

Executive Summary

" This energy saving case study demonstrates that in a one (1) year period following the installation of the Hydromx energy saving solution:

- **30%** heat energy saving was achieved;
- A saving of 90,596 kWh energy was attained;
- The emission of 18.3 tonnes CO₂ was prevented; the equivalent to the CO₂ absorbed by over 300 trees, enough to cover 4 football pitches;
- FGR benefitted from an annual saving of £3,570.

Forest Green Rovers is the most sustainable football club in the UK having achieved the Eco-Management and Audit Scheme (EMAS) gold standard for environmental performance in 2013; a standard no other football club in the UK has achieved.



The philosophy of the club is to demonstrate a truly eco friendly commitment in every aspect of the running of the club and become the leading football club in the world for sustainability.

Hence, FGR has introduced eco initiatives such as, water collection to make it independent of mains water and help create an organic pitch free of pesticides and man-made chemicals, the UK's first electric 'mowbot' to mow the pitch, use of solar and wind-generated electricity to power the stadium, the planting of wild flowers at the ground to attract wildlife and taking animal products off the club menus.



Forest Green Rovers – Space Heating

The club is owned by Dale Vince, the founder of Ecotricity the world's first Green Electricity Company who provide renewable, green electricity from wind power. At the beginning of 2013 the board started looking at the possibility of using the Hydromx® organic energy saving solution in the club's heating system with a view to furthering their already established ecologically sustainable status and in March 2013 the Hydromx trial began.

" We pride ourselves at Forest Green Rovers for being the most sustainable football club in the UK, so we are always looking for innovative new ways to save energy and reduce our carbon emissions; Hydromx has enabled us to do just that. In the year since we installed Hydromx we have seen our space heating costs reduced by 30% and our carbon emissions reduced by 18 tonnes of CO₂. It's not hard to imagine the contribution this technology could make towards the energy savings and reduction of carbon emissions across the UK in domestic and commercial buildings. Thank you for bringing this revolutionary technology to us." - Trevor Saunders, Operations Director FGRFC & Head of Special Projects Ecotricity.

The Hydromx energy saving solution also fits perfectly with the value and objectives of the [Sustainability in Sport foundation](#), co-founded by Dale Vince and footballer Gary Neville, which seeks to:

- establish eco-standards for all activities relating to the operation of sports clubs;
- use the power of sport to spread information about environmental issues and the need for sustainability to the widest possible audience;
- share knowledge, information and learning - to promote sustainability in sport;
- showcase examples and promote best eco practice;
- engage with governing bodies and clubs at all levels;
- work with technology providers to develop and demonstrate technology that will improve the sustainability of sport.



The Property



The club's complex comprises offices, function/meeting rooms and leisure activities. The property's total floor space is 2,900m² and consists of a main building over three floors and a small single story building. The main building is heated by two 70kW Potterton Compact Plus boilers, and the small building is heated by a Glow Worm 15hxi boiler. In total 1200 litres of water circulate throughout 73 radiators.

Time Scale

In March 2013 the complete heating system was drained and replaced with a 50/50% Water:Hydromx solution (600 litres water and 600 litres of Hydromx Energy Saving Solution). This study of energy and carbon emission savings covers the period from March 2013 to March 2014 compared to a baseline of energy used throughout 2012, adjusting for weather differences.

How the data was analysed

The method used to determine the energy savings is Heating Degree Days Analysis¹ (HDD), a methodology recommended by the Carbon trust and the Chartered Institute of Building Services Engineers.

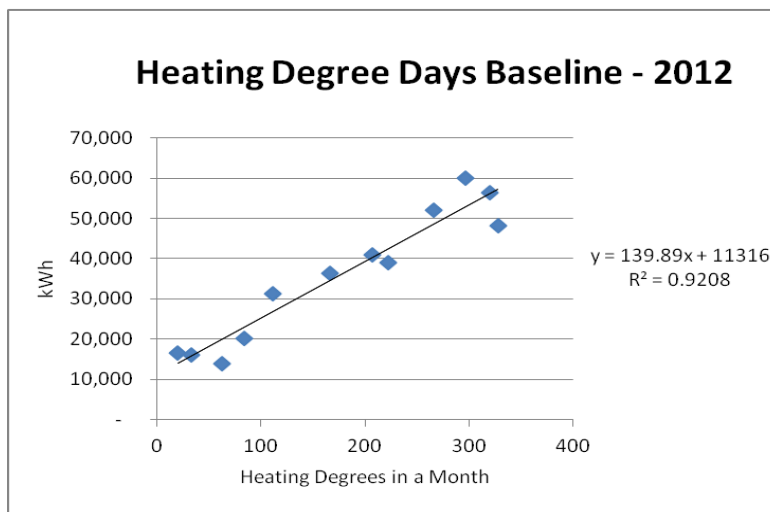


Chart 1.

