Condensing Boiler with Annual Efficiency of 96%
Based on Measured Data for Over 11 Years

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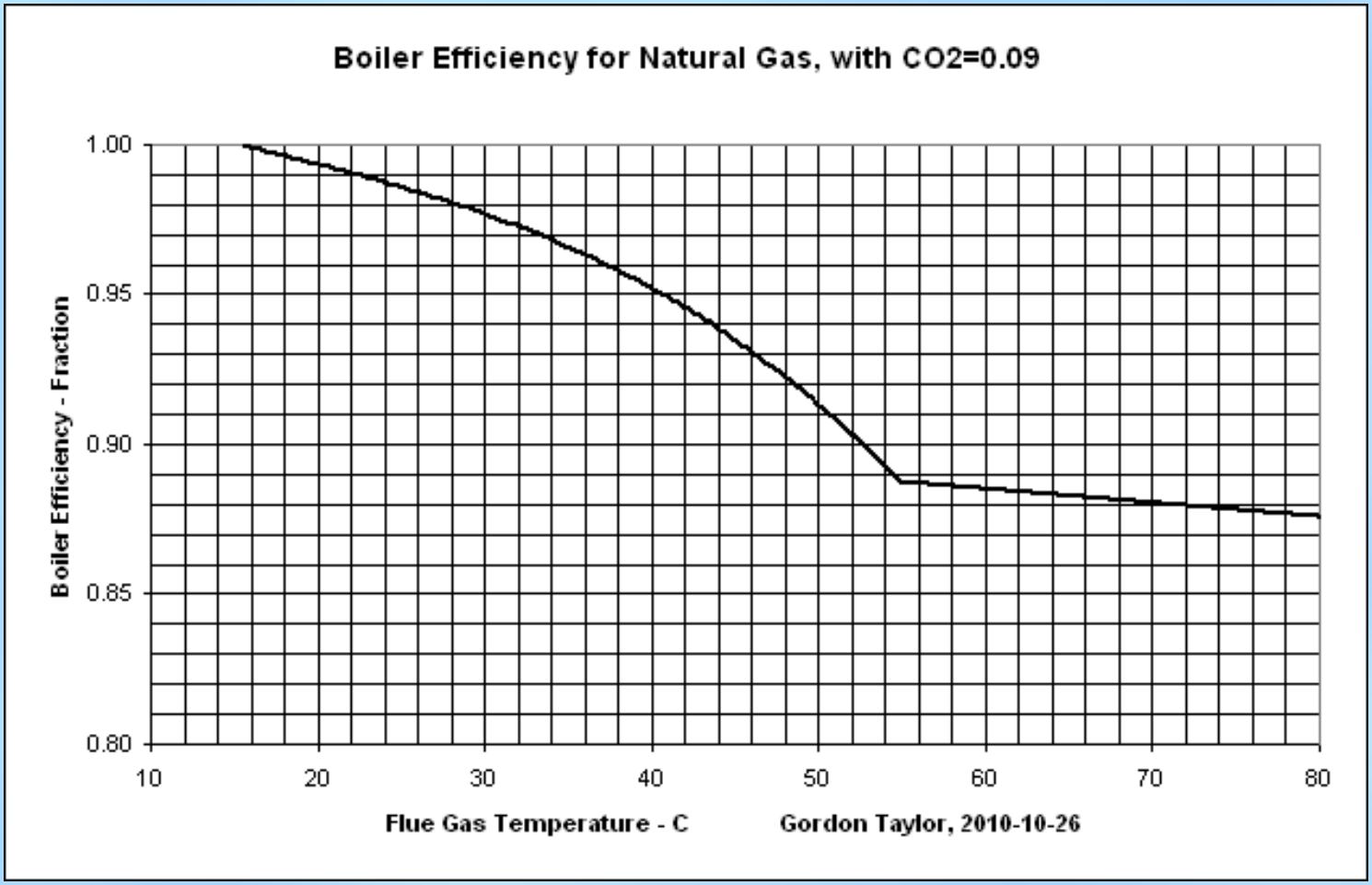
2012-05-25

The Test House

- 2-storey, 4-bedroom, ~ 100 m^2 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

How is it done?



