HEAT PUMP READY

Department for Energy Security & Net Zero

Part of the Net Zero Innovation Portfolio

Improving the installer journey from survey and design to aftercare

Learnings from the Heat Pump Ready programme

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1. Introduction

1.1 About Heat Pump Ready

Heat Pump Ready was part of the UK Government's £1 billion Net Zero Innovation Portfolio (NZIP), which provided funding for low-carbon technologies and systems and aimed to decrease the costs of decarbonisation, helping enable the UK to end its contribution to climate change.

Heat Pump Ready, led by the Department for Energy Security and Net Zero (DESNZ), aimed to accelerate heat pump adoption in the UK. The programme supported the development of new tools, technologies and business models to:

1. Improve the customer journey for heat pump adoption
2. Improve the installer journey from survey and design to aftercare
3. Develop smart and flexible home energy systems utilising heat pumps
4. Advance heat pump technology and manufacturing
5. Create innovative finance models for heat pump deployment
6. Develop new approaches to heat pump deployment at high-density

1.2 Report objectives and audience

This report summarises key innovations and learnings from Heat Pump Ready projects that **improve the installer journey, including heat pump survey, design, installation, commissioning and aftercare**. It is intended for heat pump installers, surveyors, software developers, technology providers and others involved in the design, installation and maintenance of heat pump systems.

The report highlights innovations that:

- Improve the accuracy of heat loss assessments
- Reduce survey time and costs
- Reduce unnecessary site visits

- Improve installation quality through better diagnostics and aftercare
- Enhance the customer experience with digital tools
- Empower customers to contribute to data collection

Similar reports on the lessons learned against the other Heat Pump Ready themes, as well as more detailed case studies on individual projects and programme evaluation reports, can be found on the gov.uk website**. The Carbon Trust has authored this report as a part of its Heat Pump Ready trial support and learning contract**.

1.3 Relevant projects – Improving the installer journey

Table 1: Summary of Heat Pump Ready projects focused on improving the installer journey

Company	Project name	Summary
Build Test Solutions	MEASURED	Used smart meter data to improve heat loss assessments and integrated the method into survey tools.
Geo	AI Smart Heat Pathway	Created a remote heat loss and sizing tool using smart meter data only.
Heatly	Heatly App	Built an all-in-one mobile app platform for surveys, system design and installation management.
Hoare Lea	Right Sizing Heat Pumps	Developed a sizing tool using temperature sensors and smart meter data to reduce oversizing risk.
Homely	Homely Lifetime	Developed a brand-agnostic remote diagnostics platform to improve heat pump diagnostics and maintenance.
Q-Bot	Free Heat Pump Survey Tool	Created a web tool for homeowners to complete surveys and receive quotes and retrofit options.
GenGame	Total Home Optimisation Management (THOM)	Developed an algorithm to assess heat pump suitability and optimise commissioning remotely through Homely.
MCS	Go Renewable	Built a platform enabling multiple installer quotes from a single third-party home survey.

Company	Project name	Summary
Thermly	Thermly	Developed a platform to enable installer estimates from customer-input property data, minimising site visits.
Hildebrand	GlowMarkt	Created installer tools with measured data, case studies, and customer property profiles.
Guru Systems	Guru Smart Heat Pumps	Enabled remote commissioning and monitoring to reduce service visits and improve performance.
EDF	Catalyst and Sojourner	Developed digital tools to streamline installer processes from assessment to installation.
Switchee	Heat Pump Integration	Provided remote home insights to support design, commissioning, and optimisation for installers.

1.4 Key project learnings

1. **Measured heat loss data can significantly improve the accuracy of heat loss assessments** compared to traditional methods: Several projects demonstrated that techniques using in-home measurements, such as smart meter data and internal sensors, can deliver more reliable and scalable insights into a home's thermal performance. Build Test Solutions (BTS), using its SmartHTC method across over 50 properties, found that traditional SAP-based assessments aligned with measured heat loss values in only 30% of cases. In the remaining homes, SAP either significantly under- or over-estimated performance, with potential consequences for system sizing and retrofit planning. The SmartHTC method, which uses internal temperature data and smart meter readings over a three-week period, enabled low-disruption, in-situ measurement of whole-house heat loss and was validated against co-heating tests. BTS concluded that measured performance data provides a more reliable and scalable basis for designing low-carbon heating systems. Geo's Cosy Heat Loss Estimator tool uses a 30-minute preheat test based on existing smart thermostat data (rather than requiring new sensors) to produce a heat loss estimate in under 60 seconds once the data is collected. In a sample of 50 homes, the tool demonstrated strong alignment with SmartHTC benchmarks and avoided the delays and invasiveness of conventional methods. Both projects highlight the potential of

measured data to support more accurate, low-disruption, and scalable approaches that can improve heat loss home assessment and system design.

