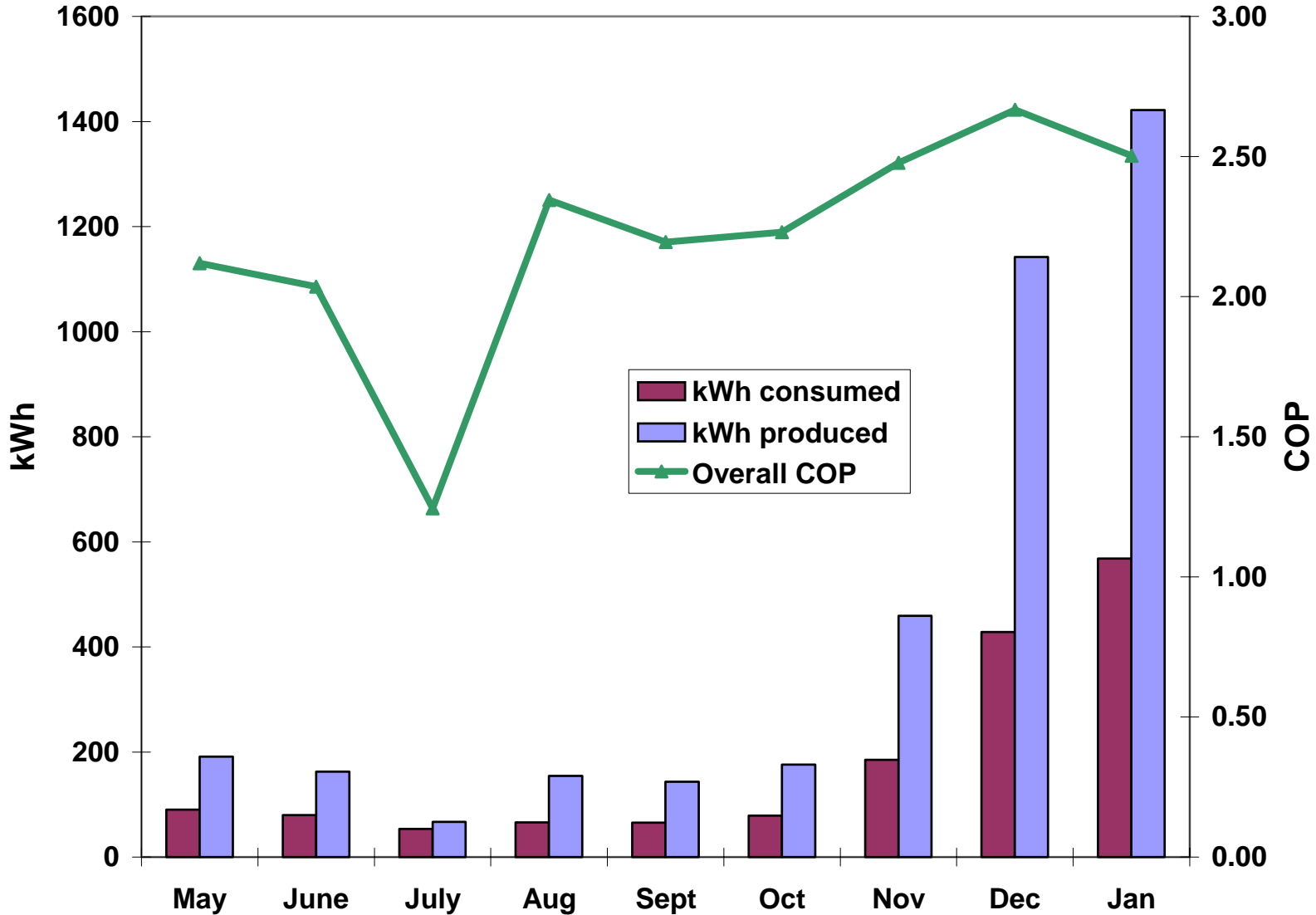
**GSHP
Metering Scheme**

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