Low Fluegas Temperature – hence Low Boiler Return

Low boiler return requires:

Low boiler flow temperature – e.g. 60 C max

Outside compensation to e.g. 40 C min

High flow-return difference – e.g. 20 K

Continuous (not timed) heating and…

…Effective radiators

Effective radiators require:

Connected Top and Bottom Opposite Ends

TRVs on every radiator to harness gains

TRVs mounted at inlet, with head horizontal

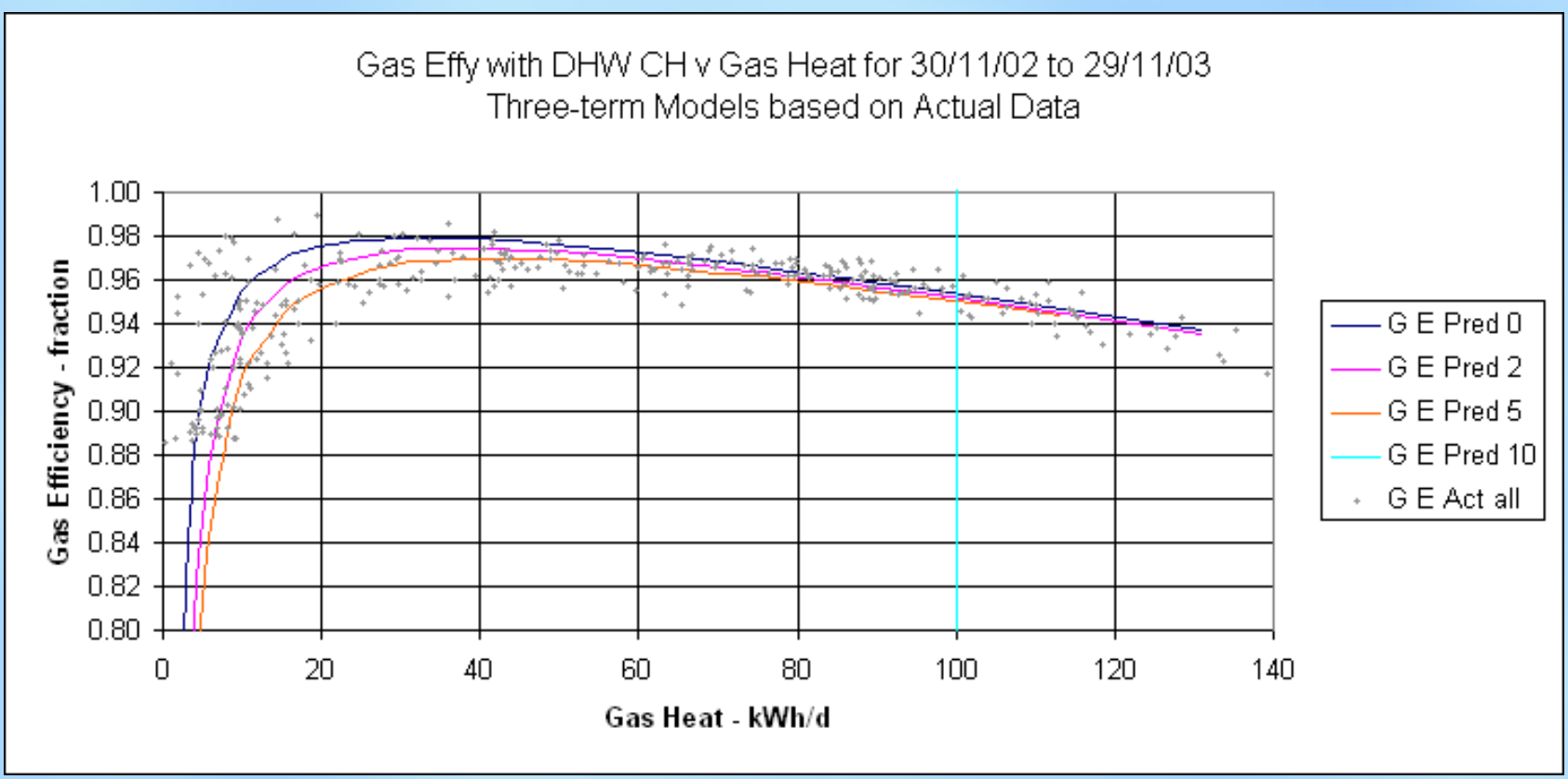
