

Case Study A: - Fountain House, Spencer Road, Derry, N.Ireland.



M&E Consultants: - Delap & Waller

Developer/Client: - McCormick Properties

Architects, Consulting Structural & Civil Engineers: - WDR & RT Taggart

Building Contractor: - Liam O'Neill

Project Summary:-

Building Size: - 1024.21m²

Heat Pumps (B0/W35) :-

- DS5062.3:- 45.6kW
- DS5030.3:- 23.5kW

Heat Source: - Bore Holes
7 x 140m Probes

Number of Floors: - Five Floors including Basement (Basement Services Only)

Building Function: -

2 Commercial Units Ground Floor (Cafe and O2 retail outlet)
6 Office Units on First, Second and Third Floors (

Project Rationale:-

- Perimeter of site essentially the perimeter of the building

- Conventional System reduces available commercial floor space available.
- One Entity/System for Heating Cooling and Hot Water
- Carbon Tax
- Enhanced Capital Allowance Scheme Incentive (DEFRA)
- Reduced Life Cycle Costs
- Energy can be sold as part of a rental package at a premium



Geothermal System Functions:-

- Domestic Hot Water
- Heating via Air Handling Unit
- Heating via Underfloor Heating
- Natural Cooling via Floors
- Natural Cooling Via Underfloor Heating Distribution Pipe work
- Active Cooling via heat pump to Air Handling Unit

Current Status: - Commissioned

Completion Date: -March 2007

Awards: - Royal Institute of Chartered Surveyors Sustainability Award 2008:-

Installation:-

Geothermal system design approved by client, Architect and M+E Consultant.

Test Bore Hole and Thermal Response Test:-

Although the design in principle was adopted by the client and M+E consultant in order to verify that a suitable heating/cooling source existed a test bore hole was drilled and a Thermal Response Test (TRT) performed on it. The test provided us with a figure for thermal conductivity. Using Earth Energy Designer (EED) the bore hole exchanger (BHE) array was derived specifically for this project.

This test verified that our design would function as a suitable heat source/sink existed.



Project induction meeting took place to present the project and introduce all involved. Project Program issued.

Drilling was a critical task in the program and the drilling of the bore holes had to be completed so that the installation of the foundations could commence.

Builder Clears site and preliminary positions of the bore holes were marked onsite

Bore Hole drilling contractor proceeded with his contract to drill the 7 x140m bore holes as marked onsite.

Nutherm apply a pressure test to each probe as it is completed. Gauges on each bore were checked each day and logged.

Probes inserted pressure tested and grouted. Protective Aluminium sleeve Put around bore holes liner so that position of the holes are obvious to plant operators working in the foundations.

Structural concrete Pads and Ring Beams installed.

Individually and as required by the builder the Bore hole Flow and Return pipework were brought back to their final position in the plant room. Pressure test re-applied and logged.

Building Structure Formed.

Electrical First fix completed by electrician and Electrical works relating to the heating system checked by Geothermal Installation engineer.

Building Plastered.

First Fix plumbing completed and Ventilation ductwork installed

60mm of High density foil back insulation installed on the floor. 25mm foil back edge insulation installed on all internal and external walls. Acts as insulator and expansion joint.

UFH system installed on 60mm of foil back polyurethelene insulation. Pressure test applied and signed of.

80mm of finish Floor Concrete screed installed.

Second fix mechanical installation completed i.e. installation of heat Pump, AHU and Domestic Hot Water Production system, filling of system (UFH and Bore Holes)

