

Measuring the Heat Losses and Solar Gains of Buildings via a Novel Analysis of the Data



Gordon Taylor

G T Systems

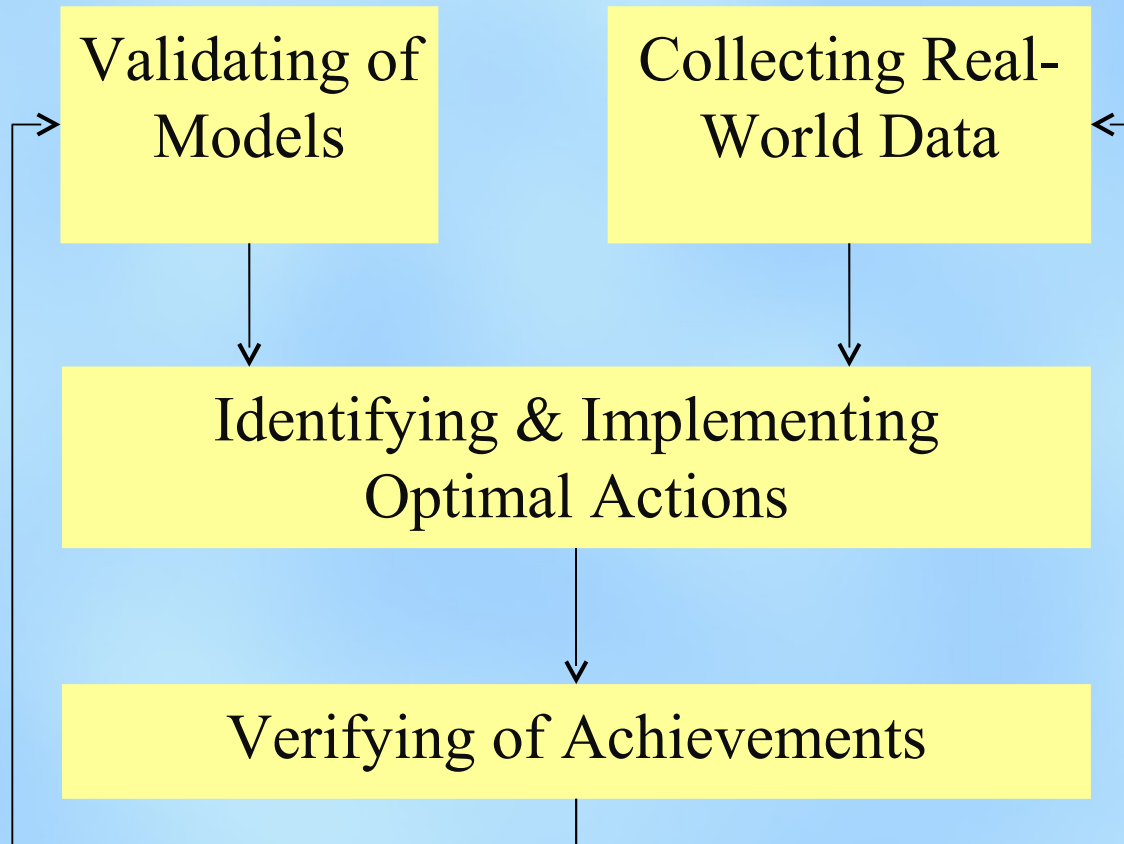
www.energypolicy.co.uk

2011-09-01

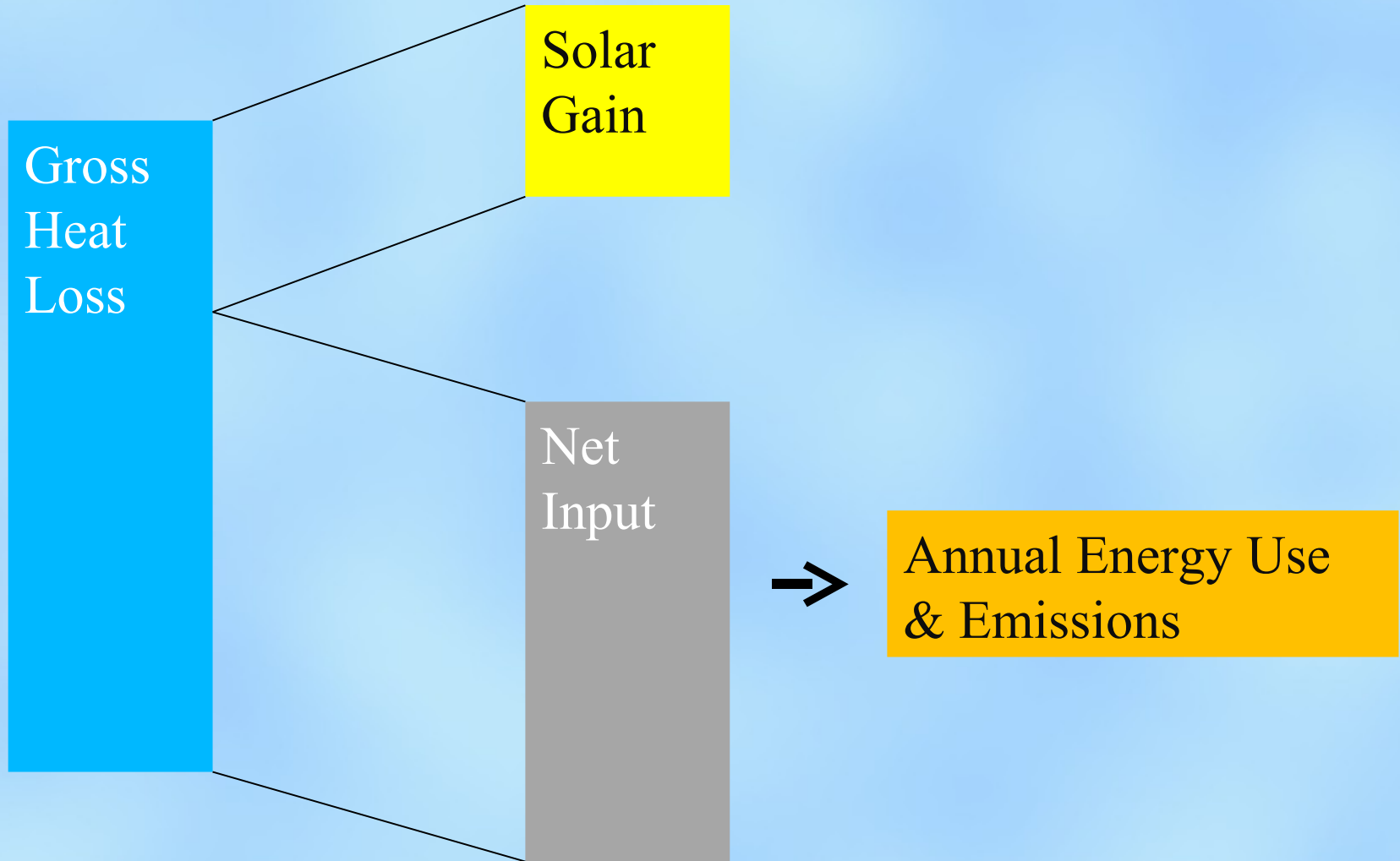
What's the problem?



Why measure?



What Must be Measured?



