Ground Source Energy Expo 2015
The Ricoh Arena, Coventry
10 September 2015

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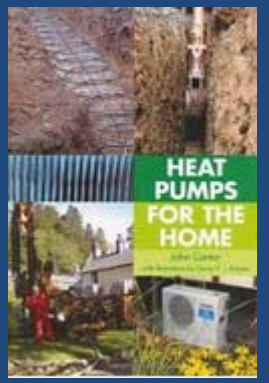
www.heatpumps.co.uk

Author
Heat Pumps for the Home

(Crowood press)



Monitoring

Introduce performance monitoring / energy monitoring

Why?

Who benefits?

Examples

What is Monitoring

Collect operational data

- Operating temperatures
- Power consumption
- Heat output

Display on a website

Why Monitor Heat Pumps?

Heat pumps are fundamentally different
from any other heating technology

Heat pumps transfer heat from one place to another

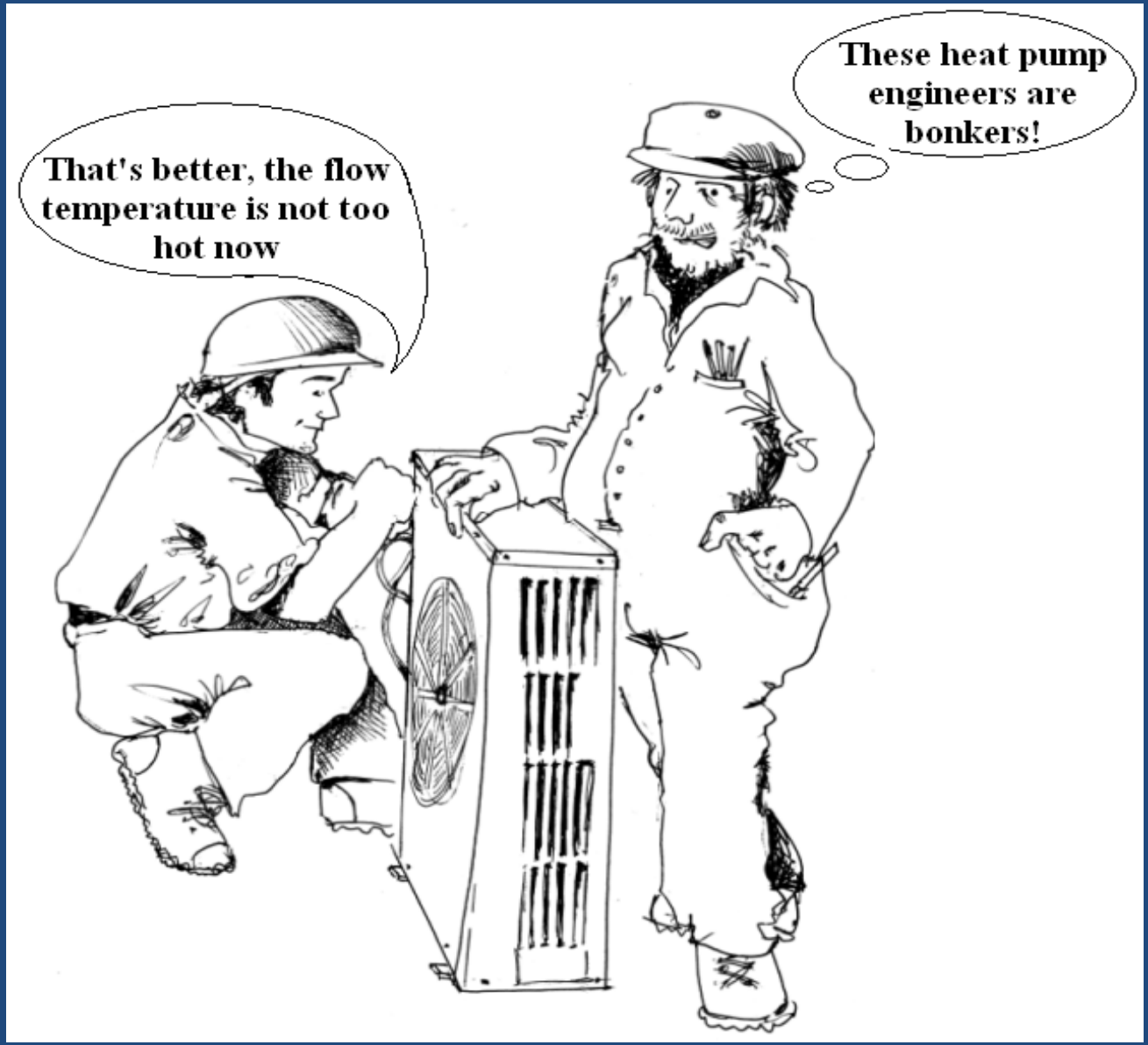
The entire heat pump system is complicated

Why Monitor Heat Pumps?

