

# Installation of Ground-Source Heat Pump system at Ternan House, Banchory

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On behalf of Henry Allen



senenergy

[www.senenergyltd.com](http://www.senenergyltd.com)

# Energy Services

- major growth >200 people



## 3 Main Sector

- Survey & GeoEngineering
- Oil & GAS
- Alternative energy

Have experienced rapid growth

- Over 200 staff
- Offices world wide

## **“Making a difference today, for tomorrow”**

Senergy is a company that not only operates within an environmentally sensitive industry, but recognises its potential environmental impact in its local working area. We are well aware of the changes to the world’s environment and the need for a shift in attitude and working practice.



# New Building Investment

## – Ternan House Extension in Banchory



- 5 well Ground Source Heat Pump system
- High efficiency gas boiler
- Enhanced insulation specs
- Rainwater harvesting
- Automated electrical system
- Automated flushing systems



## Heating the New Extension – What did we aim to achieve?



- 60% extra space
- Zero increase in carbon emissions by
  - Heating whole new building with Ground Source Pumps
  - Replacing 25 year old gas boiler
  - Using any excess capacity from heat pumps to supplement boiler system in the rest of the existing building
- Estimated carbon saving at least 14 tonnes per annum

# Extension at Ternan House – April 2007



# Drilling



# Underfloor Heating



# Royal Inspection



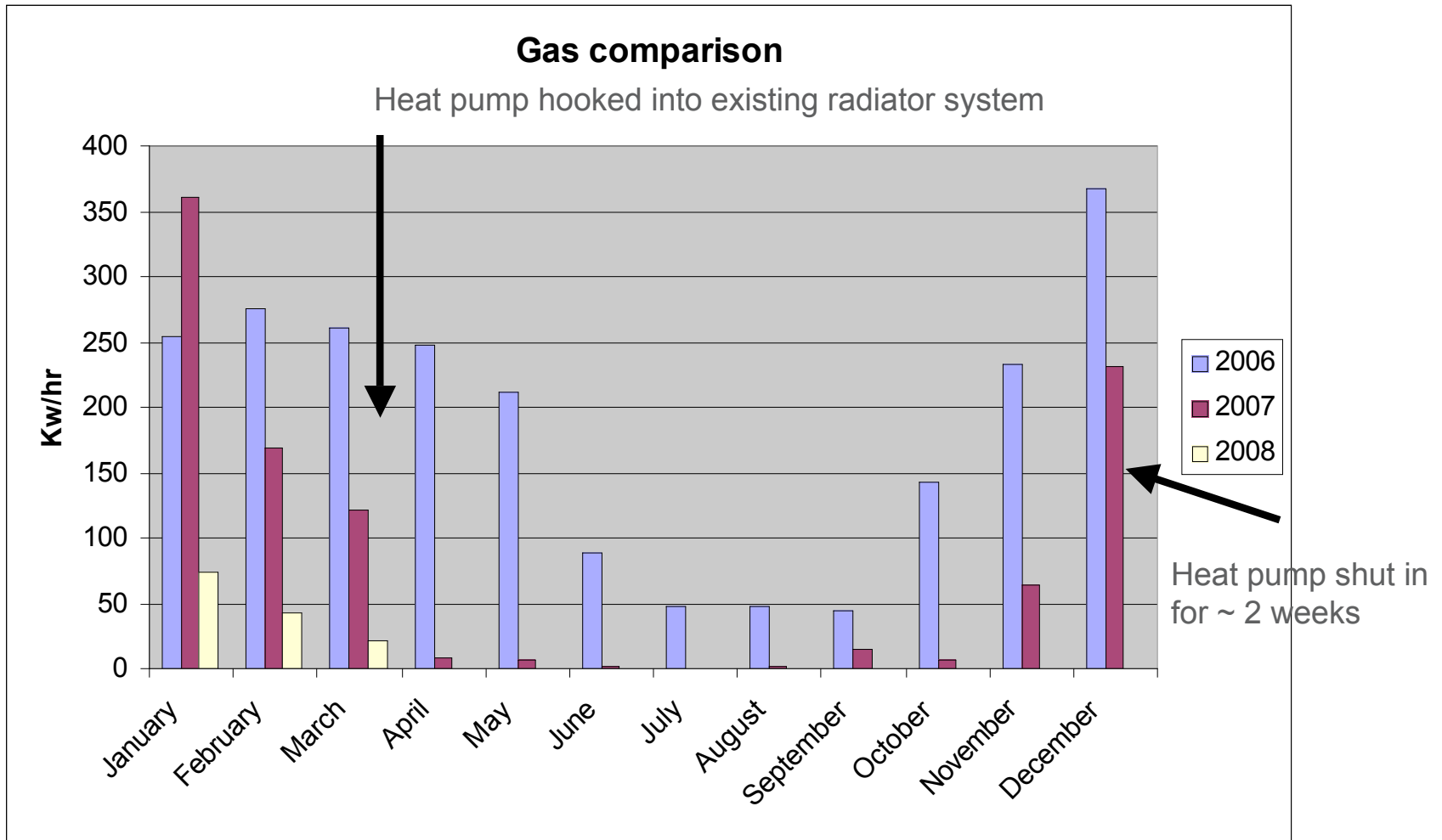
# Heat Pump Specs



- NIBE Fighter 29Kx 3-Phase pump
- Efficiency 1:4.7
- 5 -well manifold
- 11,10, & 10- way floor manifolds
- Independent room thermostats
- Outside temperature sensor
- Hooked to hot water system
- Hooked to radiator system



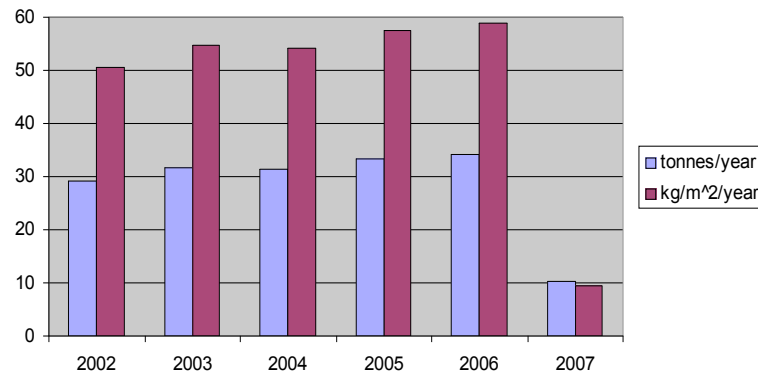
# Gas use since Heat Pump Installation (Nov 2006)



