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## Air Source Heat Pumps

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**The DEI's social science team examines the installation and operation of Air Source Heat Pumps (ASHPs) to understand how these affect current electricity demand and the potential flexibility of demand going forward. Initial observations are based on a series of load profiles collated from on-site metered electricity consumption data, and face to face interviews with householders enrolled in the Customer-Led Network Revolution project. This Briefing Note provides a high level summary of key messages from the findings on installation and use of ASHPs in the residential sector from summer 2012 to winter 2013.**

This note draws on interviews and home energy tours conducted with 18 participants from the 322 domestic ASHP customers involved in the trial (Test Cell 3), each of which has a smart meter installed.

### The adoption and use of ASHPs

Discussions with participants reveal the importance of the legacy of existing heating systems in shaping the ways in which they relate to the introduction of the ASHP. Householders accustomed to electric night storage heating on an Economy 7 tariff and an immersion heater were able to transition to the ASHP more easily than those who previously relied on heating and hot

water supplied by a gas boiler, as familiarity with the Economy 7 tariff enabled understanding of operation, as well as being perceived as offering a better service.

Users, and their expectations and practices, are critical in shaping how the system is operated.

### Engagement with ASHPs

For some householders, existing daily routines override the system imperatives, with users active in re-shaping the technology to their needs. However, the research indicates that for many of the householders interviewed, the demands of participating in the provision of energy services seemed too great. Some had tried and failed to ensure that the ASHP provided the kinds of energy services they required. Several had concerns about whether running the system all day, which technically provides the most efficient service, would in fact incur additional costs (see also Owen et al. 2012). Others sought to distance themselves from the technology, which is regarded as complicated to operate, fearing that their actions may lead to the breakdown of the system. In these cases, co-provision of energy services is not something celebrated or enjoyed, but rather the emergence of new consumer roles

is resisted, ignored or feared. This may very well reflect the social and demographic make-up of the sample of participants, and their position as tenants in social housing. At the same time, they also reflect the process of installation and instruction that participants experienced. Many participants found the instructions provided on how to operate the system difficult to follow. However, at the time of the interviews, most householders had reached a point where they were able to operate the system at a basic level (using the up and down arrows on the thermostat), but stuck to the programme set initially on installation. A few householders had changed the programme settings to suit their own preferences or understandings, however, even the more competent had some difficulty with the technical information supplied. Others found they had little understanding of how the system operated and what to do, particularly outside of normal operating conditions. Data from interviews suggests that how installation and instruction are undertaken is critical in shaping the initial reception of and the extent to which users engage with the ASHP.

#### **Changes in heating practices: mixed outcomes**

Once in place, optimising the performance of the ASHP requires users to adopt different patterns of energy use based on its continual, low level provision (see Cantor, 2011) The data suggests that householders shifting from storage heaters (with or without supplementary heating) and electric hot water systems make adjustments that sometimes result in a lowered awareness of their energy use and lead to high rates

of electricity consumption. The potential for ASHP to actually increase energy consumption depends on context, installation process and demographic factors, as well as variations in dwellings and the purposes they serve. However, no further information is available as analysis of electricity consumption data before and after installation has not yet been carried out.

Some changes to the use of supplementary heating were observed following installation of heat pumps in dwellings previously fitted with electric night storage heating, with some householders forsaking supplementary heating. However, this is not universal as others prove more reluctant to depend solely on ASHP due to apprehension about the new technology.

Practices such as bathing, showering and washing up remained largely unchanged – mainly because the ASHP meets users' expectations for hot water and exerts no pressure to adapt established routines.

#### **References:**

- Cantor J. (2011) Air source heat pumps – friend or foe? A review of current technology and its viability. <http://www.aecb.net/publications/air-source-heat-pumps-friend-or-foe> (Accessed 15 May 2013).
- Owen A., Mitchell G. and Unsworth R. (2012) Reducing carbon, tackling fuel poverty: adoption and performance of air-source heat pumps in East Yorkshire, UK Local Environment.