Existing Test – The Co-Heating Method

Short-term Tests

Electric Heaters

Thermostats

Fans

Electricity Meter

Solarimeter

Data Logger

From ~4.500-34.000 €



New Test – The Taylor Method

Long-term Test

Heat Source & Electricity Meters

Data Logger or Utility Data Collection

From ~0 €



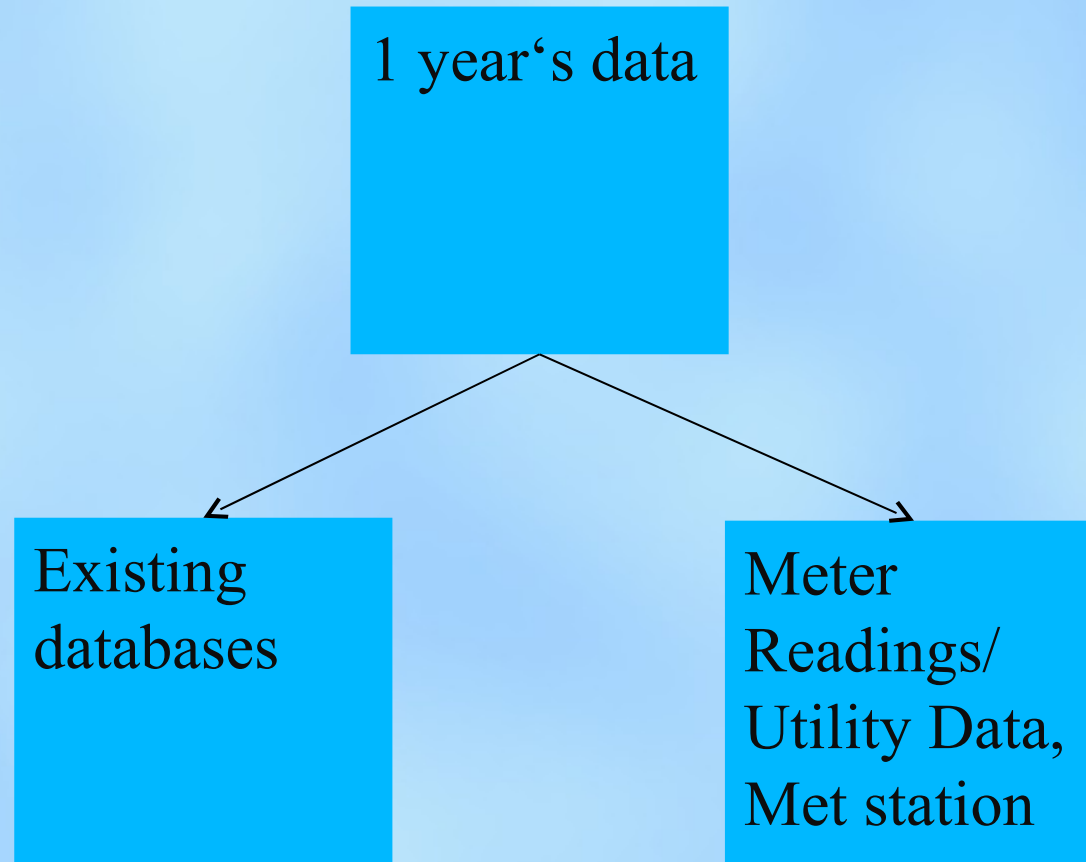
Data Requirements

(Meters) Daily energy inputs

(Min-Max-Thermometer) Daily min/max/average outside temperatures

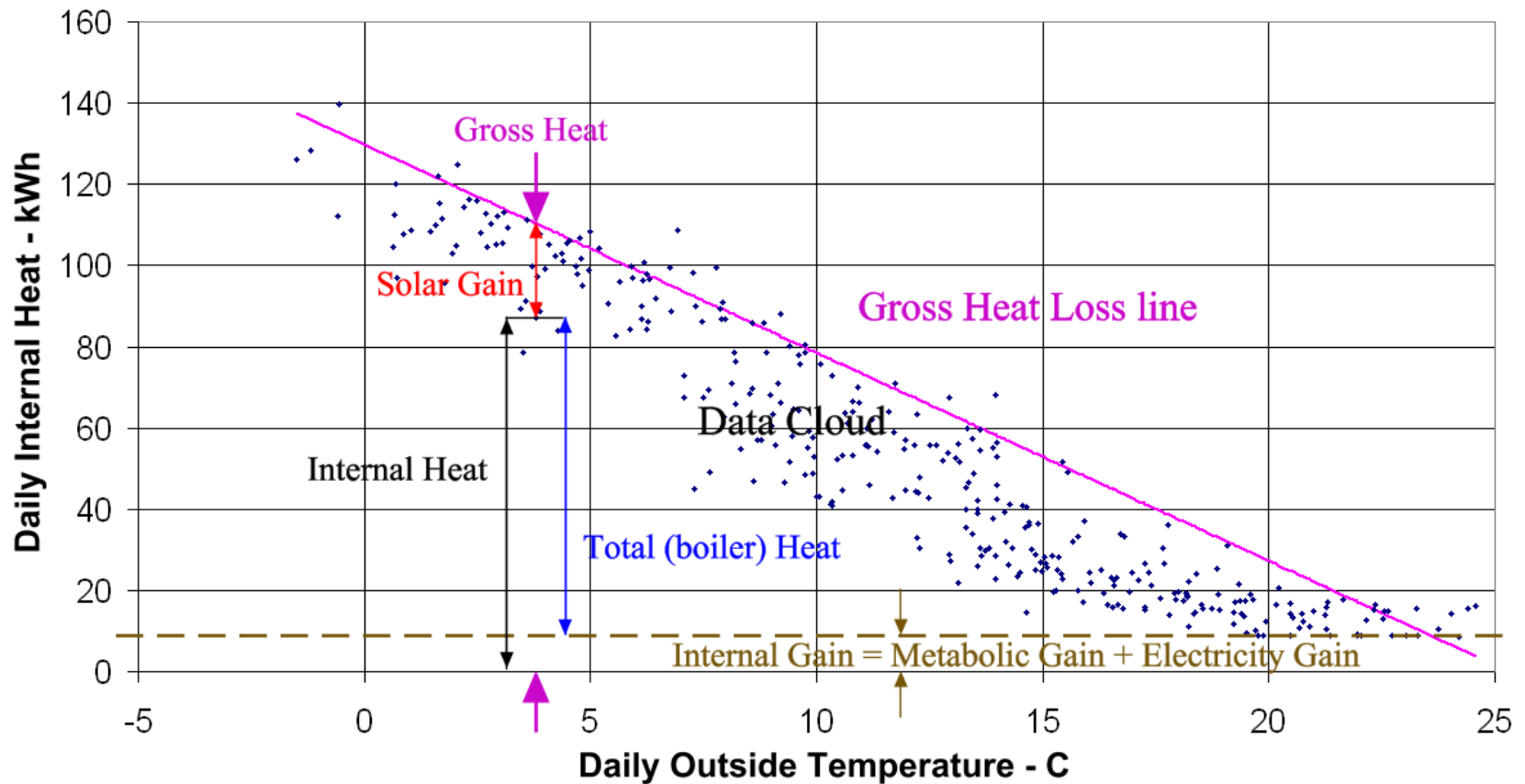
(Gas Boiler) Efficiency of furnace/boiler

