



Energy Efficiency in Mushroom Production

Andrew Kneeshaw

Introduction

– Andrew Kneeshaw - FEC Services

- » FEC Services - Farm Energy Centre (previously Farm Electric)
 - » Energy consultants with specialist knowledge of agriculture & horticulture
- » Established for 40 years and based at Stoneleigh Works
- » Work for NFU, Carbon Trust, Milk Development Council, farmers, energy utilities (NIE) etc
 - Electricity contracts
 - Advisory services
 - Research & Development

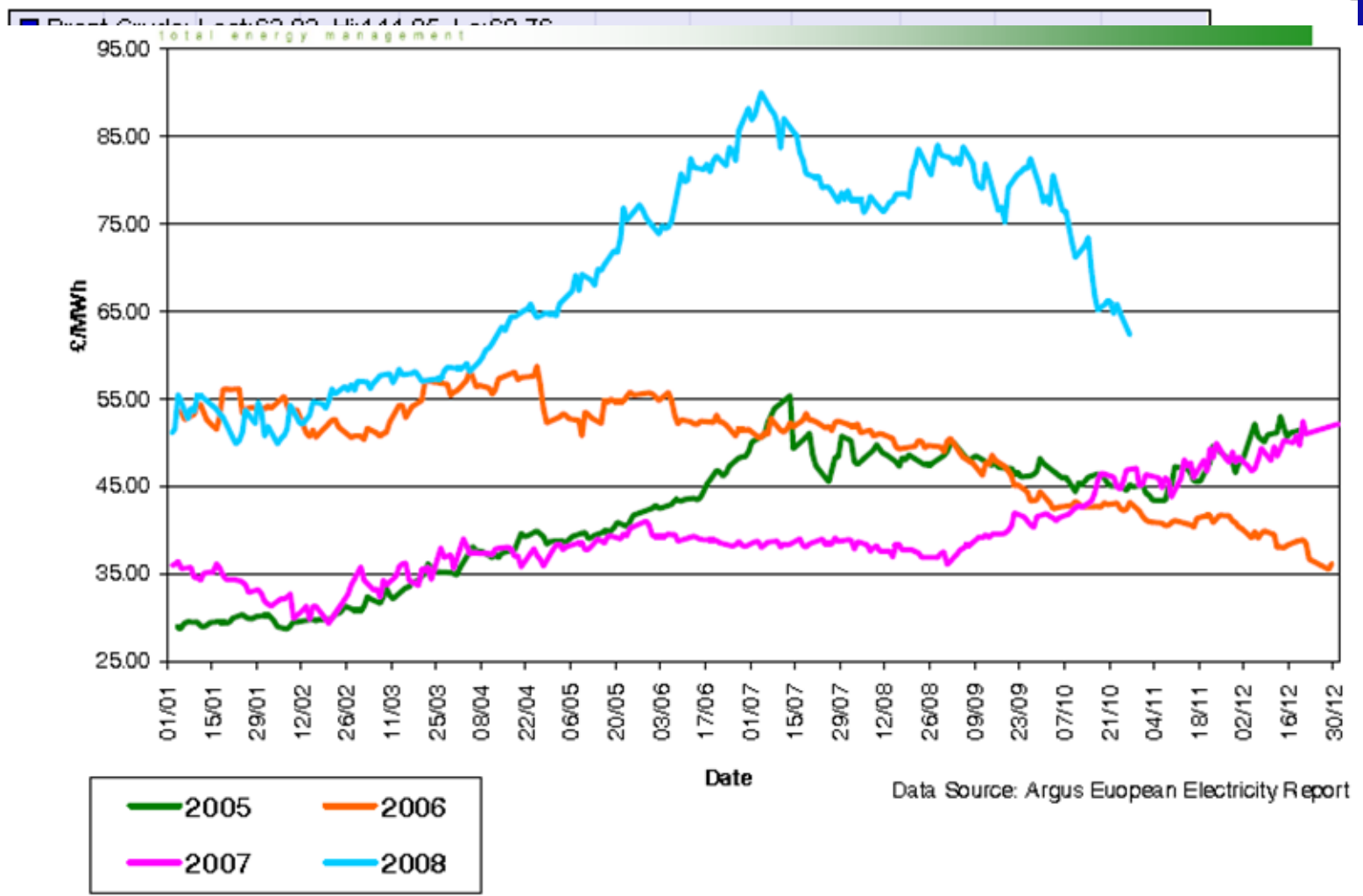
Mushroom Farm surveys

- In June 2008 requested to do 12 surveys on Mushroom farms mainly in the Armagh area
 - Funded through CAFRE
- 2 hour 'look-see' – quick surveys
 - Information on energy use
 - Techniques used