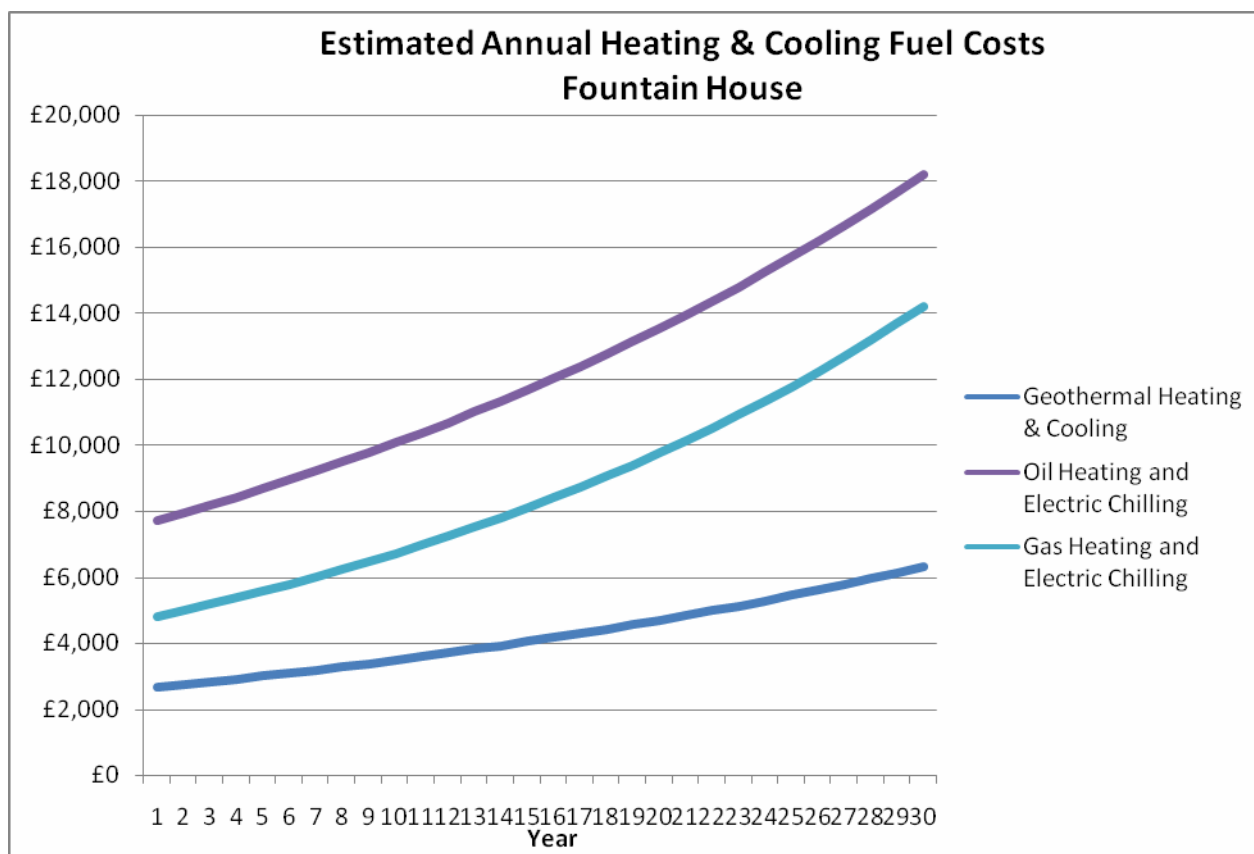
Second fix Electrical works completed

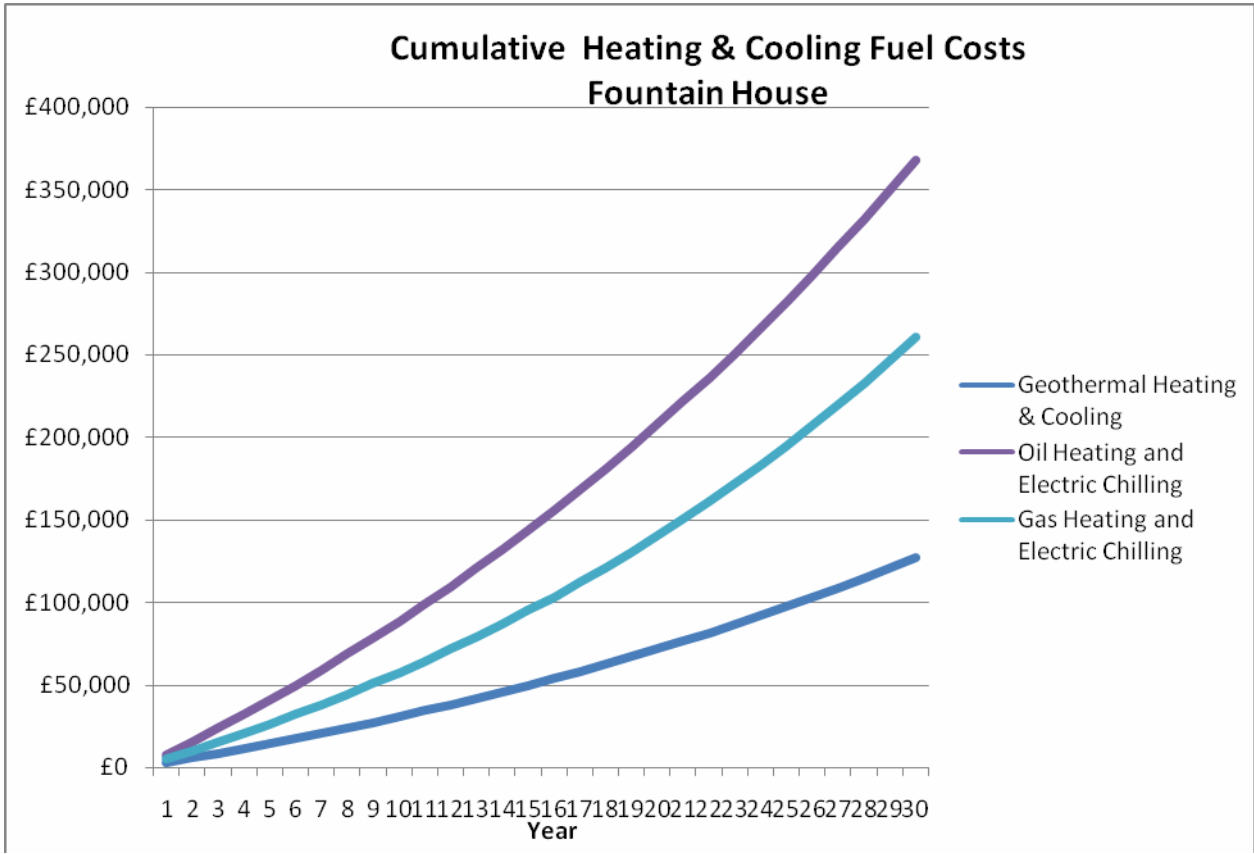
Heat Pump system started and commissioned.

Installation Difficulties:-

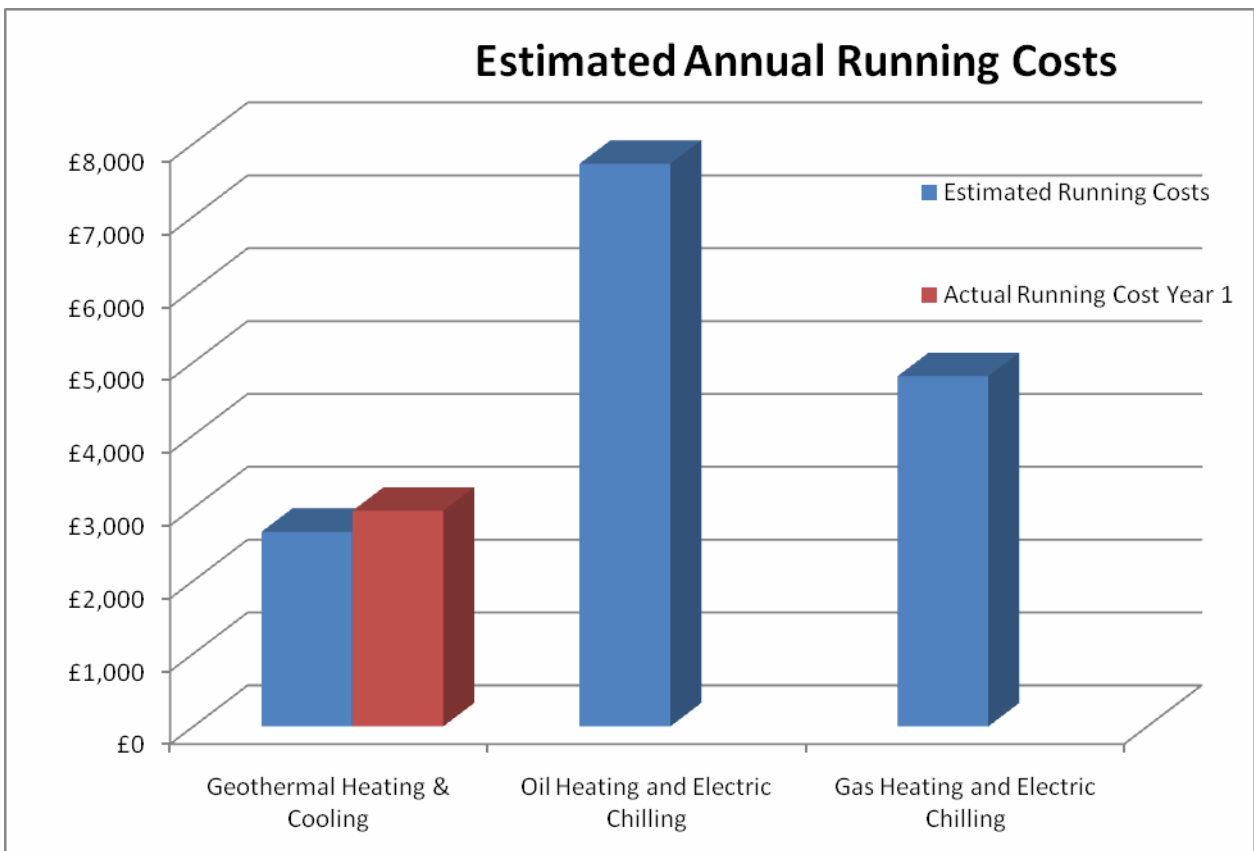
Logistics of drilling 7 x140m Bore Holes within the perimeter of building. Logistics of working around the structural elements in the foundation to bring Bore Hole pipe work back to plant room(14 x 40mm HDPE pipes). Design and Installation team on this project communicated well to ensure that he whole project ran seamlessly without any major issues.