Data Sources

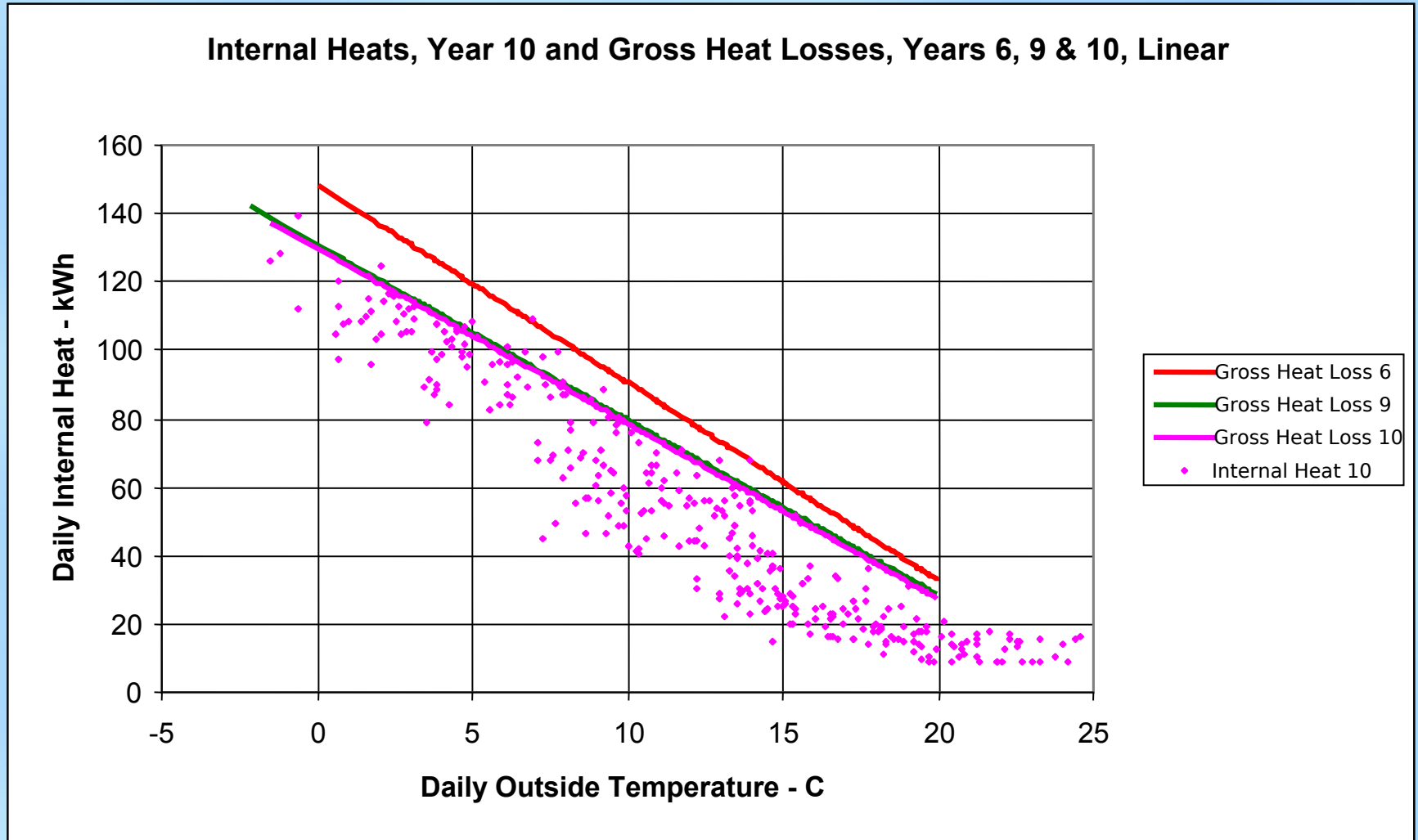


How Does the Taylor Method Work?

Internal Heat v Outside Temperature, Year 10, Linear



Years 6 (Before), 9 and 10 (After)



Summary

Summary

“The Taylor Method allows identification of optimal actions and thus can ensure the achievement of targets for energy use and emissions, from individual houses to the national building stock.”

And Finally..