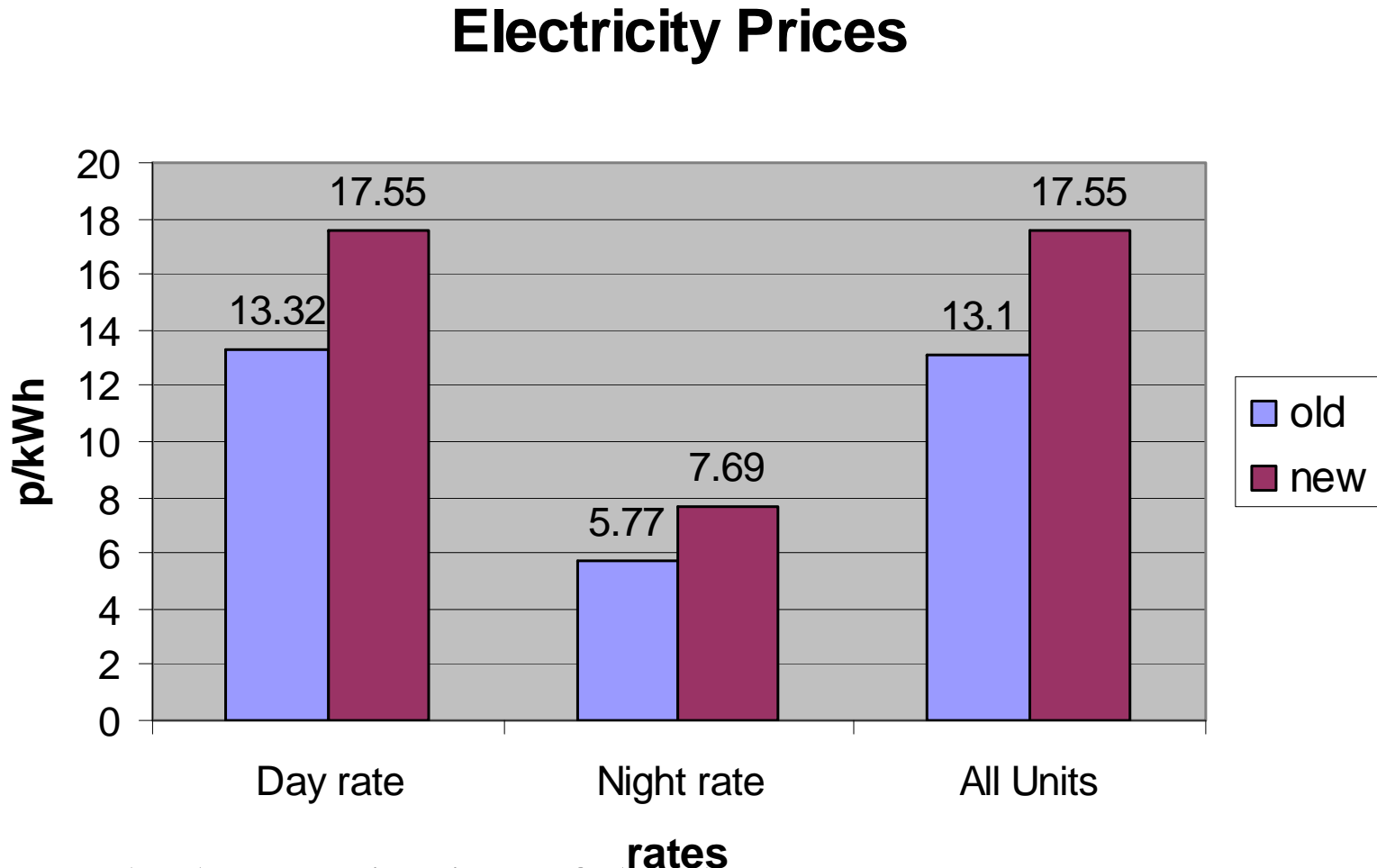
Output - an overall report and 1 sheet summary for all sites