Projected Running Costs and Savings:-

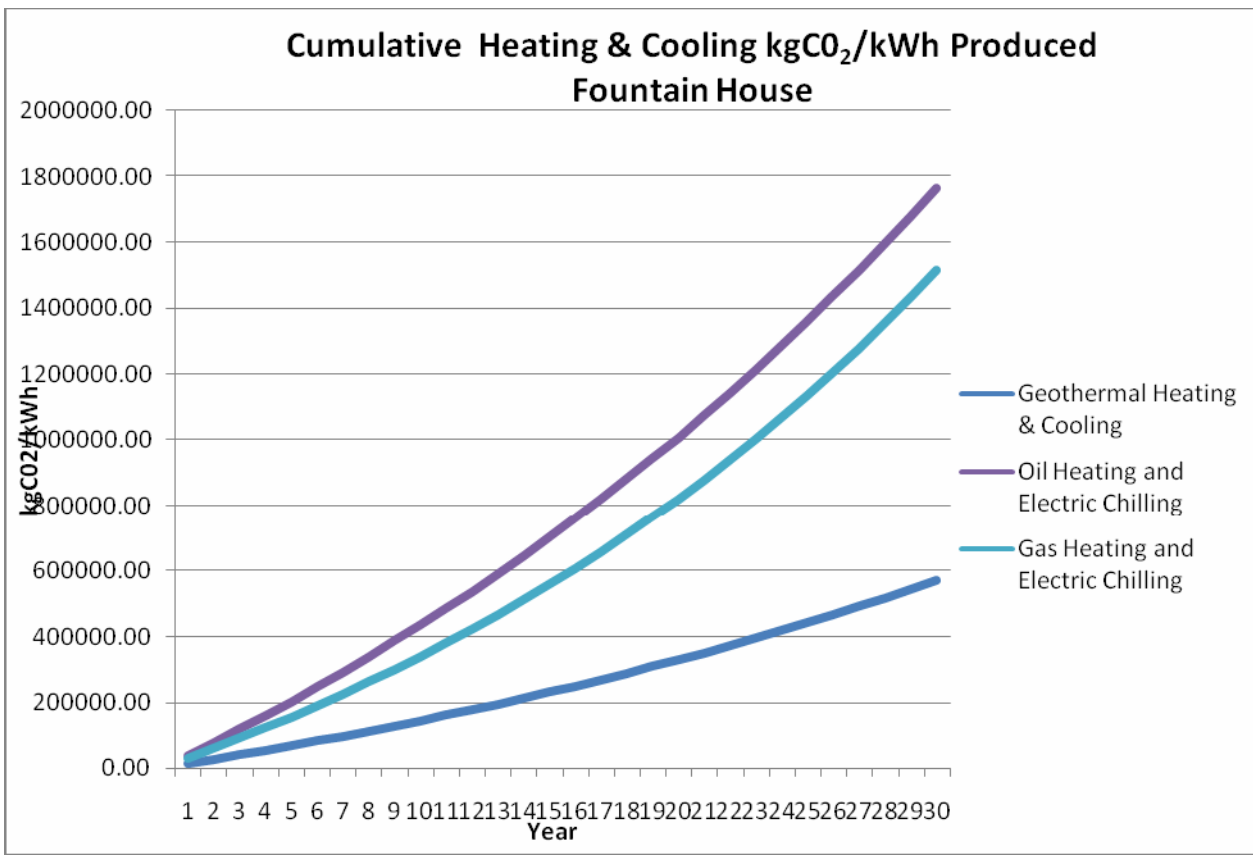




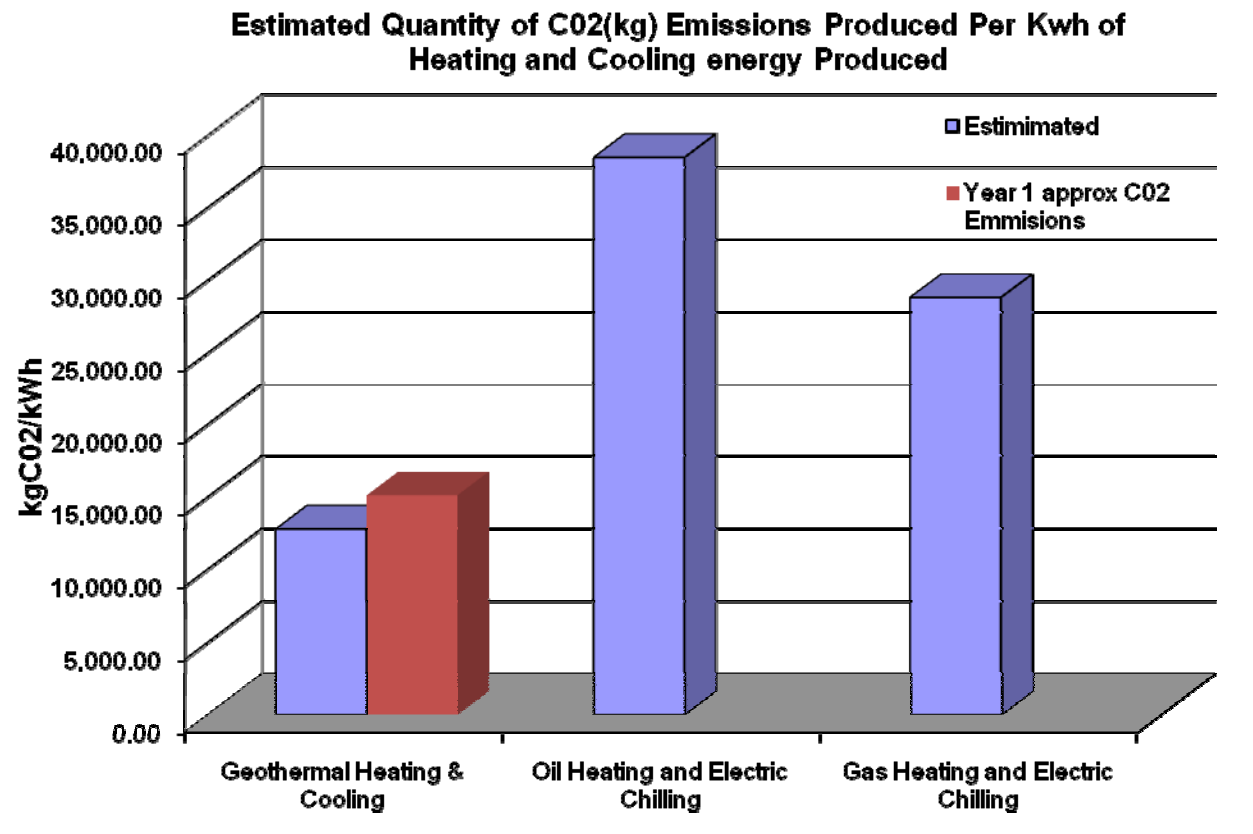
Actual Running Costs:-



Projected CO₂ Emissions Savings:-



Actual CO₂ Emissions Savings:-



Clients Opinion of System:-

Happy Due to the fact that Running Costs are very low.

Will use this system in future commercial buildings they are developing

Proud of the building and can now market themselves as true sustainable building provider.

No oil or Gas onsite

Building remains at the right temperature constantly

Client happy with running costs. Tenants happy with comfort provided by system. Overall very happy with System