- Data and Spreadsheets:

<http://www.energypolicy.co.uk>

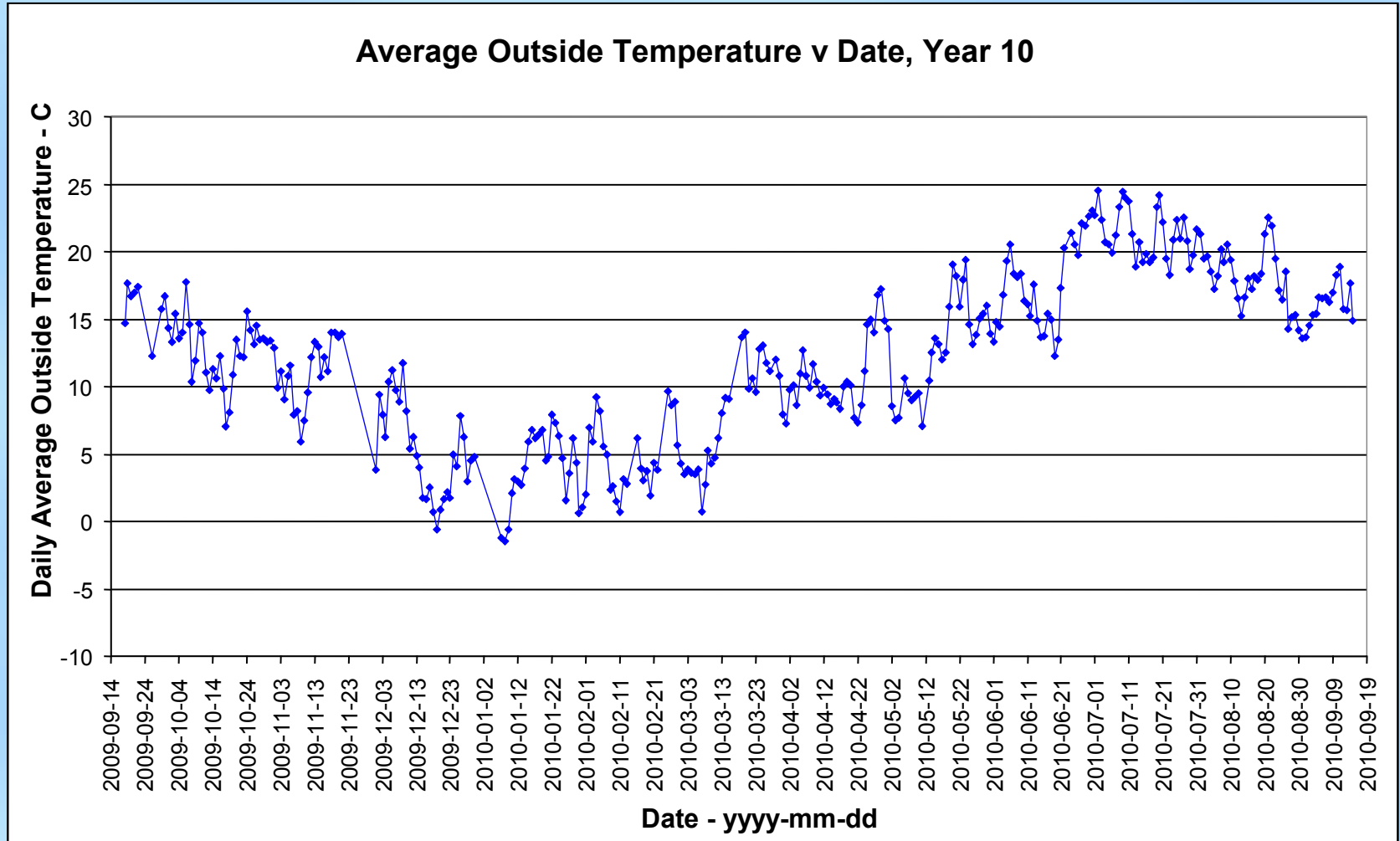
- Comments and questions:

gordon@energypolicy.co.uk

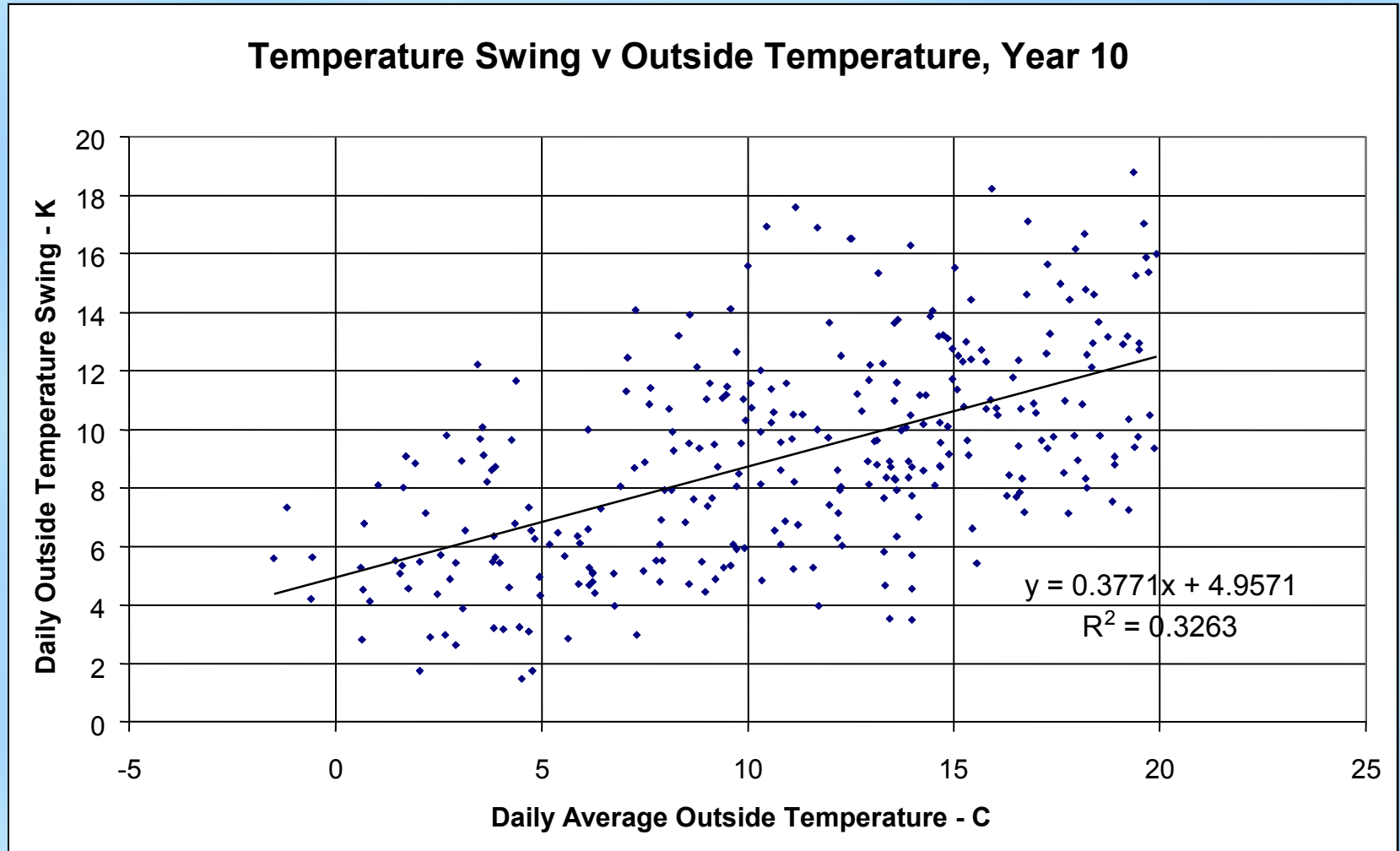
Thank you!

Any comments and questions?

