



New Energy at Arsenal's Historical Football Stadium

Case Story - Highbury, England

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The last game has been played at Arsenal's famous Highbury Stadium in London. In a unique project this historical place is now being turned into 719 apartments supplied with an effective energy system.

For almost a hundred years crowds have been cheering and yelling from the stands at the Arsenal players in their struggle to beat the guest teams here at Highbury Stadium in north London. This is now history and the last game has been played. However, Highbury's listed art deco East and West stands have been spared the bulldozer and are instead used to form the centrepiece of a unique development. Two new "stands" are added, so that the former pitch is still surrounded by stands on all sides. At the moment machines and workers are working on the former pitch to make it a garden square.

All four stands are being turned into studio, one, two and three bedroom

apartments within four 7-storey glass-fronted blocks and sold to whoever likes the idea of living at the former stadium of one of England's and Europe's top football clubs. The 719 flats will be supplied by heating and water in a most energy efficient way. Each of the flats is equipped with a prefabricated substation from Danfoss and connected to a central gas fired boiler, which is providing the heat. The energy system is modified to Highbury and configured to the specific requirements of the project by the company SAV Modules, a Danfoss partner which is specialised in the British energy system market.

Fits to Highbury

Project manager Ian Stripp from SAV Modules is taking us on a tour at the stadium. "We establish a micro DH network system, which fits perfectly to Highbury, since it is established at the same time as the flats are being build", he says. The substations were all prefabricated by Danfoss in Denmark, but were then modified to fit to the English system. SAV Modules made the

specific design together with the consultancy engineering company Crofton Design and the contractor N.G. Baileys. According to Ian Stripp there were no special challenges except the size of the project. SAV Modules mostly work on projects in England dealing with the installation of DH systems in buildings with 100-300 flats, so this 700-flats project belongs to the bigger ones.

District Heating is still new in the UK

Project engineer Simon Angold from the contractor N.G. Bailey, who is joining us on the tour, has brought us into one of the apartments, which is almost ready for the new owners to move into. The two-room apartment has got its own 41 KW unit taking care of heating and hot water. It is supplied with an in-built energy meter that monitors the consumption of heat and water, providing accurate data for billing and faultfinding. The heat company staff can call the meters through an integral radio link, which enables remote data collection via a

hand-held blue tooth receiver, so they don't need ever to enter the apartment to read it.

"One reason why this substation is more energy efficient than a traditional boiler, which would be the alternative, is that it is without a hot water cylinder. Here you only have hot water on demand and don't store any water", Simon Angold explains. Indirect versions feature a second heat exchange module, which acts as an interface between the hot water main supply from the boiler and the circuit within the dwelling. In this way heat energy can be taken efficiently from the central boiler, while maintaining a "sealed system" condition for the individual apartment.

Moreover the primary flow of water from the plant is around 70 C, but in the summertime the return temperature from the flat goes down to 25 C. "That's a big advantage. This low temperature makes it possible to connect solar panels to the system, which can then bring the temperature

up again to around 55 C. The panels are placed on the rooftop of one of the stands. All this makes the energy bill for the customer relatively low compared to those, who have a traditional hot water cylinder", Ian Stripp says. Its an extra plus that the substation takes less space than an old boiler system and since the apartment is equipped with under floor heating there are no need for radiators and pipes either.

No CHP - yet!

One of the goals of the London Climate Change Agency, which was set up in 2006 to introduce measures to reduce CO2 emissions in London, is to take 25% of electricity production out of the grid. So why isn't a project like this DH networks system connected to a Combined Heat and Power plant (CHP)? Ian Mills, experienced PR person of SAV Modules, who is following the Highbury project, explains: "I am convinced, that a project like this could be connected to a CHP in the future instead of a gas fired boiler station like now. It is much

more energy efficient. But DH is rather new in England and we are not yet quite ready for this. Until recently we had a separate boiler and a hot water cylinder in each flat. So a separate substation like here at Highbury is a huge step forward. But there is no doubt that micro CHP's are on their way. Gas boilers give many challenges, like gas supply and services issues, whereas this is simply a plug and play solution, which need almost no maintenance".

SAV Modules has already developed a system that combines CHP units and heat pumps. These technologies offer significant energy and fuel cost savings compared to conventional stand alone oil or gas fired boiler plants.

It is therefore a matter of time before SAV connects new Danfoss substations to micro CHP's and in this way makes the energy system even more effective. The winner of this will be London's CO₂ emission account - and most of all the climate, according to Ian Mills. The project at this beautiful now former Highbury Stadium is just the beginning.



Project manager of SAV Modules Ian Stripp and PR person Ian Mills in front of a model of the new Highbury. They agree, that the project is being done in respect to the former stadiums football traditions.
Photo: Anna Kari ©



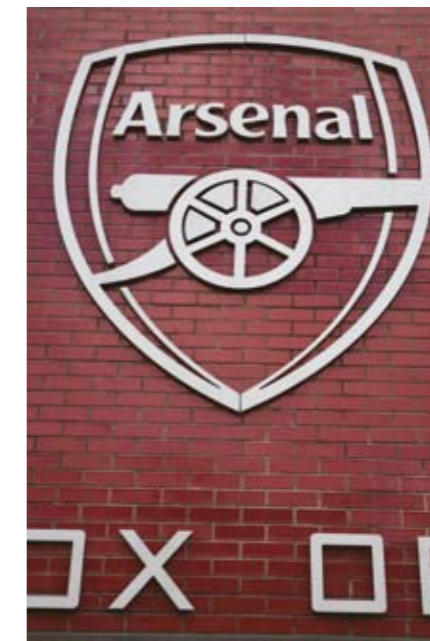
Project manager Ian Stripp from SAV Modules is controlling a Danfoss substation in a flat in the former art deco West stand at Highbury Stadium.
Photo: Anna Kari ©



Project engineer Simon Angold from the constructor N.G. Baileys is satisfied with the fact that the new energy effective system at Highbury demands much less space than a traditional boiler.
Photo: Anna Kari ©



The installed Danfoss substations are all equipped with a heat meter, type Sonometer® 1000 enabling individual billing according to actual consumption.
Photo: Anna Kari ©



The world famous football club FC. Arsenal is now playing at the new and top modern Emirates Stadium just 500 meters away from the former Highbury Stadium.
Photo: Anna Kari ©

Facts on installed Danfoss substations:

Pressure Level: PN10
Differential pressure: 0,7bar
Design temperatures for heating: 70/26C-35/25C
Design temperatures for DHW: 70/28C-60/10C

- 4 sizes of substations:
- Akva Lux VX (5 kW heating and 42 kW DHW)
 - Akva Lux VX (5 kW heating and 53 kW DHW)
 - Akva Lux VX (5 kW heating and 60 kW DHW)
 - Termix VVX Compact 20 (15 kW heating and 100 kW DHW)

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