Making Measurements - 1

1 Boiler, 2 Rain Gauge, 3 Electricity sub-meter, 4 Heat Meter-Boiler, 5 Heat Meter-DHW, 6 Screen of Data Logger PC.

Making Measurements - 2

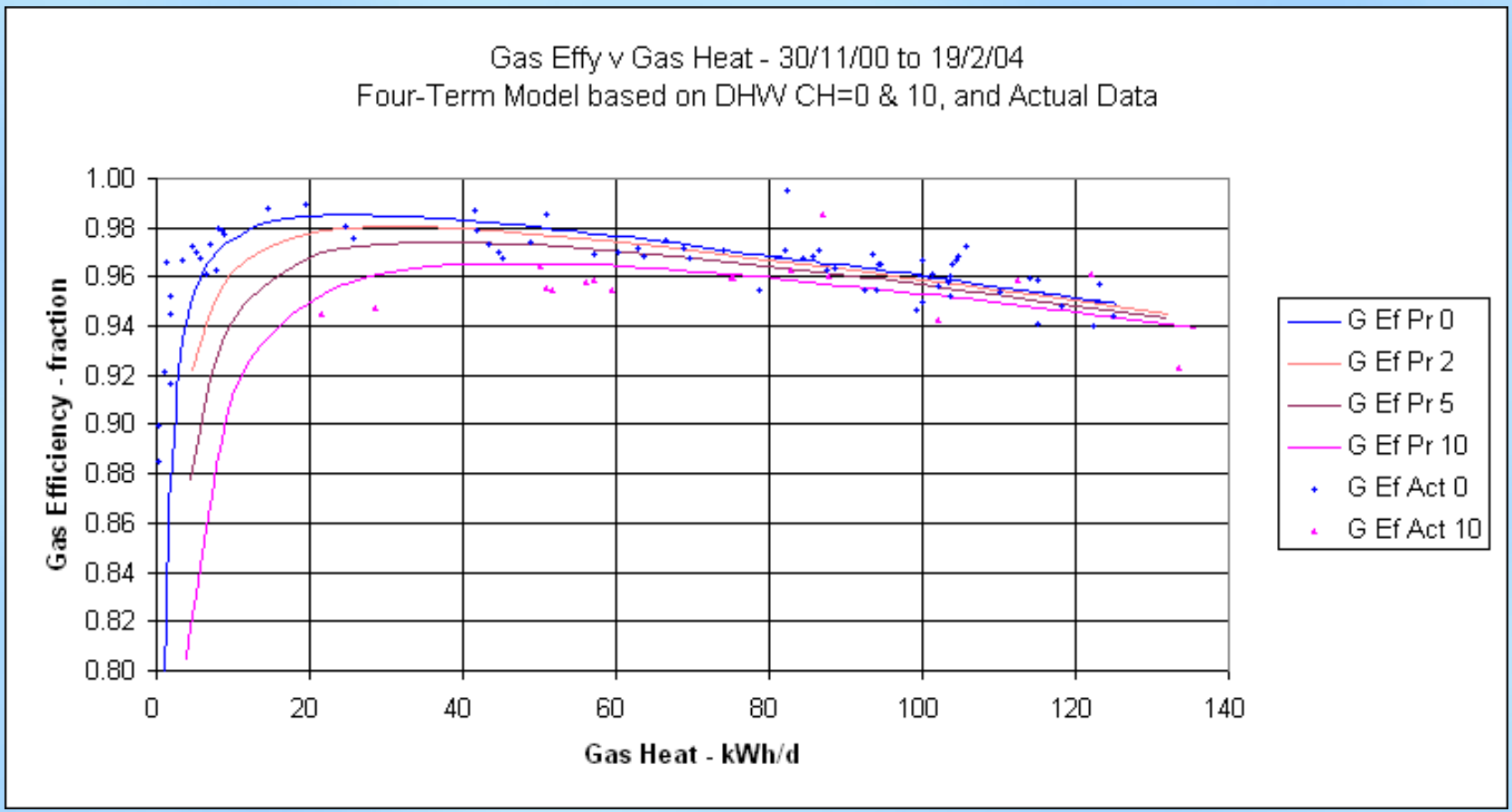
Logger PC(s) Logger Sensor Cables

Typical daily results for a year



Scatter is largely due to differing DHW/day

Results showing effect of DHW/day



Effy can > 98% at DHW = 0 & > 96% at 10 kWh/d

Lessons from such results:

‘Peak and droop’ effy curve is intrinsic

High effy requires continuous heating

DHW load is ‘coil heat’ (not draw-off)

High effy requires low cylinder losses

A ‘combi’ boiler would be far larger

But condensing boilers are nothing like enough:

Gas is depleting fast, so prices will rise fast

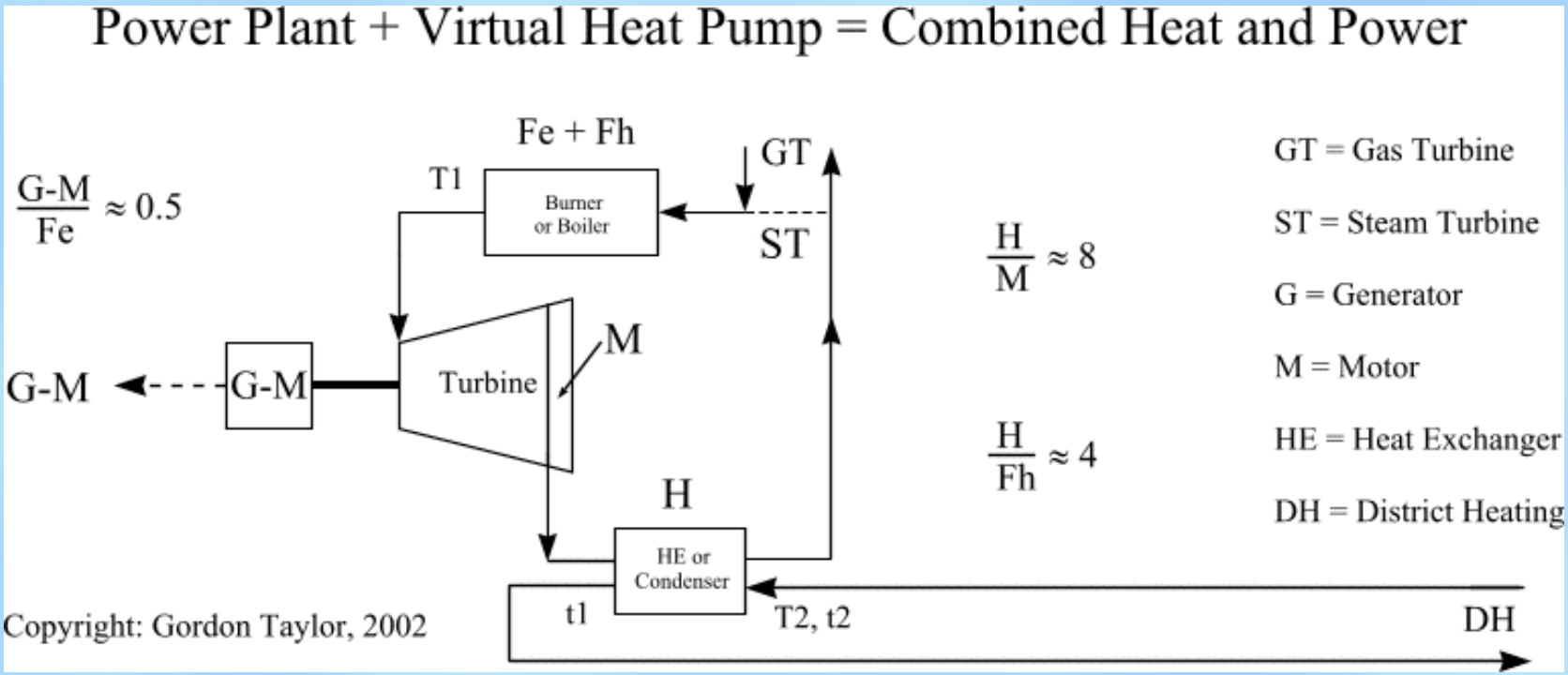
District heating (DH) is the logical successor

