Largest air-source heat pump to relieve UK's energy poverty

Star Renewable Energy's Neatpump is creating a cleaner and more affordable source of electricity for the UK's residential sector.

UK’s Star Renewable Energy has recently launched its pioneering industrial air source heat pump, an innovation that emerged from the joint partnership of forward-thinking GHA, WSP Parsons Brinkerhoff, Scottish Gas and Star Refrigeration’s renewable arm. Neatpump is to bring a cleaner more affordable and energy efficient future, according to Dave Pearson, Director of Star Renewable Energy.

Designed in conjunction with Glasgow Housing Association (GHA), WSP Parsons Brinkerhoff and Scottish Gas, the industrial scale 700kW low carbon district heating solution is 8 metres long and hits temperatures over 60 degrees Celsius. The air source heat pump provides three units of heat for each unit of energy consumed.

Tackling Scotland's fuel poverty

As the grid decarbonises, the high temperature air source heat pump represents an opportunity to effectively heat retrofit social housing buildings, new buildings and commercial property alike - all while simultaneously lowering expenditure and reducing carbon footprints by over 53%.

Air source heat pumps have until now been typically up to 60kW and used in single properties. Large scale heat pumps are able to provide even more benefits as the higher temperatures allow the continued use of existing water circuits and radiators. Their ability to use existing infrastructure and avoid costly new investment is shifting public opinion towards the use of big industrial heat pumps for residential buildings, with government support incentivising its use to further reduce energy costs.
The environmental and economic viability of air source heat pumps, particularly in comparison to conventional HVAC installations, has led to the air source heat pumps market experiencing consistent demand. Air source heat pumps cause less harmful emissions than traditional air conditioning units and are also much more economical to run.

We wrote recently about the UK's Smart Systems and Heat programme (SSH) which is developing products and services to decarbonize UK homes. The ultimate goal of the SSH programme is to develop new products, services and business models that can be introduced for heat decarbonisation - bearing in mind that these will need to be implemented at a rate of approximately 20,000 homes per week to convert all 26 million homes by 2050. Currently heating in the UK is largely gas-based and there is a need to move to a system with near zero emissions that is both affordable and secure, whilst also providing the necessary degree of warmth and comfort for consumers, according to Jeff Douglas, strategy manager of the Smart Systems and Heat (SSH) programme at the Energy Systems Catapult. [Decarbonising homes-the UK challenge.]

Other benefits of air-source heat pumps over conventional boilers include no combustion or explosive gases within the building, no need for flues or ventilation, no local pollution (although noise from the external unit fan may be a problem), long life expectancy, and low maintenance costs.

The cost benefits lead to major savings for the consumer in the long term due to the lower amount of electricity consumed and the environmental incentives on offer in several countries around the world. This is expected to drive the global air source heat pumps in the coming years, says Transparency Market Research in its "Air Source Heat Pumps Market - Global Industry Analysis, Size, Share, Growth, Trends and Forecast 2015 - 2023" report.

In Europe, there are almost 8.4 million operational heat pumps. These are providing 147 TWh of useful energy, reducing the final energy demand by 120 TWh and save 24 Mt of CO2 emissions, according to the European Heat Pump Association. Not surprisingly, the market is growing by around 900 000 units per year. If fully used, the heat pump stock provides a demand response potential of 296 GWh for around 2 hours.

Among sustainable HVAC systems, ground source heat pumps are the main competitor of air source heat pump systems. Compared to ground source heat pumps, though, air source heat pumps require much less space and expenses, and also do not require the construction of specialized structures such as ground loop installations. This has made air source heat pumps the preferred choice among such devices, thus driving the global air source heat pumps market.

**Innovation and government support are key**

While the heat pump is one of many solutions to energy savings, it has to be designed, installed and commissioned correctly. Once this is done, it is capable of creating fewer carbon emissions than the gas boiler system and that, as far as UK and European legislations are concerned, is the key guide and marker, says Jonathan Prescott, Regional Sales Manager, Renewable Heating, Mitsubishi Electric, who spoke recently at Low Carbon Scotland. [Consider Variables Before Installing Heat Pumps and District Heating Systems.]