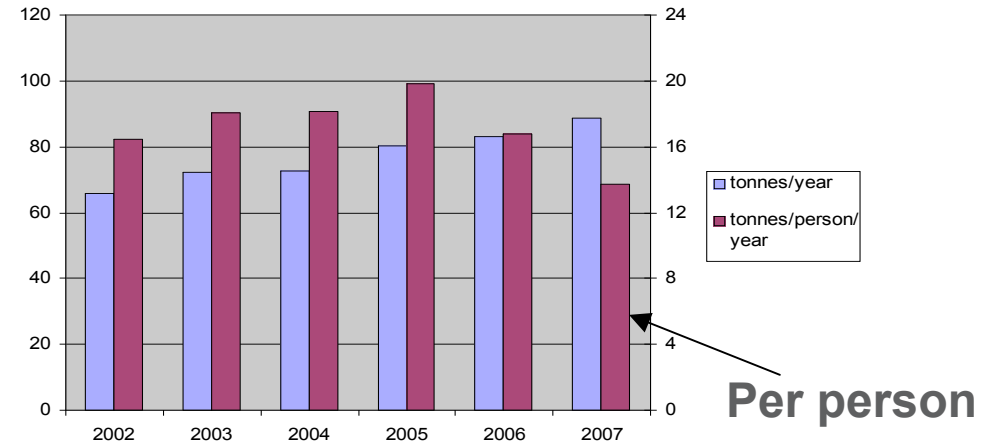
# CO<sub>2</sub> Impacts



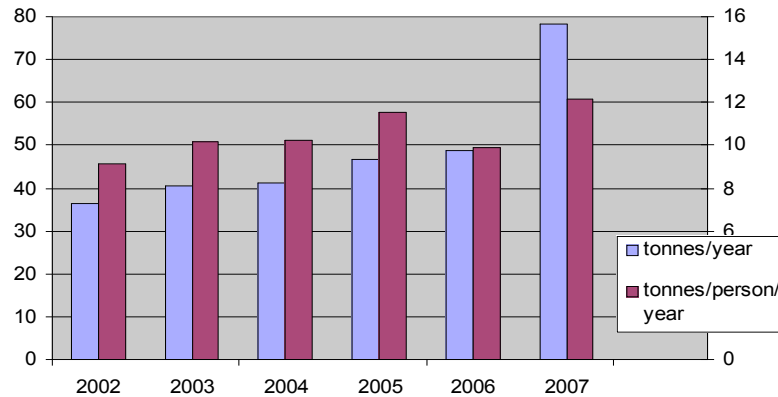
### CO<sub>2</sub> / year - Gas



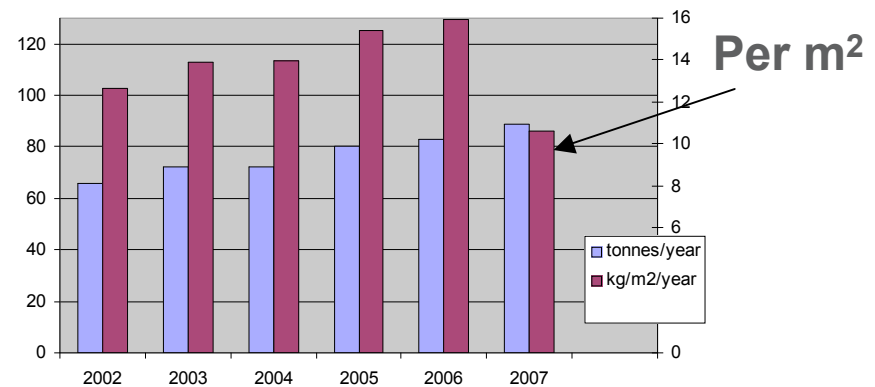
### CO<sub>2</sub> / year - Gas and Electricity



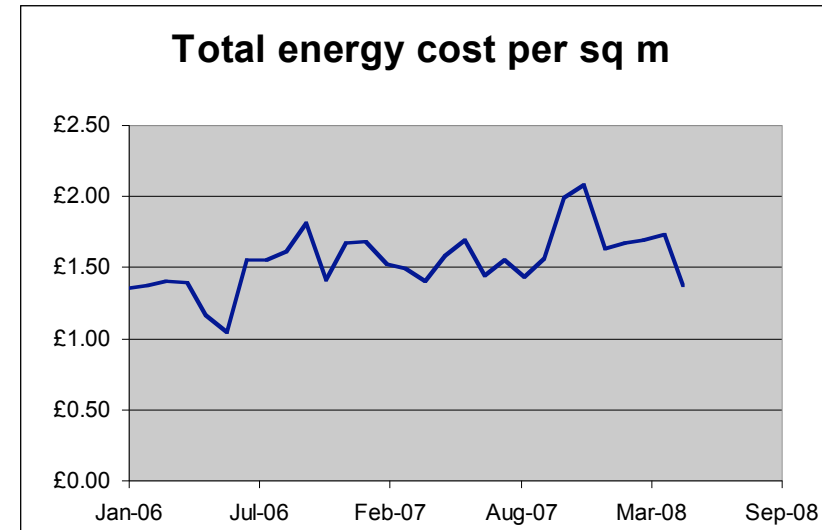
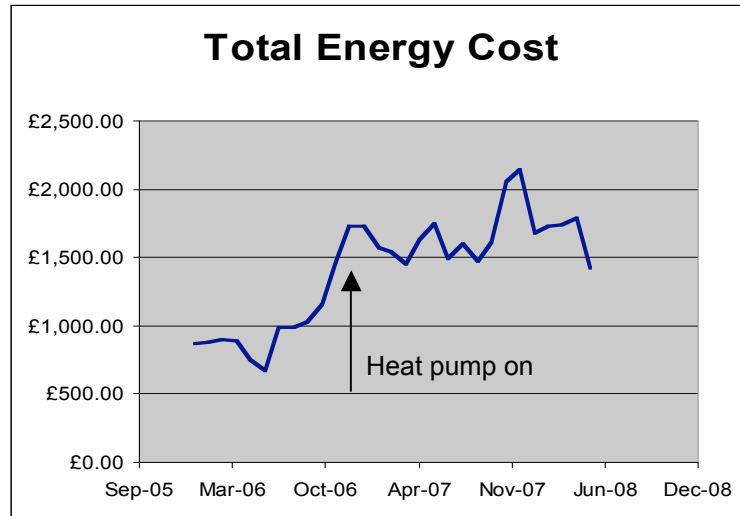
### CO<sub>2</sub> / year - Electricity



### CO<sub>2</sub> / year - Gas & Electricity



# Cost Impacts



## Pay-back?

- negligible financial pay back.
- However if we had previously been heating building with direct electricity or heating oil Saving ~£2,250 per month
- Pay-back would be a few years

# Economics?



- Under floor Heating £10K
- Heat Pump £15K
- Wells £15K
- Other payback factors
  - Mains

# Considerations



- Space planning
- Monitoring systems
- Reversible for a small incremental investment
- Open under-floor loops may have been used in a water tank.



# Conclusions



- We have been able to more or less maintain our building carbon footprint despite 60% increase in space
- Saved 15-20 tonnes of CO<sub>2</sub> per year
- Sensitive to what the true CO<sub>2</sub> equivalence of Scottish electricity might be
- Further reductions in CO<sub>2</sub> by purchasing green power.
- If mains gas is available, the cost-benefit is negligible, if not, pay-back would be easily achievable
- Heat recycling and reversible ground/air source systems should be considered if you have heavy-duty IT systems