Heat comes from CHP and renewables

CHP-DH offers 80% gas and CO_2 savings

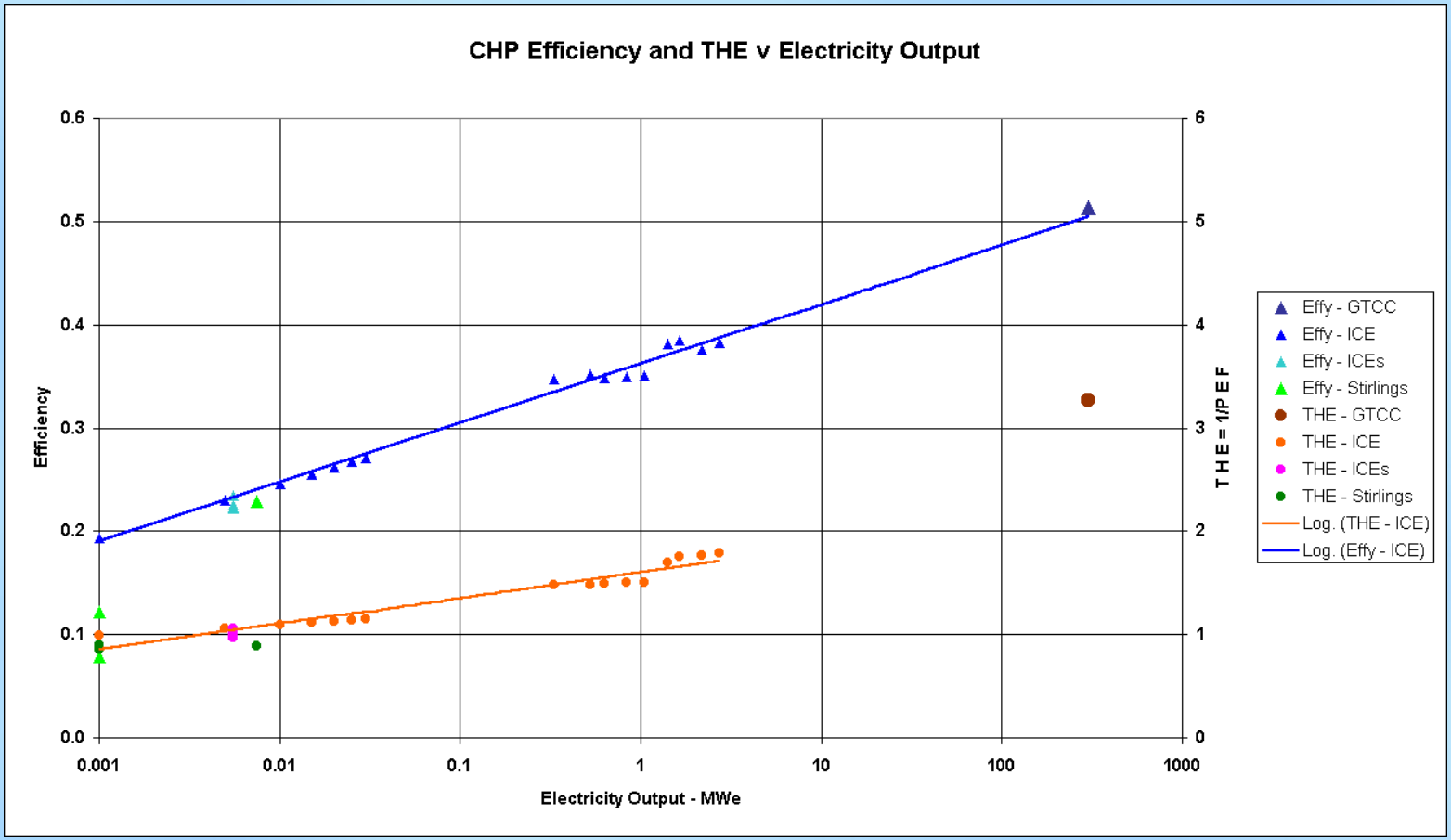
‘1000 cities cannot be wrong’

The True Merit of Heat from CHP



Thus the Heat Out/Fuel Burnt is ≈ 400%

But a large CHP unit size is crucial



Micro-chp is no better than a good boiler !

And Finally..

Raising the efficiency of gas boiler heating is also helpful to the Thermodynamic Heating Efficiency of CHP

Deploying DH from CHP and renewables offers huge import savings and many jobs in every UK city

Delivery of DH should be as on the Continent – via municipalities and/or Energy Service Companies (ESCOs)

(See www.energypolicy.co.uk/epolicy.htm)

Thank you!

Any comments and questions?