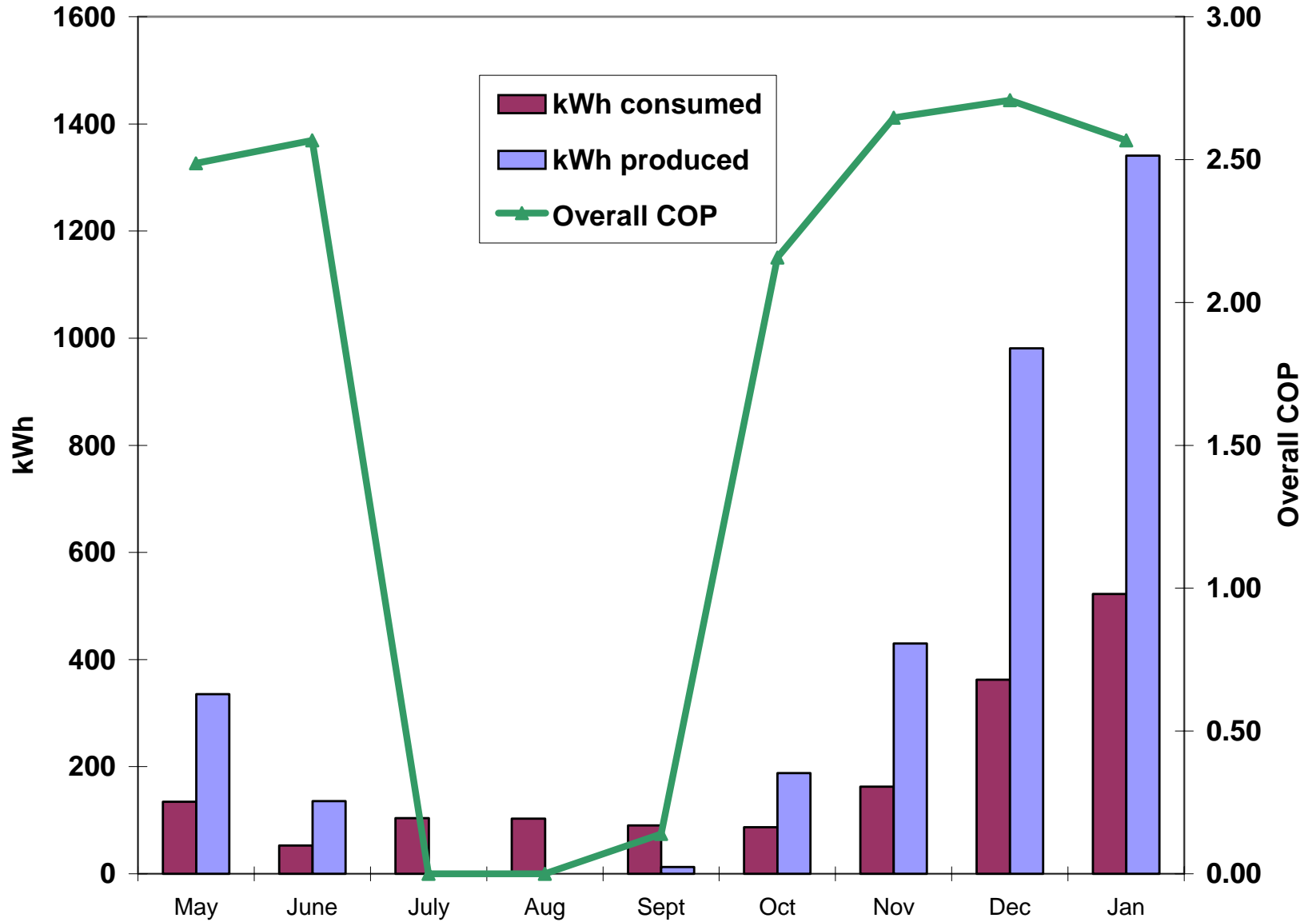
Data Summary – input/source side