- Ground source size, depth and fluid circulation
- The heat pump unit
- Distribution of heated water
- Emitter system (underfloor or radiators)
- Domestic hot water

- The type of house and way it is used
- User controls

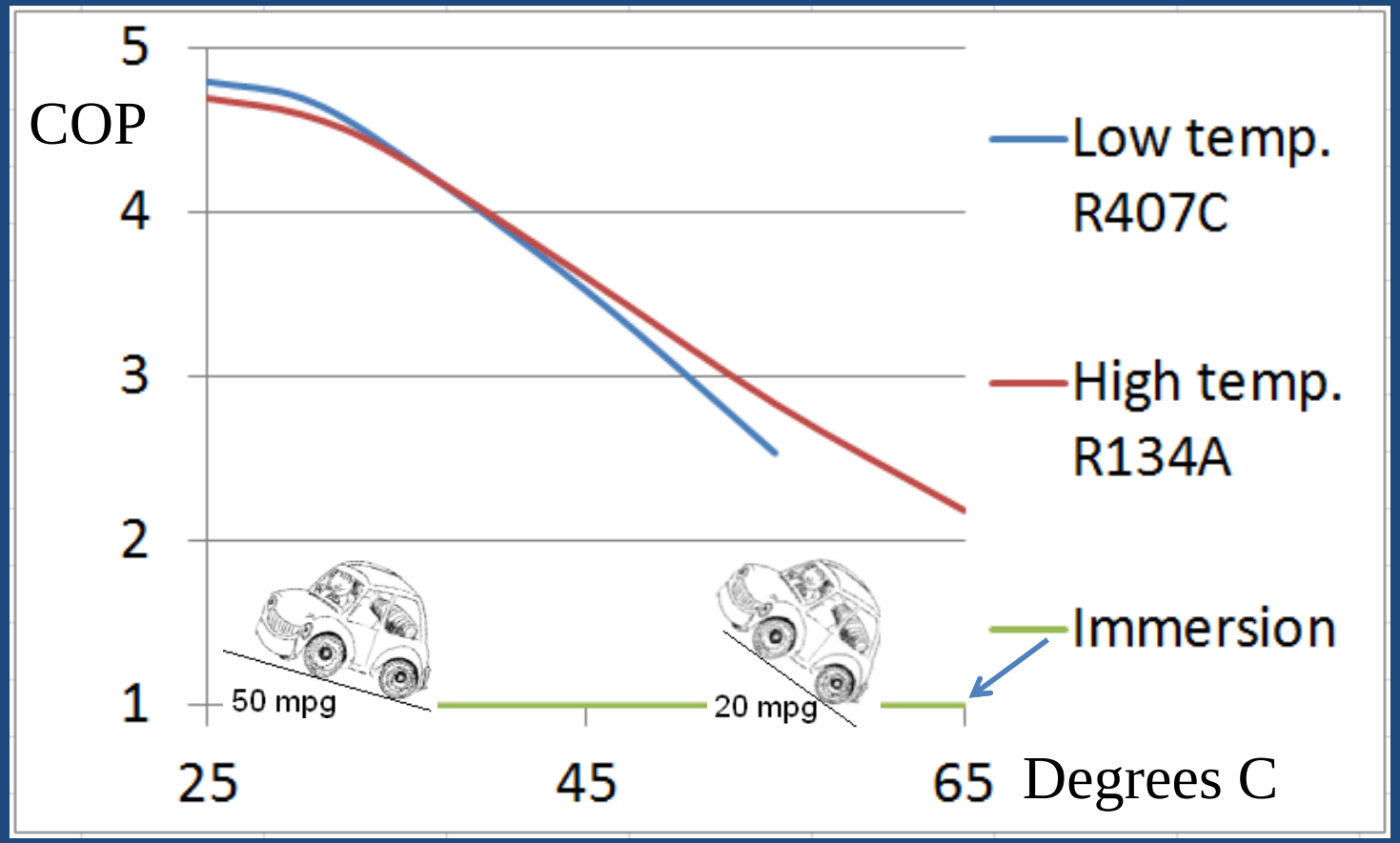
DON’T PANIC!



Lower water temperatures improve energy efficiency

Operating the system at its best efficiency

Energy efficiency v Output temperature



Who Benefits?

Installer/ designer

- Ensure the system is operating correctly
- Can learn what designs work best
- Can alert potential issues as they develop

Home owner

- Learn how to set the system for best effect
- Check running costs and operation

Metering and Monitoring Service Package

Contract between MCS installer and the customer

Pays the home owner £230/year (for 7 years)

https://www.ofgem.gov.uk. (Search MMSP)