Energy Price Trends



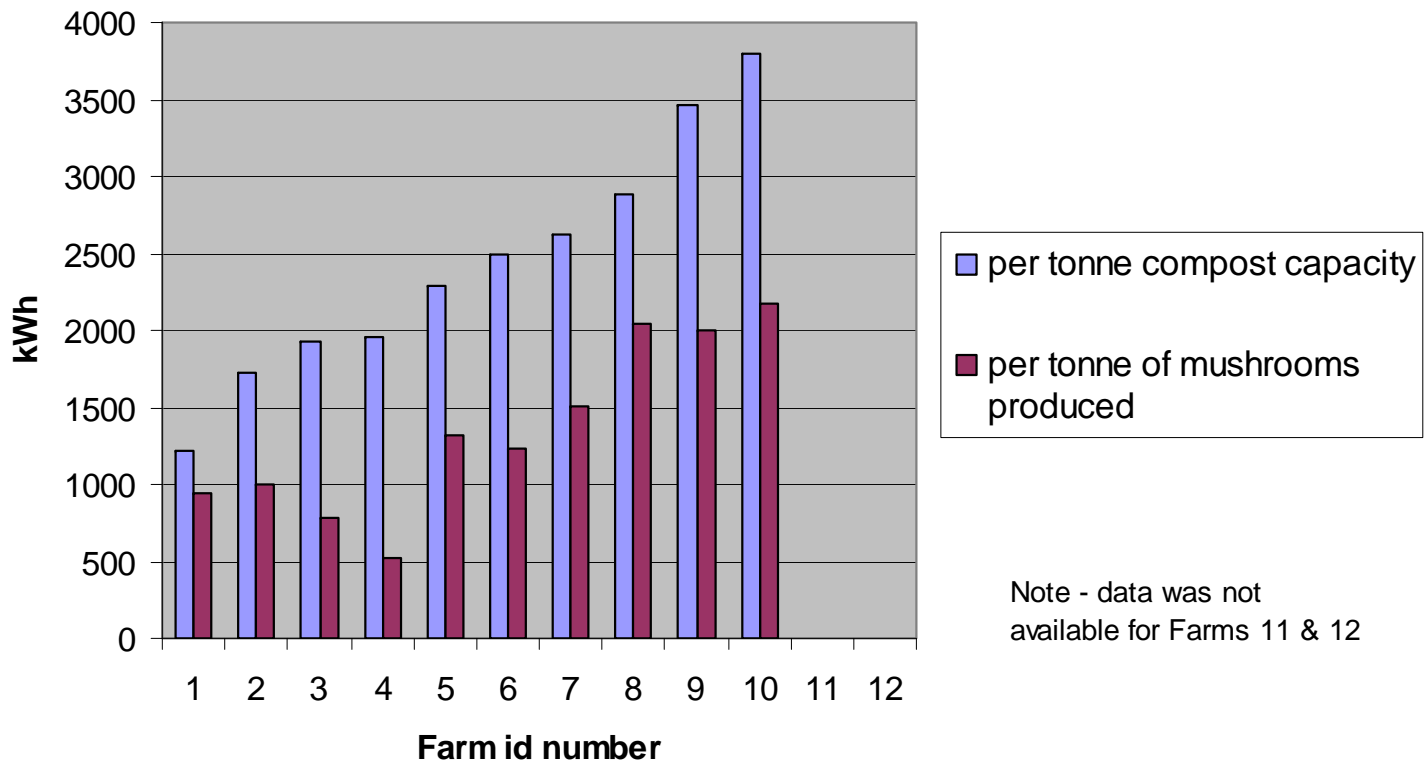
Current electricity prices



Note the harmonisation of the day rate

Comparative performance - Oil

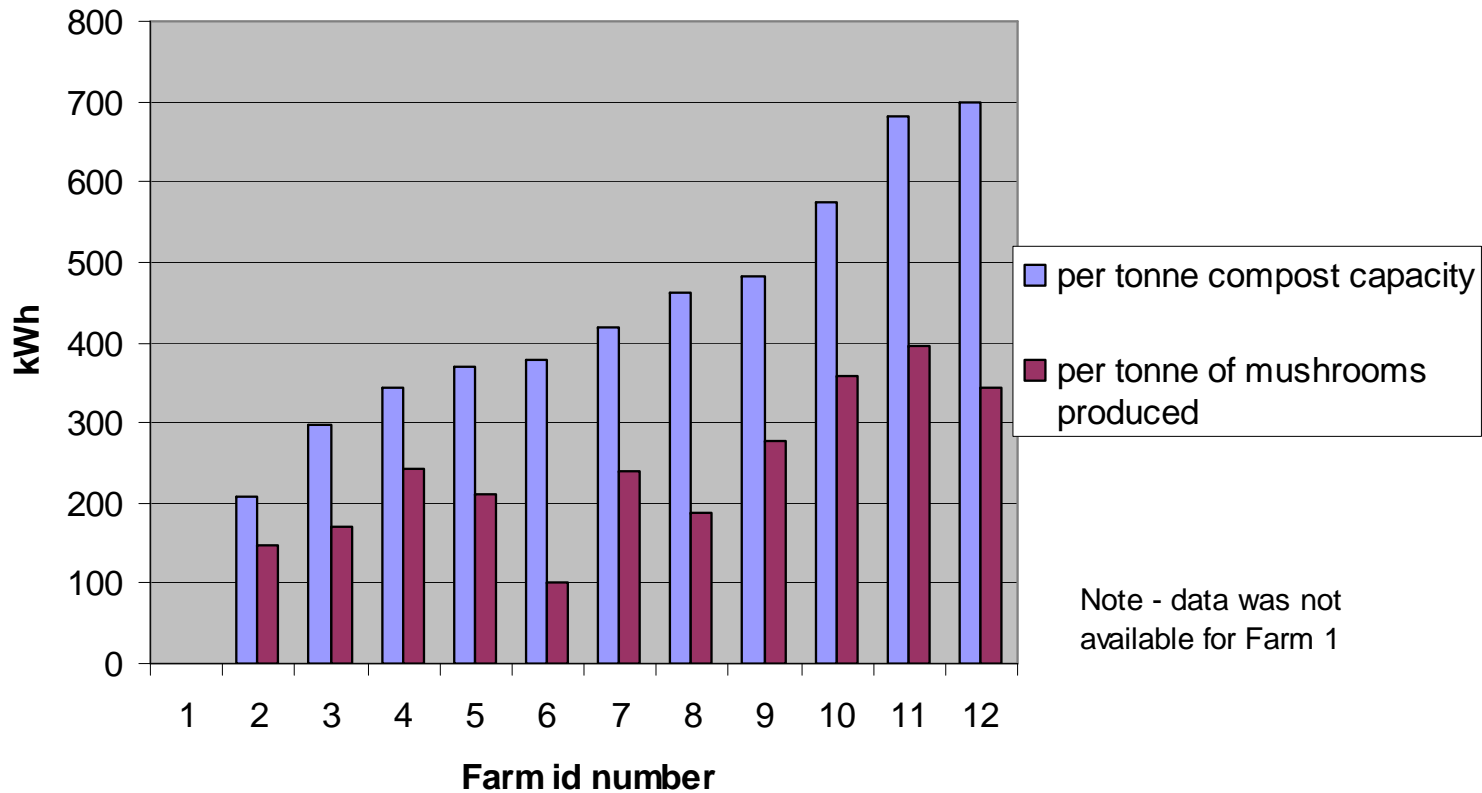
Oil consumption for mushroom production



Note - data was not available for Farms 11 & 12

Comparative performance - Electricity

Electricity consumption for mushroom production



Note - data was not available for Farm 1

Conclusions

- No one had gone through this comparative exercise before
- There were really big difference
 - Not all could be put down to production system differences
 - What makes the difference?