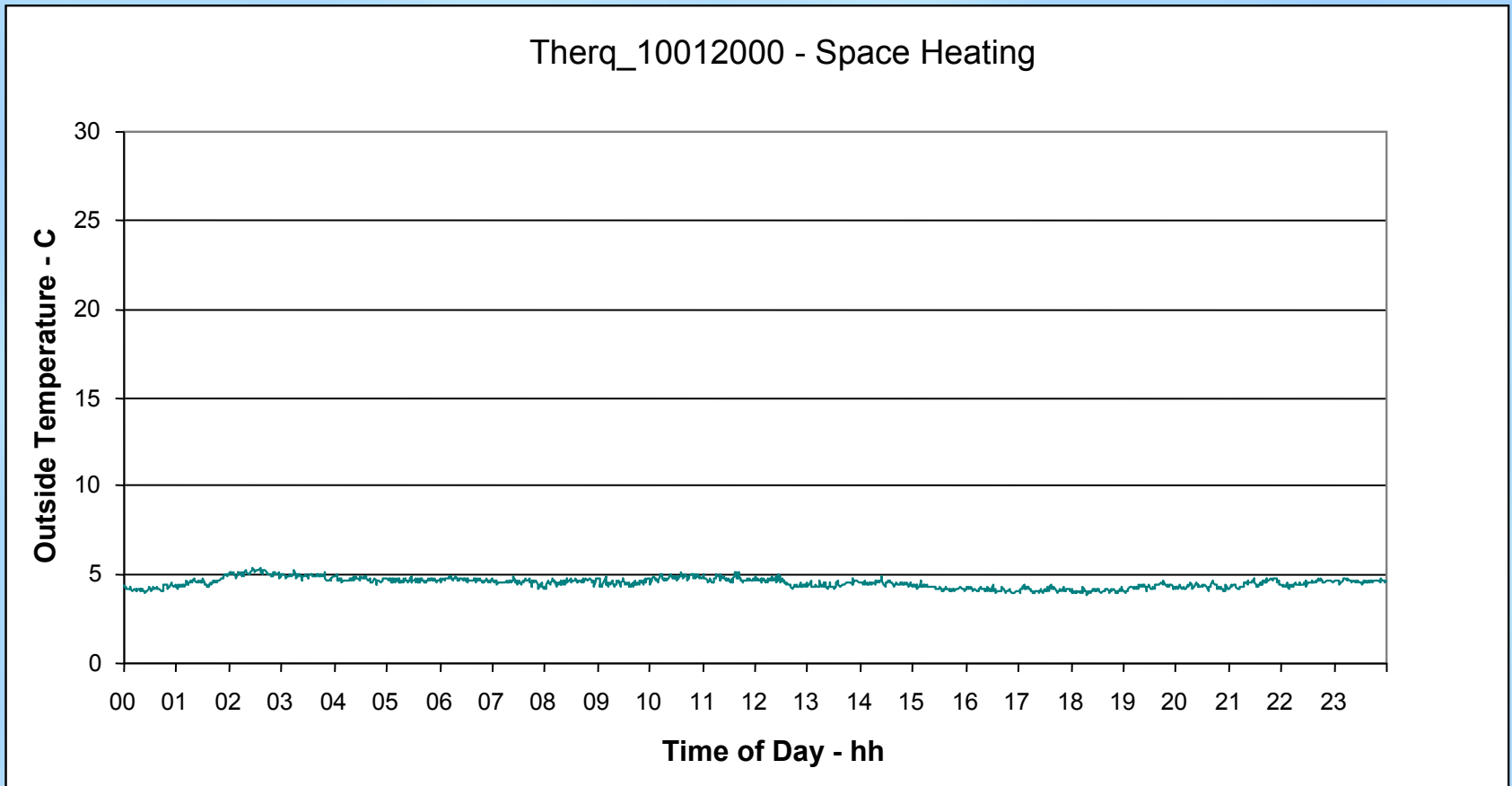
Average Outside Temperature v Date



