



Mixed demand for heating and cooling gives outstanding efficiency performance

When civil engineering giant, VolkerFitzpatrick created its state-of-the-art headquarters in Hoddesdon, Hertfordshire, it took the opportunity to make a bold sustainability statement.

The stunning new HQ replaces outdated facilities and has been designed to enhance the company's corporate identity *and* its sustainable credentials.

The project forms part of the regeneration of a brownfield plant compound. The specification was for a realistic and practical design, with low energy in both construction and use, in order to reduce carbon emissions.





The City Multi WR2 ground source heat pump is ideal for locations with a large area of land.



The entire system is monitored with Mitsubishi Electric's Maxi M2M-IP/50 controller, offering total control of efficiency and performance.

The company needed a sustainable, low carbon, solution to heating and cooling the building and tasked Cool Planet, part of British Gas, with providing the answer.

In conjunction with VolkerFitzpatrick's Building Division, who carried out the design and build of the new office, Cool Planet drew up plans for the installation of a closed loop geothermal system, taking advantage of the large amount of land available around the office site.

The new system utilises a ground array of 32 boreholes 5.5 metres apart and 100 metres deep. Mitsubishi Electric's City Multi WR2 ground source heat pump condensing units now provide heating and cooling for the building, saving around 23 tonnes of carbon dioxide a year.

"The first stage was a feasibility study to determine the scale of the ground works installation required, based on indicative peak heating and cooling loads," explained Cool Planet's Managing Director, Steve Grey.

"We considered both trench and vertical closed loop boreholes, but selected vertical boreholes as they could be confined to particular areas of the site, and, in comparison to their trench counterparts, impinged less upon the construction works."

To meet the energy efficient criteria for the building, the WR2 heat recovery system was installed together with a number of other technologies. These include PQFY heat pump boilers, solar thermal hot water preheating, an Ecodan® air source heat pump, ground air technology, low energy light fittings, daylight saving lighting controls and photovoltaics.



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The ground source heat pump system connects to PQFY heat pump boilers to maximise the efficiency of the system.

Installation Summary

City Multi WR2 GSHP

COP range from 5.54 to 7.14

46% reduction in running costs

53% reduction in CO₂ emissions

Savings of 23 tonnes of CO₂ per year*

**when compared to alternative technologies*

The system has been monitored for the past seven months during which time Mitsubishi Electric demonstrated an impressive average co-efficient of performance (COP*) of 6.27 for the ground source heat pump air conditioning system. This reaches an impressive COP of 7.14 when the efficiency is maximised through heat recovery during the months of mixed demand for heating and cooling.

“It’s clear from these results that the system is performing much better than predicted at design stage, highlighting the efficiency of the ground source units. We anticipated monthly COP’s of between 4.0 and 6.0, but the resulting 5.54 and 7.14 are a significant improvement and clearly demonstrate the advantages of a heat recovery system.”

“We compared the results with alternative technologies, contrasting the expected efficiencies, and estimated a 46% reduction in running costs compared to a chiller and gas boiler system,” said Mr Grey. “Over the last 7 months the cost per m² of heating and cooling VolkerFitzpatrick’s new building has been just £1.29/m², with a 53% reduction in CO₂ emissions.”

For further details on the comprehensive design and installation services provided by Cool Planet, visit www.cool-planet.co.uk

For further information on the City Multi WR2 ground source system visit www.airconditioning.mitsubishielectric.co.uk

*COP is an efficiency rating for heat pumps.



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