https://www.recc.org.uk/rhi/mmsp

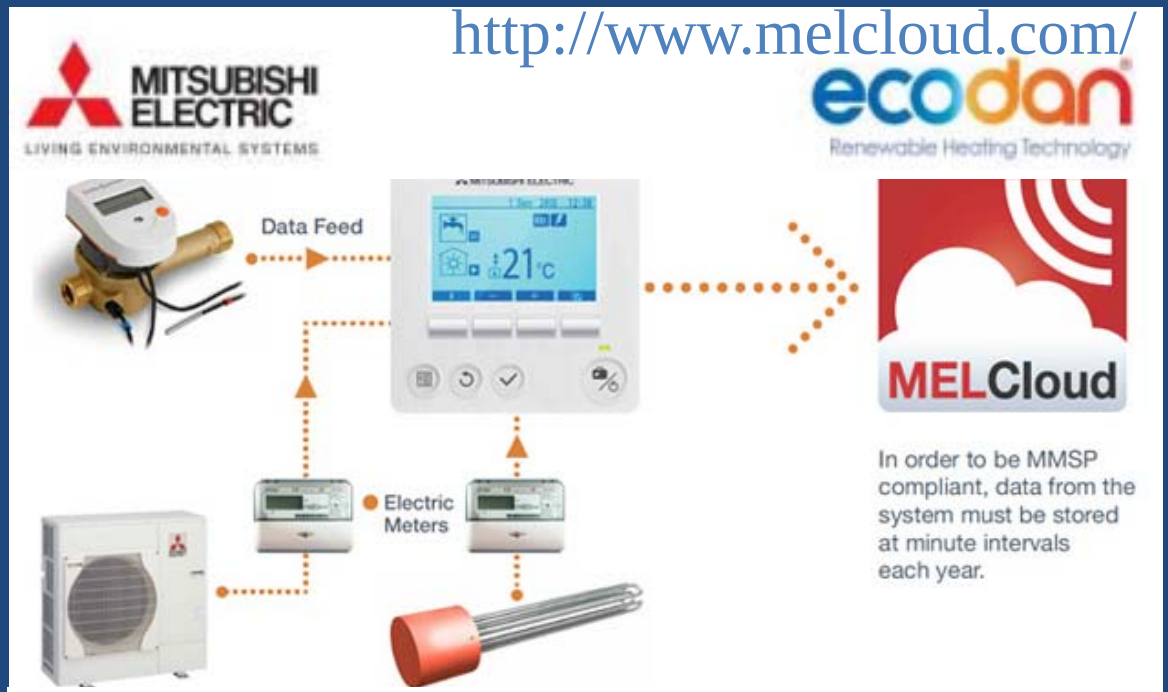
Capped at 10,000 applicants this year

https://www.ofgem.gov.uk. (Search MMSP)

MMSP compliant monitoring systems

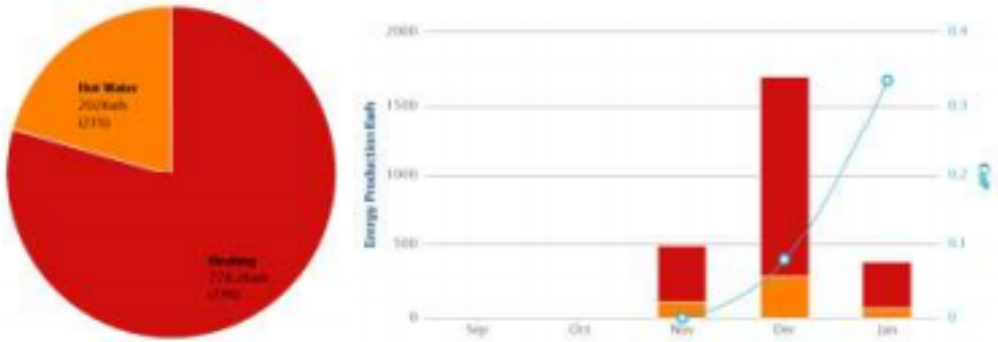
Hardware

http://www.melcloud.com/

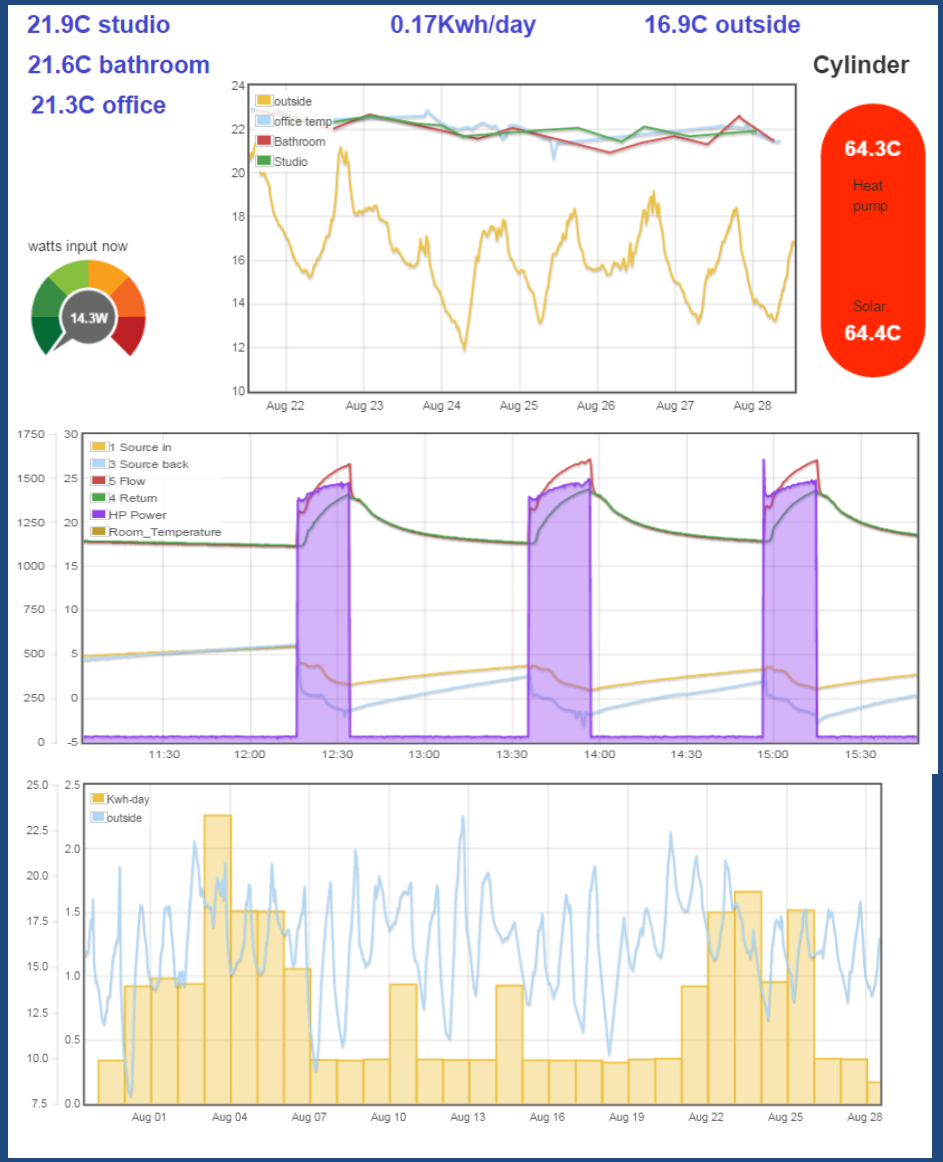


Dashboard

The reports are generated within the MELCloud app environment and can be exported to PDF. Sample MMSP report:



Dashboard example



OpenEnergyMonitor

Open source

Data stored on a website

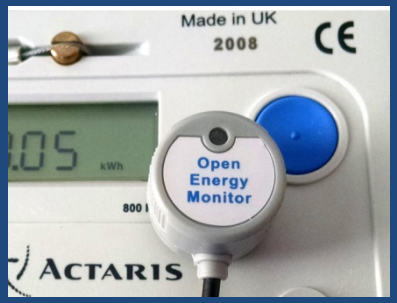
Viewable from any computer

Very adaptable

Steep learning curve

http://www.openenergymonitor.org/emon/

1) Electrical power input



Pulse measurement

CT clamps With Voltage sensing

2) Temperatures

Heat meter sensor
In pocket

Room temperature transmitter

3) Heat output

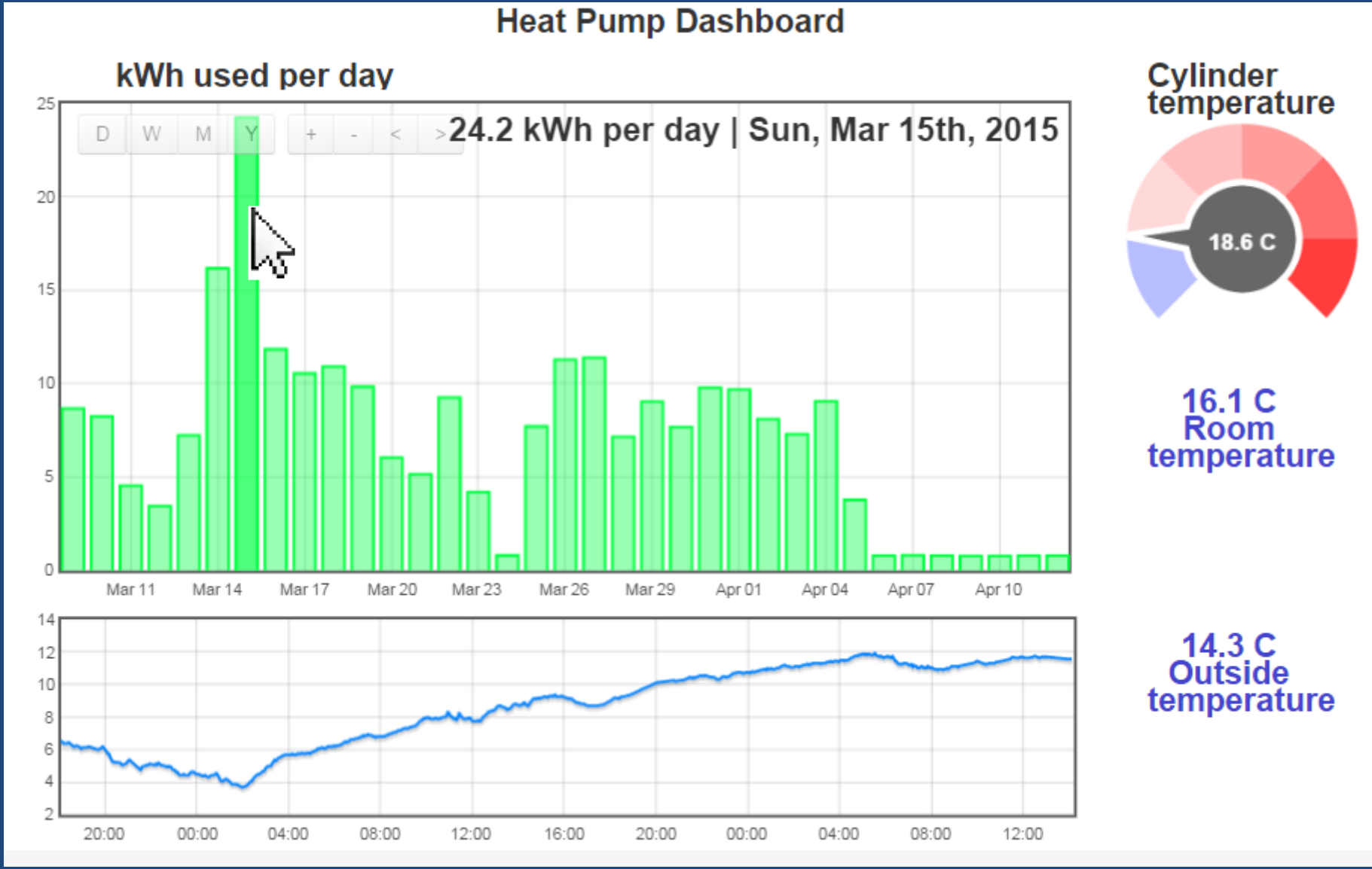
Heat Meters

Water (glycol) flow rate
& temperature difference

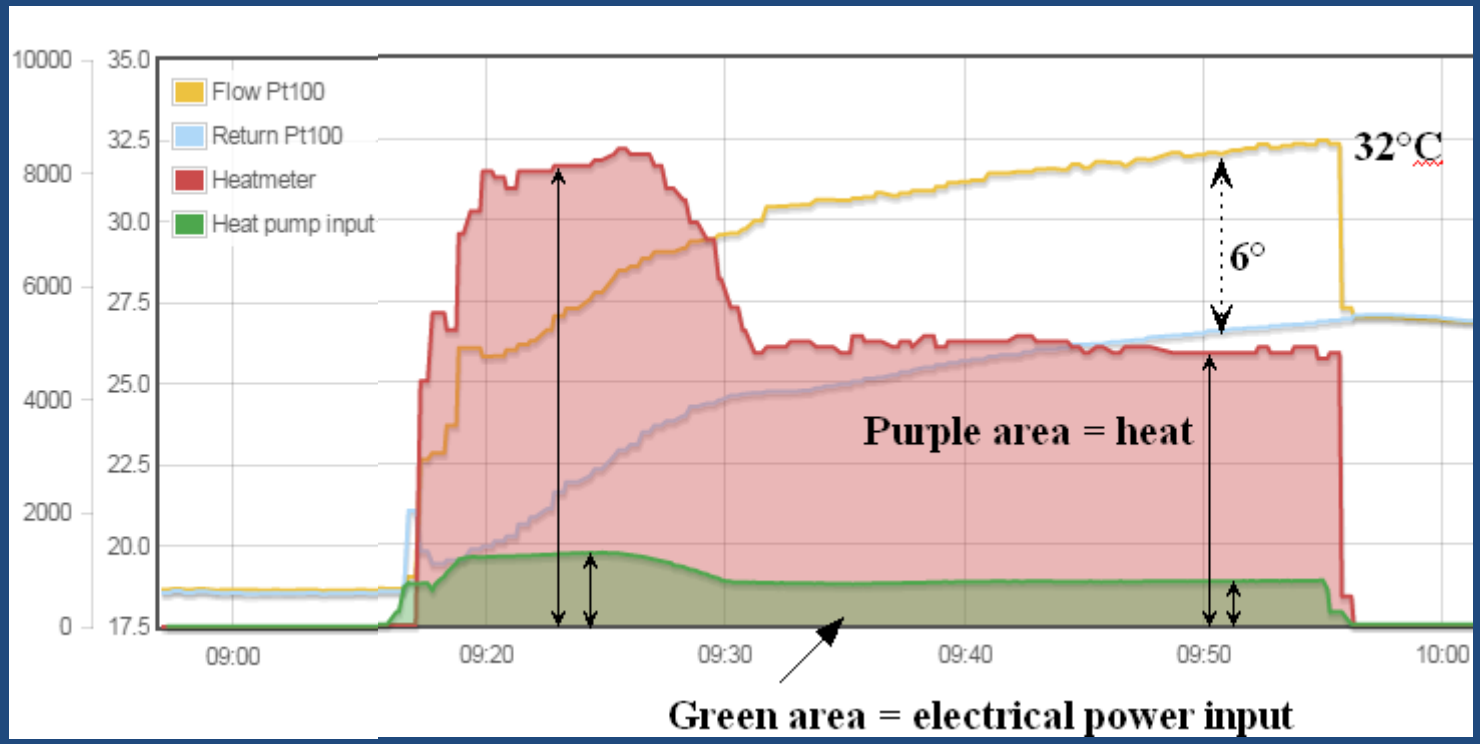
Kamstrup

Sontex

Simple dashboard for home owner