Common Issues

- Boiler efficiency
- Tariff
- Heat distribution system efficiency
- Insulation
- Refrigeration efficiency
- Control

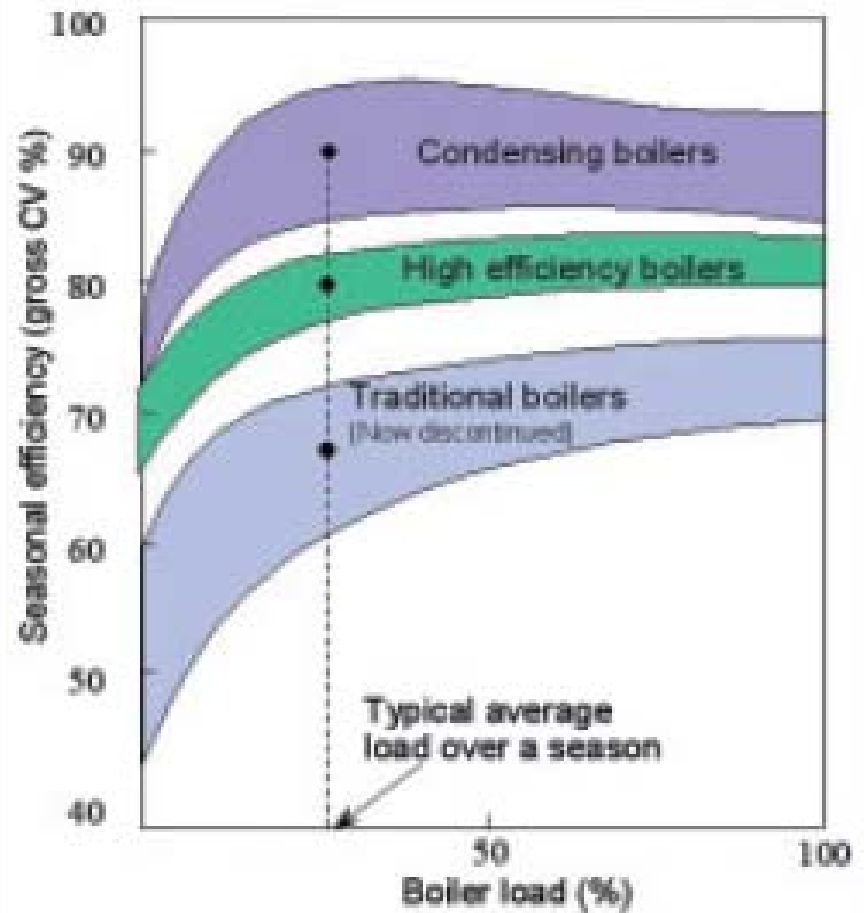


Tariff

- Most sites will achieve 20 to 25% units during economy 7.
- Anyone not on Night rate electricity will immediately save about 11% on their bill at no cost by switching



Boilers



Boilers

- Up to 23% saving could be had by replacing an old style boiler with a new condensing unit:
- Paybacks in 2 to 3 years give amount of typical usage