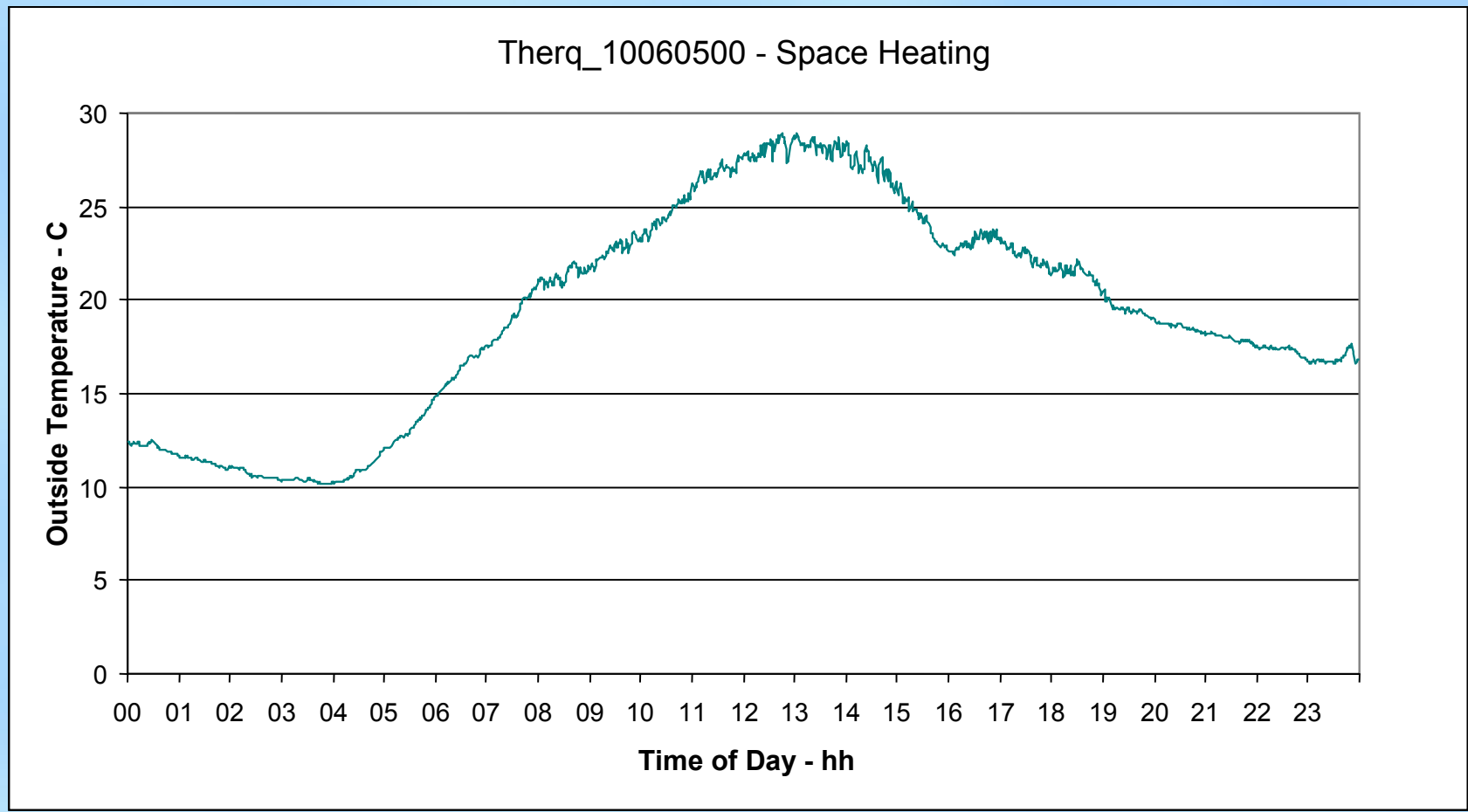
Temperature Swing vs Outside Temperature