2. **Digitalisation of the survey and design process reduces time, cost and complexity:** Projects including Heatly, Thermly, and Q-Bot enabled rapid early-stage assessments using mobile apps or web tools. These platforms generated accurate quotes from basic property data and allowed installers to complete designs in a fraction of the time compared to conventional methods.

   Remote assessment tools can reduce the need for initial site visits and help installers target suitable leads more effectively: Geo's Cosy Heat Loss Estimator used smart thermostat data and short preheat tests to remotely assess a home's heat loss, supporting early-stage design without requiring a physical survey. MCS developed a digital platform allowing installers to access standardised property data, including Energy Performance Certificates (EPCs), to pre-screen homes and generate indicative quotes. These tools reduce time spent on unsuitable properties and streamline the initial stages of the customer journey. While not a replacement for all on-site checks, remote assessments help improve lead quality and reduce wasted visits.

3. **Remote diagnostics, commissioning and monitoring improve performance and reduce service costs:** The Homely Lifetime project demonstrated a remote diagnostics platform capable of identifying system faults and performance anomalies across a fleet of installed heat pumps. By using real-time and historic data on flow temperatures, internal conditions, and system performance, heating engineers were able to detect underperforming systems and flag emerging issues without site visits, helping reduce callouts and improve customer satisfaction. Guru Systems applied remote monitoring and recommissioning capabilities in a heat network context, using high-resolution data from its Guru Heat Manager platform to detect inefficiencies, adjust system settings remotely, and reduce energy waste across multiple dwellings. In the GenGame project, Homely focused on remote commissioning, particularly by automating the optimisation of the weather compensation curve. Rather than relying on installer-defined static heat curves, the system learned from household behaviour and external conditions to fine-tune heat pump operation over time. This dynamic approach led to improved comfort and efficiency, reduced installer burden at commissioning, and contributed to a more consistent user experience. Projects reported that while measured data improves accuracy, current standards such as

MCS and BS EN 12831 still mandate survey-based assessments, limiting the use of remote or automated tools.

4. **Customers can contribute to the survey process to accelerate installations:** Several projects, including Hoare Lea, Hildebrand, Thermly and Q-Bot, enabled homeowners to self-install sensors, complete guided surveys, or provide building data through intuitive interfaces. This approach supports faster, lower-cost installations and improves the customer experience.

2. Detailed project learnings

2.1 Measured heat loss data can significantly improve heat loss assessment accuracy

Multiple Heat Pump Ready projects demonstrated that measured data, collected via smart meters, internal sensors, or home energy management systems, can produce significantly more accurate heat loss assessments than traditional survey-based methods. This can lead to better sizing, lower installation and operational costs, and increased consumer confidence.

- **Build Test Solutions** conducted a field trial of 56 homes, comparing standard survey-based heat loss assessments (using BS EN 12831 methods) with measured heat loss derived from smart meter data. The results showed that standard surveys were only accurate in 30% of homes when compared to the measured HTC (Heat Transfer Coefficient) results. 59% of surveys overestimated heat loss, leading to oversized systems, and 11% underestimated it. Using this insight, Build Test Solutions integrated its SmartHTC calculator into Elmhurst Energy's DEA software tools, allowing assessors to input measured data into existing workflows. Measurement methods were validated using smart meter readings and industry-accepted co-heating test benchmarks. Build Test Solutions also developed standardised heat loss measurement protocols and began work with the Chartered Institute of Building Services Engineers (CIBSE) in the hope of developing a standardised approach to incorporate measured data into BS EN 12831 guidance.

- **Geo** used smart meter data and internal temperature data from its Home Energy Management System (HEMS) to develop and validate a Digital Twin tool for remotely assessing HTC and sizing heat pumps. Geo collaborated with Build Test Solutions to

integrate their SmartHTC approach into the project. In Geo's testing, the SmartHTC tool achieved a 12% average error margin against co-heating tests, outperforming the software used to create Energy Performance Certificates (EPCs), RdSAP, which has a 34% average margin of error, and the standard method for undertaking room by room heat loss assessments, BS EN 12831, which has a 49% margin of error. Geo then advanced the tool to a version that uses only historic smart meter data, removing the need for sensors or site visits, which achieved a 22% average error margin. This version can produce a heat loss assessment in under 60 seconds and for less than £10, at any time of year, without the need for monitoring equipment. All results were validated against co-heating test data (28 trials) and publicly available datasets, including SMETER and ECO4 thresholds.