Alternative Fuels

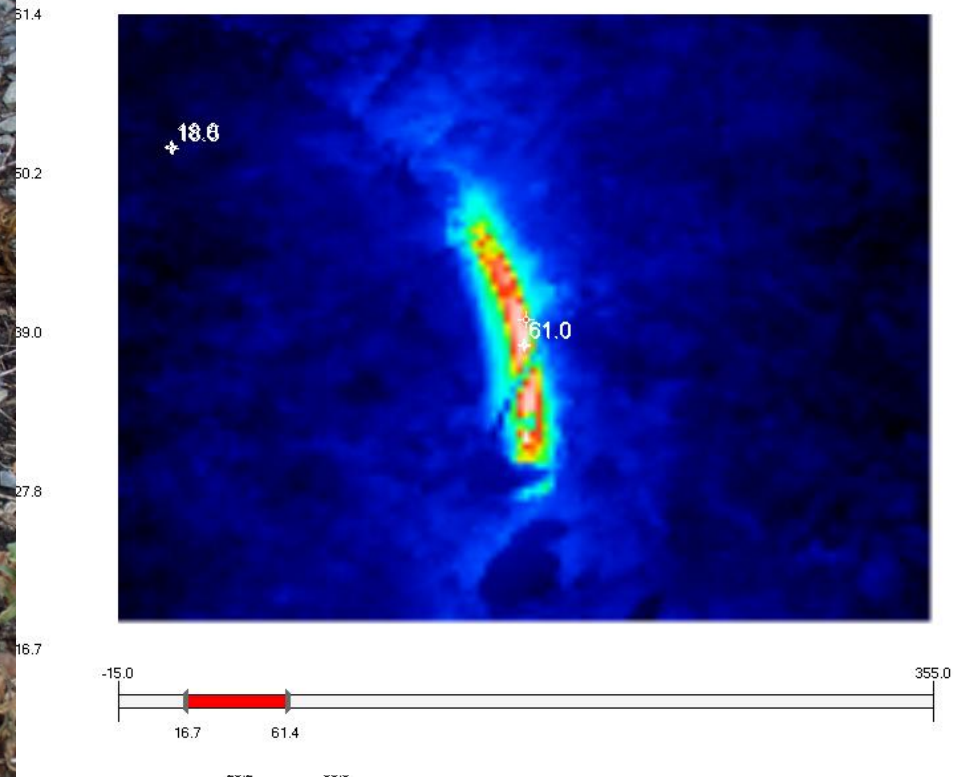


	Cost per bought unit	Cost per kWh	Cost for 200,000kWh
Oil	60p / litre	5.55p	£11,000
Wood chip	£70 / tonne	2.61p	£5,220
Wood pellets	£150 / tonne	3.13p	£6,260
Straw pellets	£100 / tonne	2.30p	£4,600

Distribution pipework

- Running hot all year round

Potential constant loss



Heat loss costs

Type of insulation	Heat loss of 10m one inch pipe at 70°C	Loss in one year	Cost (oil @60p/litre, boiler efficiency 65%)
None	900W	7884kWh	£673
Nitrile rubber (19mm)	160W	1401kWh	£122
Polyurethane (50mm)	5.50W	482kWh	£41