Ground source inverter heat pump
40 minute run period to underfloor heating

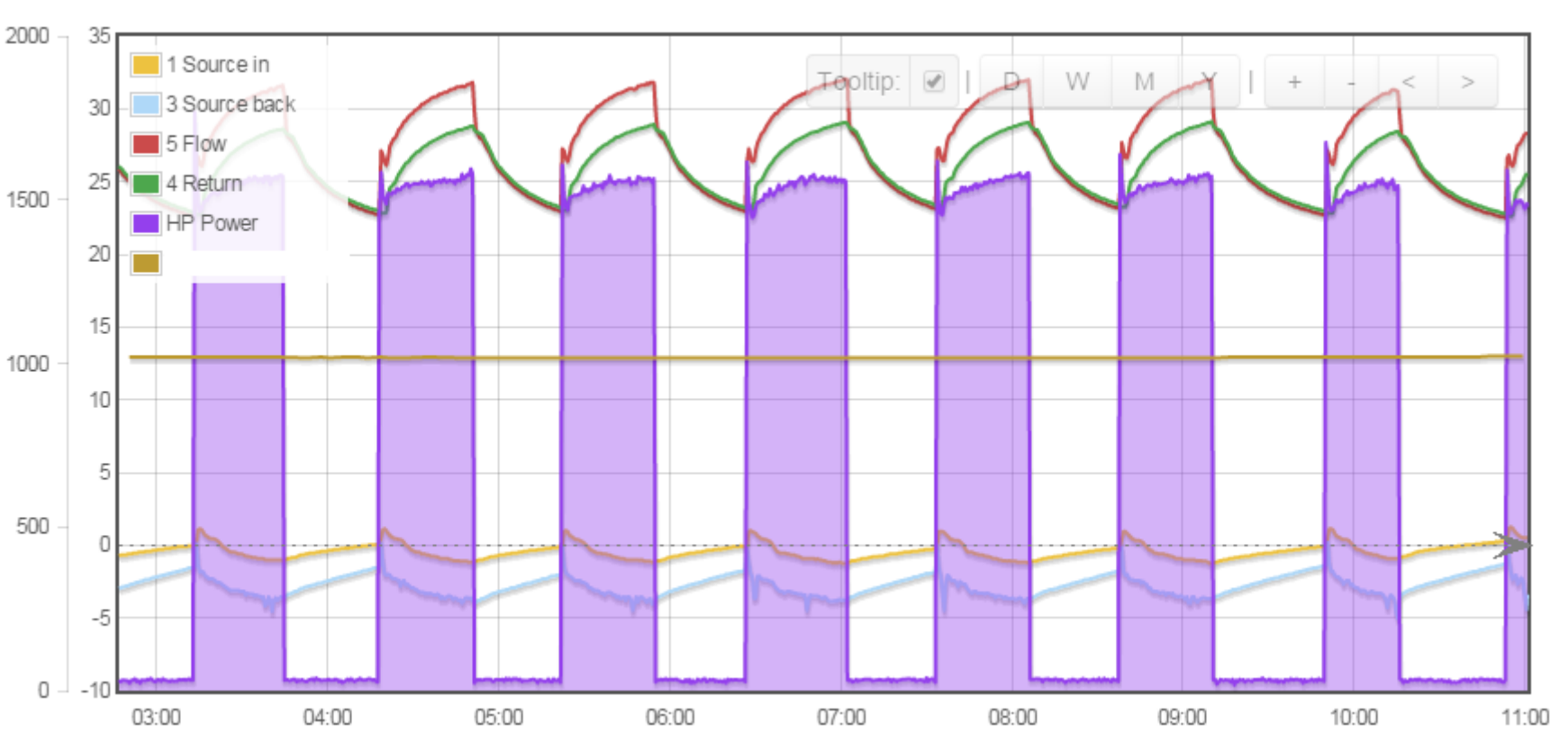


Ground source heat pump

30 minute run periods to underfloor heating

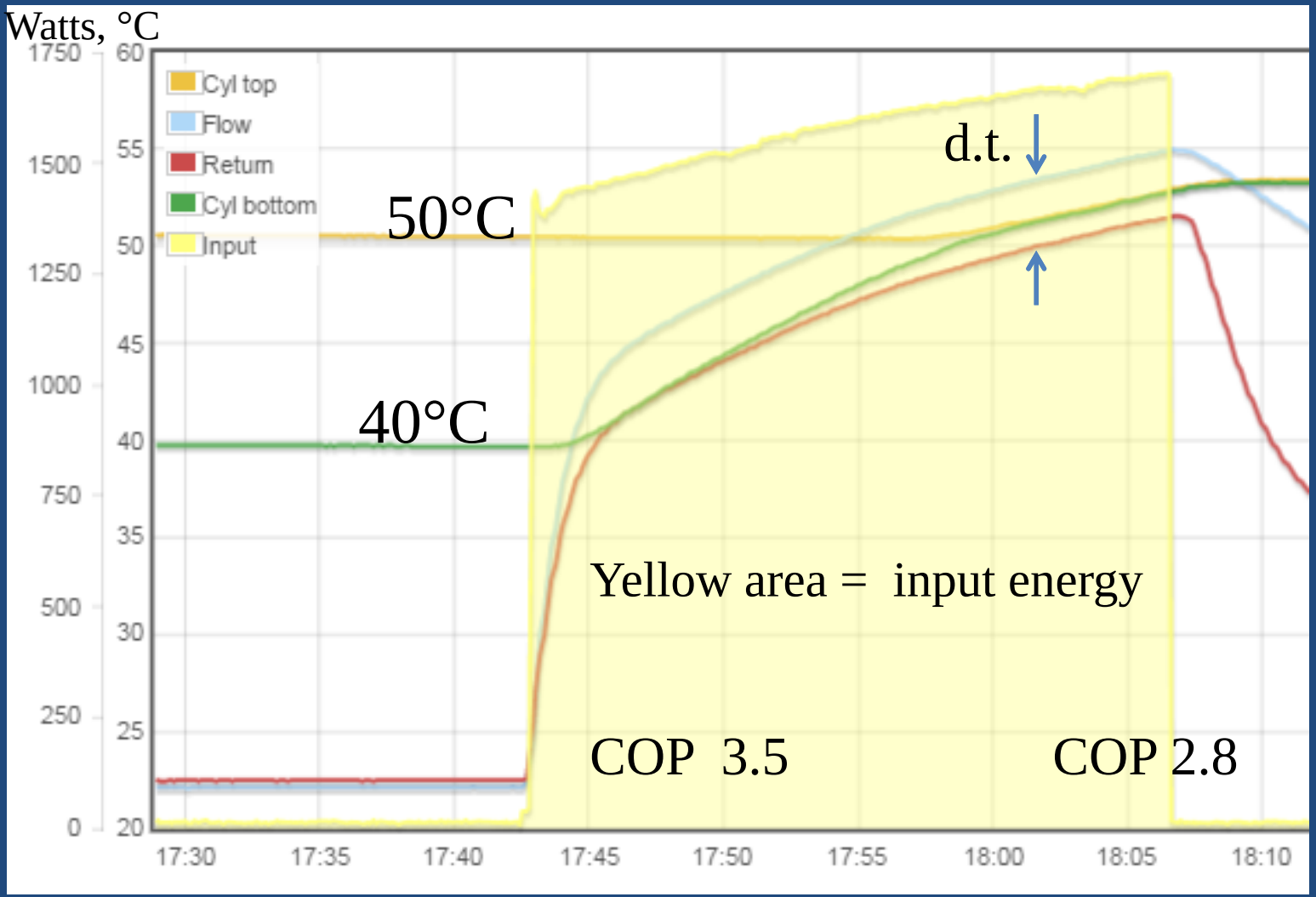
Flow-return dt’s good, flow rates good

Ground coil below zero!