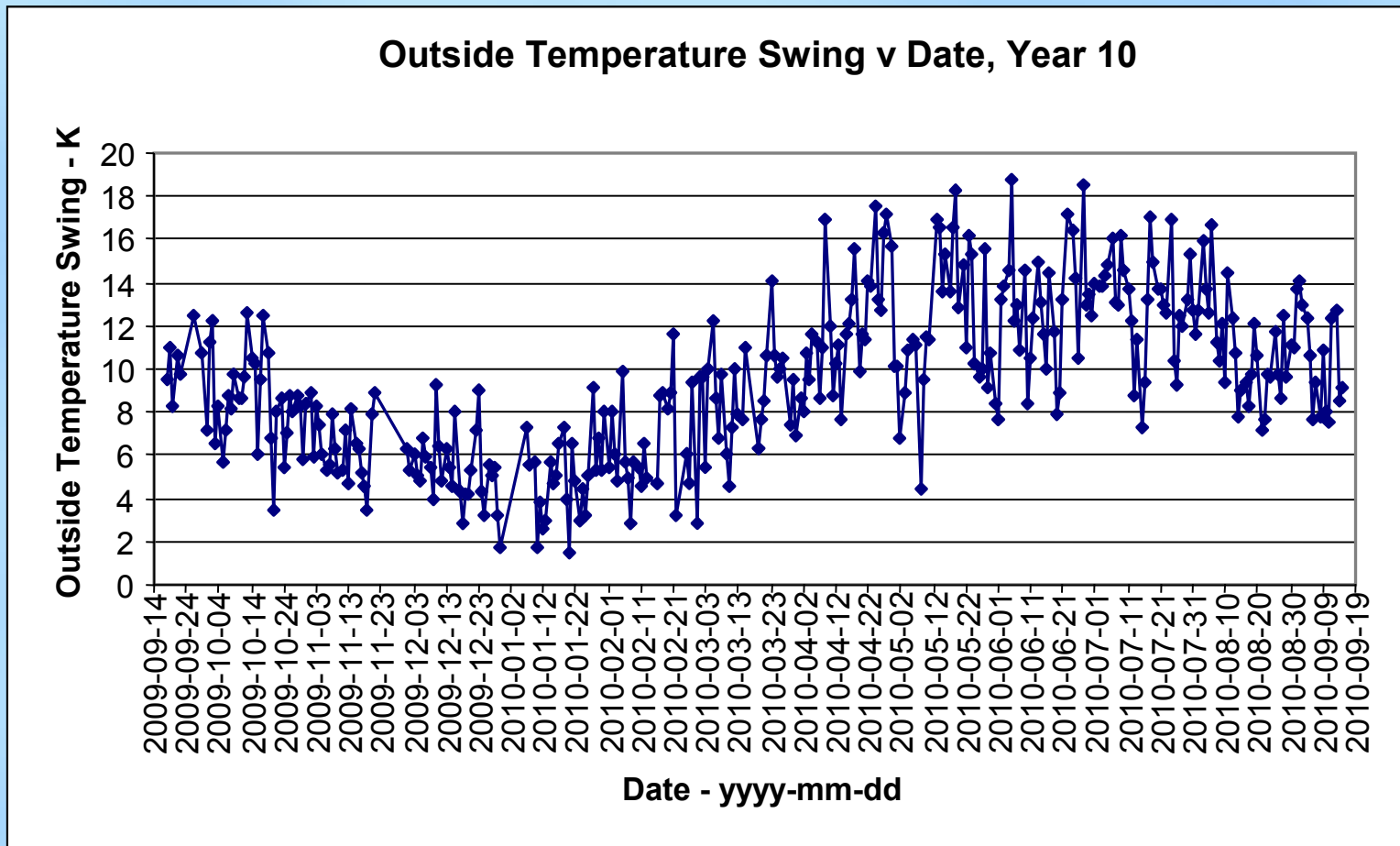
OT for day of TSwing min, Year 10



OT for day of TSwing max, Year 10



Outside Temperature Swing v Date



Daily Temperature Swing = Outside T. max – Outside T. min

The Test House

- 2-storey, 4-bedroom, ~ 100 m² floor area
- Floor – concrete, no cellar, no insulation
- Walls – brick, cavity of ~ 50 mm, UF foam
- Windows, doors - double-glazed, uPVC frames
- Roof – tiled, ~ 150 mm mat, later + 170 mm mat