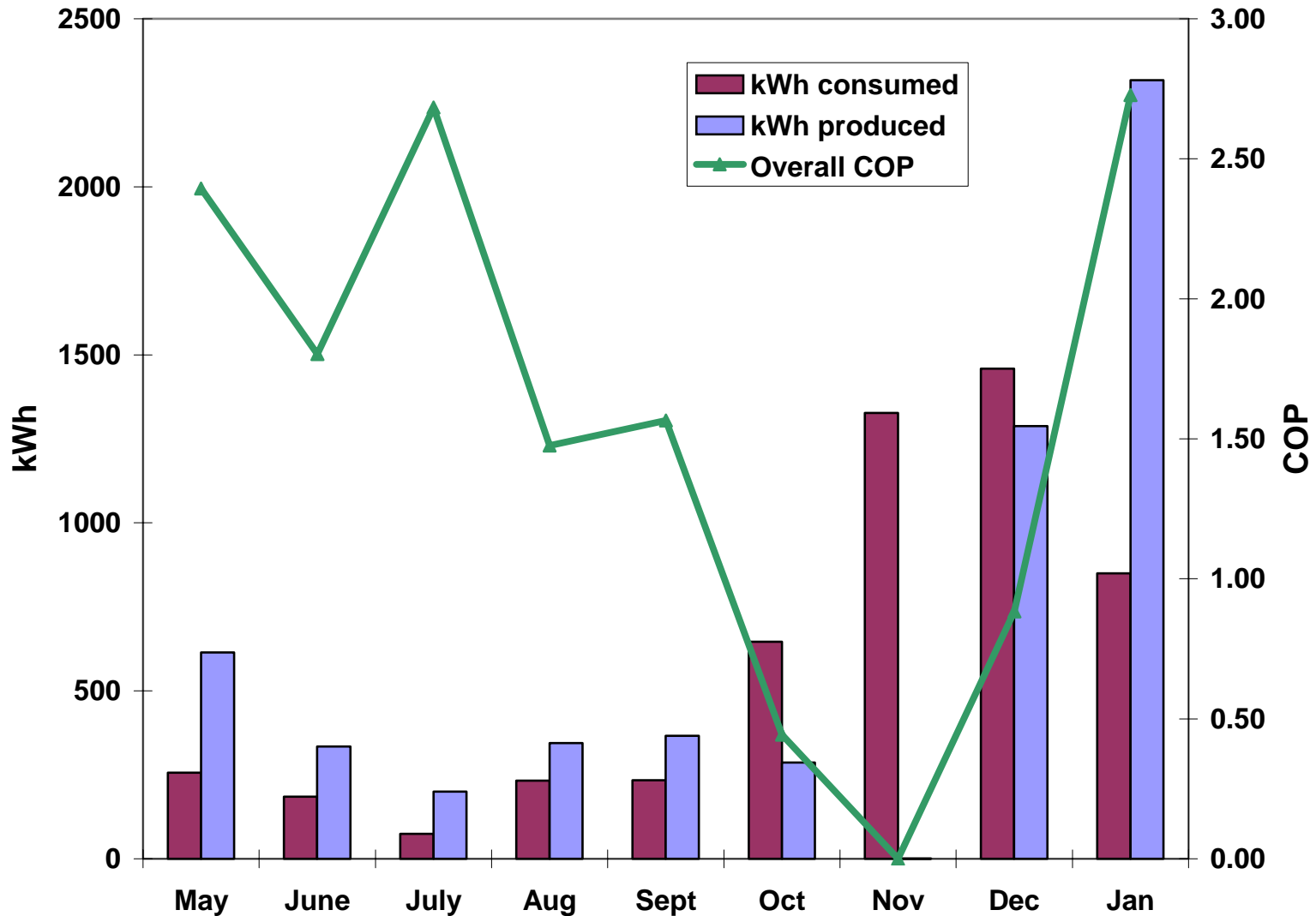
Pill House Heat Pump Performance



Stone House Heat Pump Performance



Knight House Heat Pump Performance



System COP – load/input side

3 Heat Pumps - Performance