- **Hoare Lea** developed a tool that combines in-home wireless temperature sensors, smart meter data, and weather data to determine a building's heat loss. A trial of 30 homes and testing at the Energy House in Salford showed the tool typically sized heat pumps 15-20% smaller than MCS-compliant survey tools due to the more accurate assessments. A dynamic version of the tool was also tested and found to achieve a predictive error of just 9%, outperforming the steady-state version (16%). In homes where smart meters were available, users were also asked to share meter data adding just 15 minutes to the setup. User testing confirmed that homeowners were able to self-install the temperature sensors with minimal support. In the pilot, all five participating households successfully installed the equipment and submitted data that passed the project's basic quality thresholds for use in SmartHTC analysis. While the sample was small, this 100% success rate indicates strong feasibility for homeowner-led deployment in low-risk, supportive environments, though broader roll-out would likely require additional safeguards to maintain data quality at scale. Verification of HTC outputs was done using standard co-heating methods and internal consistency checks, including identification of anomalies such as irradiance or misplaced sensors.

Whilst measured assessment of heat loss was found to be possible and accurate, it should be noted that these approaches are not intended to fully replace standard survey-based methods for undertaking room-by-room heat loss calculation. A room by room assessment is still required by BS EN 12831 (the standard required by MCS) in order to correctly size heat emitters. Additionally, there is not currently an approved way to incorporate measured heat loss data into BS EN 12831 survey assessments, although, as a result of the findings from Heat Pump Ready projects, two separate

CIBSE working groups have been established to investigate how this could be remedied.

2.2 Digitalisation of the survey and design process reduces time, cost and complexity

Several projects demonstrated that digitalising the survey and design process, particularly using smartphones and integrated software platforms, can significantly reduce the time, cost and complexity of heat pump projects.

- **Heatly** developed an all-in-one digital survey, design and installation management tool. Installers can complete a full room-by-room survey using only a smartphone in under 15 minutes, compared to 3-4 hours using conventional methods. The app creates a 3D model of the home, runs heat loss calculations, specifies required emitters and pipework, generates quotes, and supports procurement. The project shifted its initial focus away from LiDAR-based scanning, which was found to have issues with light distortion and user error, to simpler methods, including perimeter scans and photos. The 3D digital twin achieved 98% volumetric accuracy in testing. The platform also integrates EPC data and weather data. The Heatly platform integrated real-time equipment availability data from major national suppliers, including manufacturers and distributors of heat pumps, cylinders, and related components. This feature allowed installers to check whether specific models or components were in stock at the point of system design, helping to streamline quotation and scheduling processes. Installer feedback during beta testing highlighted improved quote turnaround times, greater design consistency, and easier integration with CRM systems.

- **Q-Bot** created a customer-facing web tool that uses address-based data and simple homeowner input to return tailored retrofit options and heat pump designs. It initially experimented with LiDAR-enabled smartphones but pivoted to simpler interfaces after user testing revealed a preference for speed and ease-of-use. The platform incorporates machine learning models trained on retrofit datasets, including those from Parity Projects, to recommend packages of measures (e.g. fabric upgrades) alongside appropriate heat pump systems. While not designed for installers, the tool pre-qualifies leads with realistic expectations of cost and system requirements, potentially reducing wasted installer time.

- **Geo's** AI Smart Heat Pathway was created in addition to the measured heat loss calculation tool: Geo built a white-label version of the AI Smart Heat Pathway platform for integration with service providers. The platform enables customers to receive heat pump quotes online without installer involvement. Initial pilots showed time savings of 2–4 hours per customer journey.

- **Thermly** developed and launched a beta version of a digital platform that allows customers to complete a quick Heat Pump Readiness Assessment, providing a pre-assessment of heat pump suitability, indicative cost, and estimated heat pump size based on customer-provided property information. Installer quotations generated from this data were typically within 10-15% of final quoted prices, demonstrating the effectiveness of the tool in accelerating the design process.

2.3 Remote assessment tools and verified third-party surveys can reduce unnecessary site visits and improve lead quality

Remote assessment tools were shown to significantly reduce the number of unsuccessful or unnecessary site visits, a major source of wasted installer time and cost.