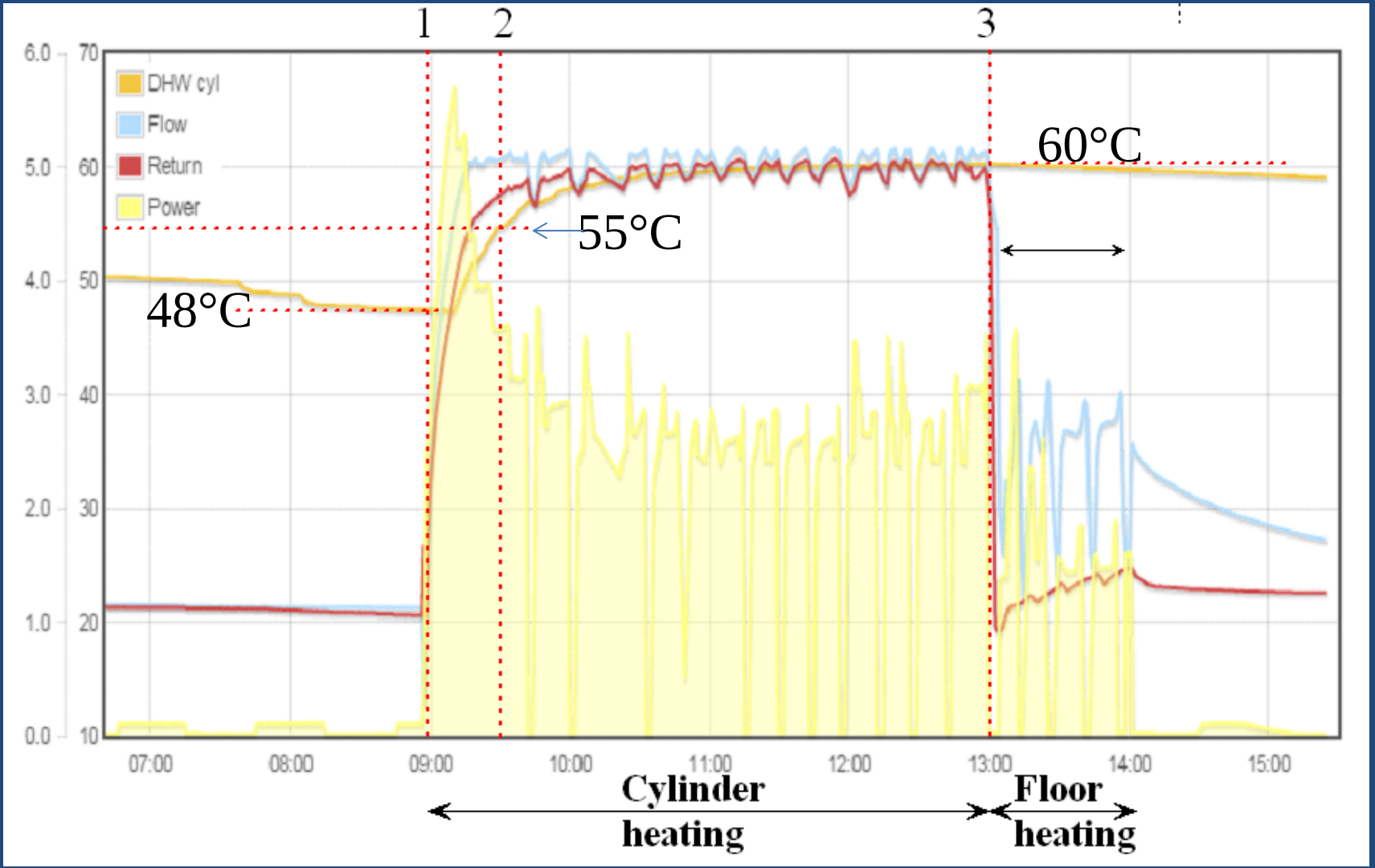
Domestic hot water

Analysis for engineer



Indicating an average COP over heating period of over 3

Domestic hot water



What can we glean?

Is the compressor cycling reasonably?

Can the heating curve be lowered?

Are there unnecessary DHW charge periods?

Is standby power reasonable?

Temperature difference (flow-return) tells us what the liquid flow-rate is.

