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Briefing: **In-Situ Heat Pump Performance 2**

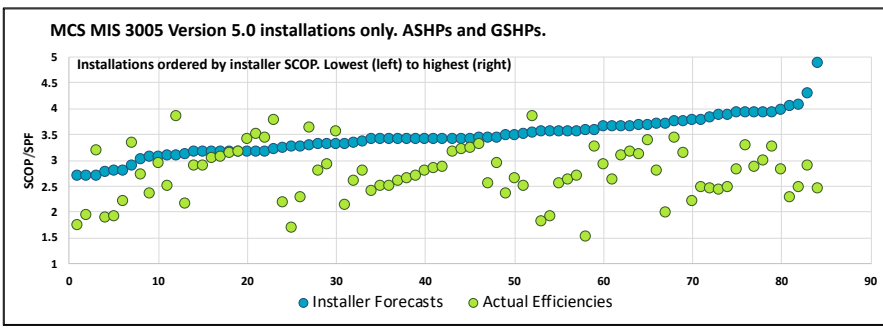
Correlation and deviation from the mean – March 2022

Introduction: in-situ heat pump efficiency

Our first briefing described our research project based on an Ofgem dataset of more than 2,000 installed heat pumps that we used to calculate their actual in-situ performance. ***Breifing 1*** also contrasted the actual calculated efficiencies with the installer efficiency forecasts that were also included in the dataset. This briefing provides more detail on that analysis, with a focus on *the most recent* installs included in the dataset.

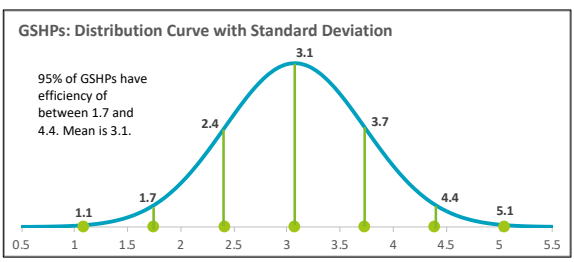
We have also drawn up distrubution curves to provide some necessary context to recent research that has focused on the financial outcomes of domestic heat pump installation.

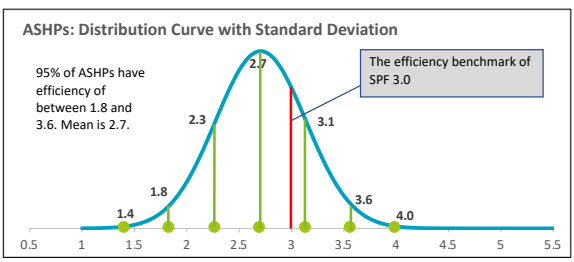
Correlation: forecasts versus calculated results



This chart provides the efficiency results for the most recent cohort of installations included in our analysis: 84 ASHP and GSHP installs carried out after October 2017 under **Version 5** of the MCS Installation Standard for Heat Pumps (**MIS 3005**). The blue markers indicate the installer forecasts, and the corresponding green markers provide the calculated efficiencies for each installation. No statistical correlation exists between installer forecasts and outcome and similar results were found for all the data samples. The gap is widest for installations with SCOPs forecast to be 3.5 or higher.

Standard deviation from the mean





The distribution curves (left) indicate the spread of calculated efficiencies for 88 Ground Source and 510 Air Source systems (from the sample of recent installs). ASHP installations have an average SPF of 2.7 and GSHP an average of 3.1. The vertical lines indicate the standard deviations from the mean showing GSHP systems have a much wider spread, with significantly more installs performing at high efficiencies.

Using standard deviation, we can show that 95% of the GSHP installs have an SPF of between 1.7 and 4.4. 95% of ASHP installs have an SPF of between 1.8 and 3.6.

What are the likely financial outcomes?

Our full report (*see right*) includes an examination of the financial case for heat pump installation, and that analysis will be updated to incorporate recent energy price volatility and price caps. In the meantime, the Regulatory Assistance Project (RAP) has published a useful paper showing that, as gas prices are increasing faster than electricity prices, heat pump running costs are more competitive. RAP concludes that where heat pump systems are 'designed and installed well,' they can be cheaper to run than gas boilers. Using the recently announced domestic energy price caps, the RAP paper indicates that heat pumps become cheaper to run than gas boilers when the SPF is about 3.0.

RAP concludes that efficiencies of 3.0 are 'easily achieved' and base that conclusion on the Fraunhofer field trials based in Germany. What is missing, however, is the UK context. UK field trials have found that most heat pumps do not achieve SPF 3.0. While the Ofgem data shows that the average efficiency of GSHP systems is about 3.0, the average for ASHP systems is 2.7. Our full research paper explores why heat pump efficiencies in the UK tend to be lower than those reported in European research. We will cover these issues in more detail in further briefings.

rb&m's research method is explained in our study text (link below). That report includes commentary on efficiency boundaries. Only the most recent installations were included in the analysis, and only those where at least one year of contiguous clean data was available.

rb&m is engaged with a range of key stakeholders to devise better ways to provide consumers with **evidence-based** information about the energy transition. For more information contact Colin Meek: colin@r-b-m.com

The study text is available from rb&m: https://r-b-m.com/wp-content/uploads/2022/03/Performance-Data-Research-Summary-rbm-.pdf