In Chart 1, monthly gas consumption is plotted against the number of kWh used per month throughout 2012 (obtained from historical gas bills). This shows that 11,316 kWh per month was used when no heating was needed, and that every degree of heating required 139.89 kWh. This provides a baseline of gas energy use when water is used as the heat transfer fluid in the heating system.

The HDD data for each day in 2013 was obtained from the local weather station and using 139.89 kWh per degree of heating required, a prediction of the gas usage was made on a daily basis. For example, if the day temperature was 7 °C this was subtracted from the standard 15.5 °C to give 8.5 heating degrees. This predicted a requirement of 8.5 x 139.89 kWh = 1,189 kWh to heat the building in that day.

¹ <http://www.carbontrust.com/resources/guides/energy-efficiency/degree-days>

Results

As can be seen in Chart 2, savings in energy consumption are significant and sustained during the periods of heating demand.

During the summer months when the heating was turned off gas consumption has continued for cooking and the production of hot water. In this time period the trend levels off as consumption matches the summer usage in 2012. Once the boilers are turned back on for the winter the energy saving trend continues.

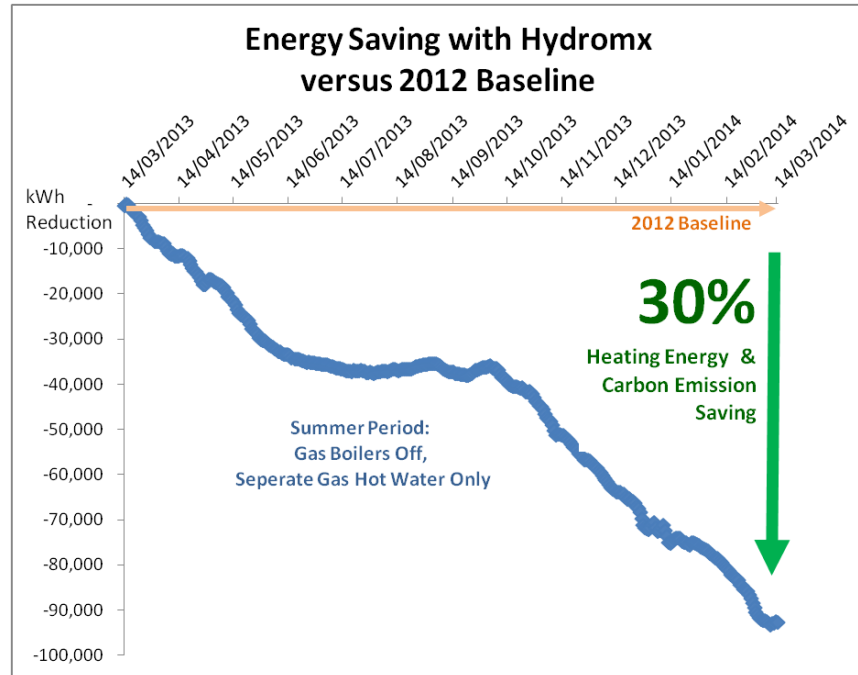


Chart 2.

What does this mean?

In real terms the analysis shows there has been a sustainable trend of **30%** space heating energy savings since the introduction of Hydromx. The property uses gas for separate hot water heating and cooking at 27% of the overall usage, so that the energy savings are 22% (net) of the total gas bill. The HDD analysis predicted the property would require 413,266 kWh. In fact the property only used 322,670 kWh, a saving of 90,596kWh which equates to **£3,569 per year, 18.3 tonnes CO₂ the equivalent absorbed by 306 trees**, or as Trevor Saunders says, "in football terms over 4 football pitches of trees".

The Hydromx® brand, logo and other Intellectual Property Rights are owned by HYDROMX INTERNATIONAL KIMYA SAN. ve TiC. A.S. Patent and trademark information can be found in full at www.hydromx.com.