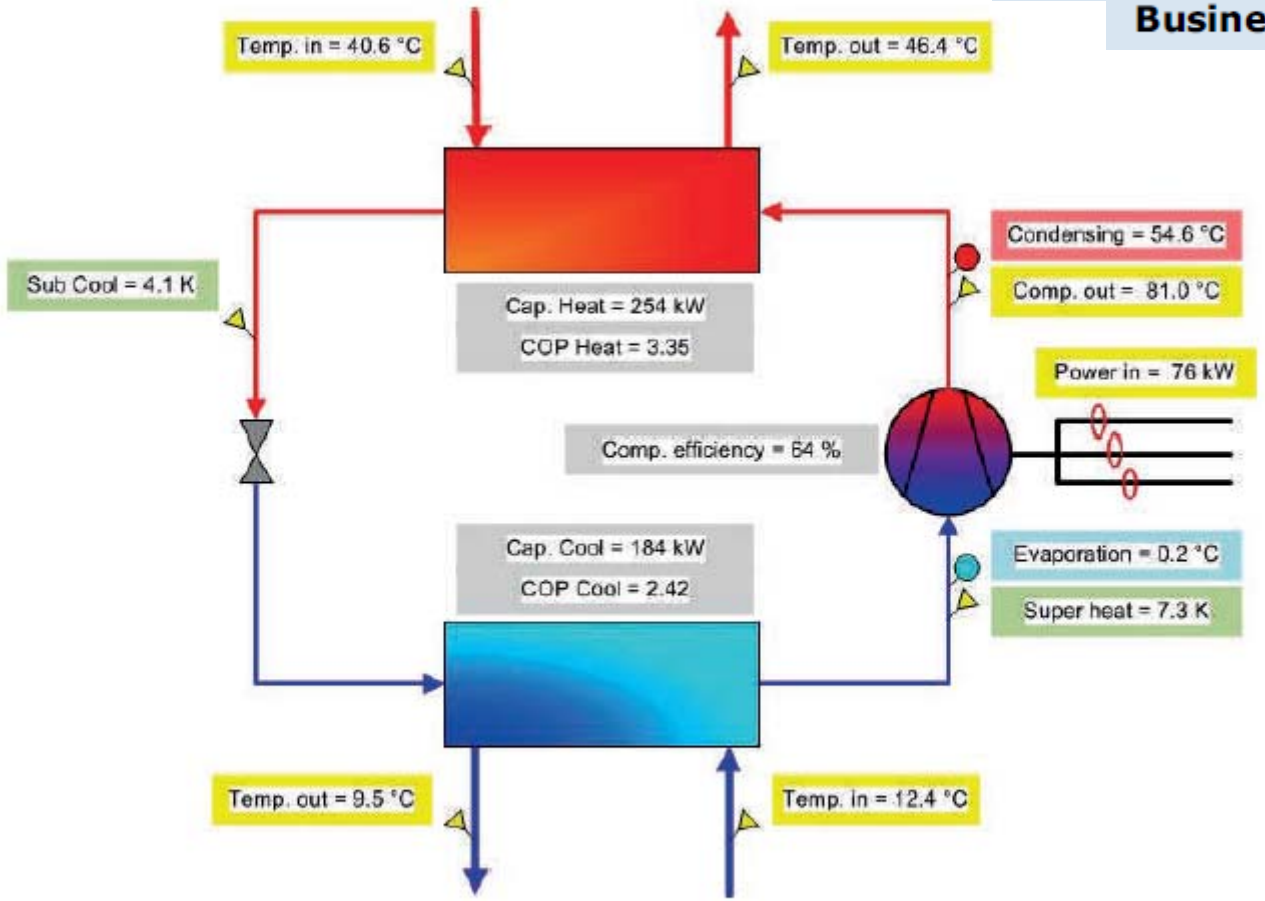
Is pipework sized correctly?

Is there a blocked filter?

Is the pump speed set correctly?

Refrigerant circuit analysis

To heating circuits

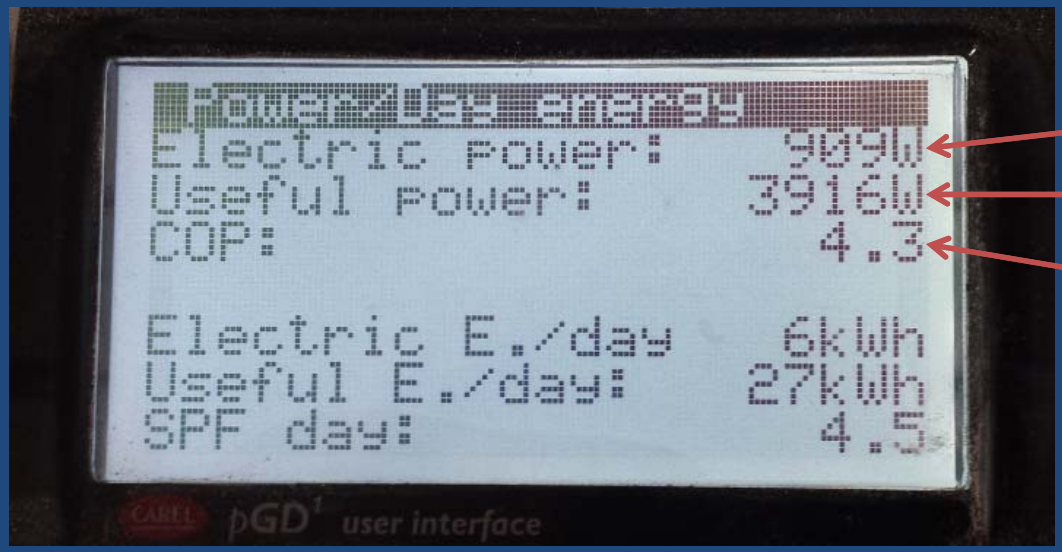


From ground loops

System Flow Chart with dynamic sensor readings

ClimaCheck
Business Edge Ltd

Heat pump controller's COP/SPF calculator



Input power

Heat output

COP

Refrigerant data

Thank You

www.ofgem.gov.uk. (Search MMSP)

www.recc.org.uk/rhi/mmsp

www.openenergymonitor.org/emon/

http://johncantorheatpumps.blogspot.co.uk/