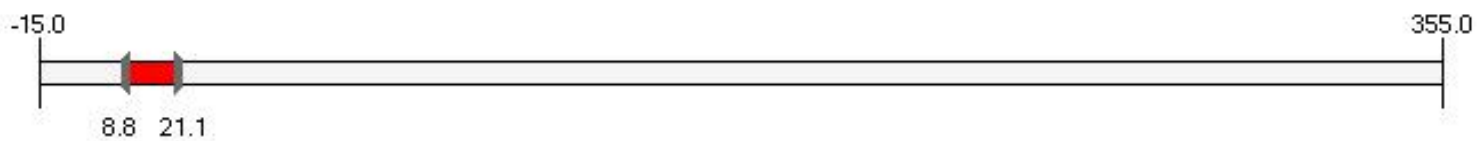
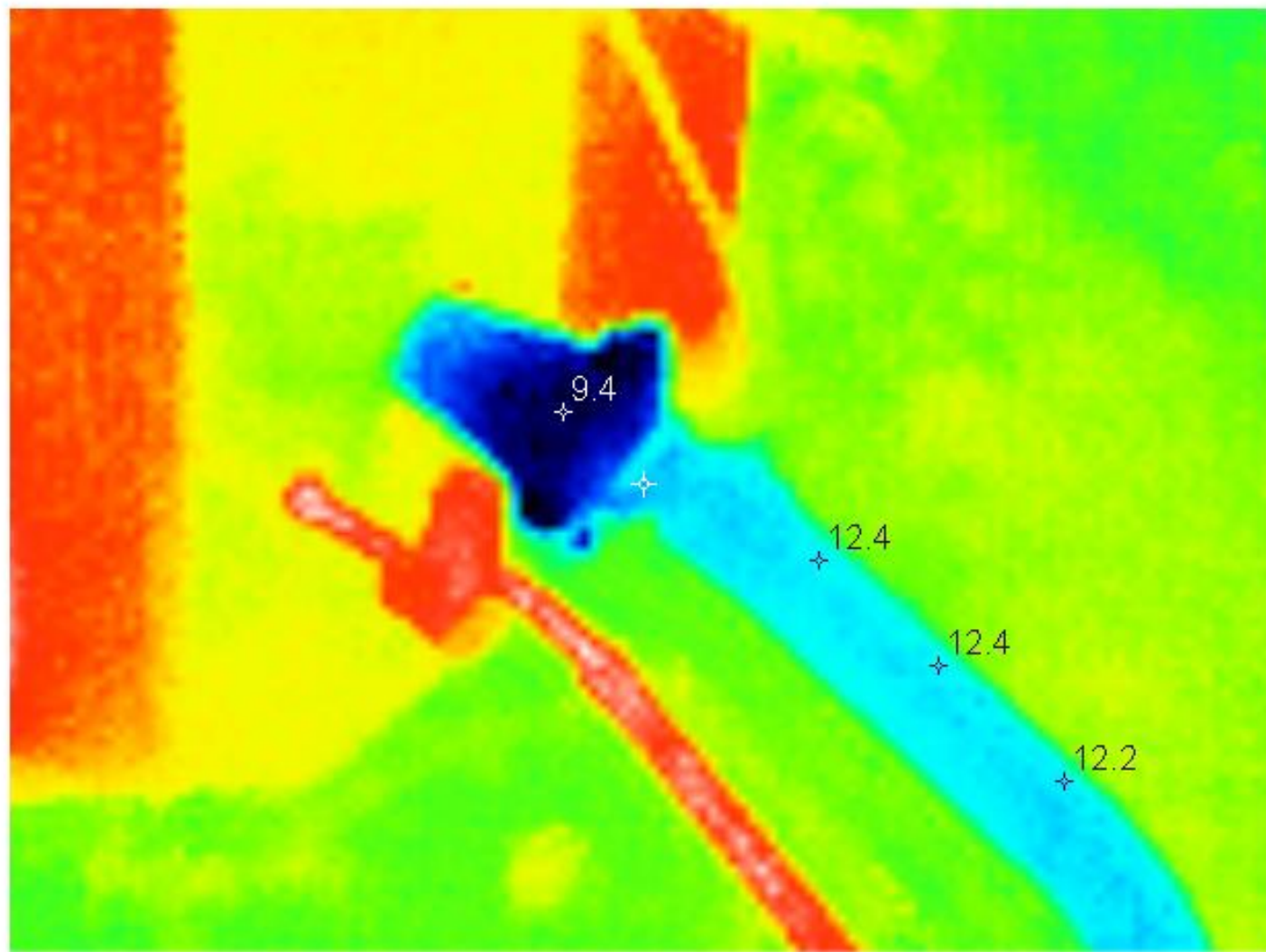
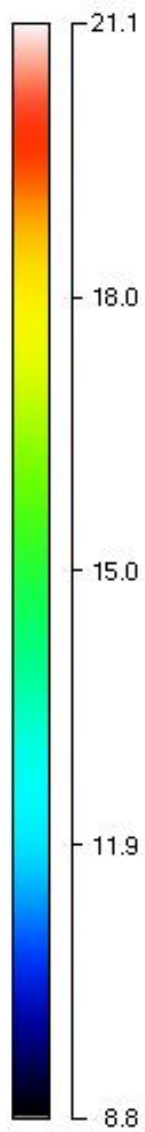
Better insulation products



- £30 / m
- Most sites losing around £2k worth of heat each year

Sealing buildings







Control

- Key in controlling heat and cooling costs
- Some evidence of system 'chasing'



Lighting

- Mostly used 'switch start' IP65 fluorescent lamps
- From 25 to 60% savings from use of T5 electronic ballast replacement.



Grants??



- Discussions with NIE on their Energy Saving grant scheme:
- Condensing boilers – grant £600 - £2200 / boiler
- Pipe Insulation – grant £8/m – cost £20/m
- Tubesaver – grant £10/tube cost £13/tube
- INTERESTED?

Summary



- The surveys revealed enough variability between sites to indicate that improvements are possible
- Some advantage could be had by organising on-going gathering of energy use information
- My opinion is that 30 to 40% energy savings are possible in the short to medium term