- **Geo's** AI Smart Heat Pathway was shown to produce a heat loss assessment for any smart meter-equipped property within 60 seconds, with no need for internal sensors. This version of the tool achieved a 22% error margin, which was found to be more accurate than RdSAP or BS EN 12831 in project testing. Geo estimates the tool can save 2-4 hours per customer and £100-£500 per site visit, based on benchmarked industry costs. These savings enable installers to pre-screen leads and focus on customers likely to proceed to an installation.

- **Hoare Lea** tested an approach where homeowners install temperature sensors themselves. Five households successfully completed the setup of temperature sensors without support, and all five tests produced reliable data for heat loss assessment using the SmartHTC method. No households in the pilot failed to complete the installation, meaning there were no dropouts or unusable data in this small sample (while this suggests strong feasibility for homeowner-led setup in a controlled pilot, the project notes that further testing with a larger and more diverse user group would be required to understand the reliability and risks of self-installation

at scale). This removes the need for an installer to conduct an initial visit, reducing the risk of unproductive time spent on leads that don't progress. The sensors also generate higher-confidence data, improving decision-making on design and sizing.

- **GenGame** created the ‘ivie Thermal Efficiency Score’, an algorithm using smart meter and internal temperature data to remotely assess a home’s thermal performance and its suitability for a heat pump. Testing at the Energy House showed the tool could reliably differentiate thermal performance across three retrofit levels within best practice benchmarks. When used in advance of a survey, the score improves heat pump sizing and can eliminate the need for an initial installer visit.

- **Hildebrand** integrated tools that compile property documentation (including SmartHTC-derived heat loss, EPC data and measured heat output from radiators) into a digital property profile accessible by installers. This snapshot allows installers to review suitability, size systems, and quote for work without attending the property, significantly reducing unproductive site visits and improving early-stage design accuracy.

- **MCS’** Go Renewable introduced an innovative single home survey model which allows multiple installers to generate comparable quotes based on one third-party survey. This reduces duplication, standardises the quoting process, and improves installer productivity by connecting them with high-quality leads.

- **Thermly**’s virtual marketplace connects customers who have completed the online readiness assessment with a network of pre-approved local installers. The system reduces the burden on installers by filtering out low-quality leads and providing structured data that supports early-stage design and quotation development.

2.4 Remote diagnostics, commissioning and monitoring improve performance and reduce service costs

Remote monitoring and diagnostics platforms were shown to help maintain performance, reduce service costs, and increase customer satisfaction.

- **Homely** developed a brand-agnostic remote monitoring platform (Homely Connect) for installers. The system collects real-time operational data from installed heat

pumps, regardless of manufacturer, and flags issues such as short cycling, incorrect flow temperature settings, underperforming heating profiles and battery depletion in sensors. Installers can view all installations on a single dashboard, access historical performance data, and make remote parameter changes. A proactive alert system enables issues to be resolved before they become failures. During the trial, the platform was tested with 175 installations. Installers reported reduced service visits and greater ability to pre-empt problems. Homely's user analytics and structured interviews confirmed installers were using the system to reduce overheads and improve customer outcomes. Homely's innovation suggests that remote aftercare can be a valuable part of the installer offering, improving trust, reducing cost and providing actionable insight into system operation.

- **GenGame** upgraded the Homely Home Energy Management System (HEMS) with a dynamic weather compensation feature that can remotely and automatically adjust the heat pump's flow temperature based on external conditions. Energy House testing showed this reduced annual space heating costs by 22% compared to fixed flow control and improved internal temperature stability. The feature is integrated as part of commissioning and requires no additional installer input once the system is active.

- **GenGame** also demonstrated that the Homely HEMS system, when paired with time-of-use tariffs and dynamic compensation, could reduce overall energy costs by up to 31% and cut peak demand from heat pumps by 58% during flexibility events. These capabilities are automated and require no installer action post-setup, supporting more efficient system commissioning and enhanced customer satisfaction.

- **Guru Systems** developed the Guru Integrate platform to allow remote recommissioning of heat pumps, addressing a common issue where settings are inadvertently changed by residents or contractors. The system integrates directly with Daikin Altherma heat pumps via a secure Modbus connection, enabling engineers to adjust settings and resolve faults remotely. This reduces the number of post-installation visits, with project partners estimating that many common issues (such as incorrect settings or user-induced faults) could be resolved remotely, potentially avoiding 1-2 follow-up visits per property. While the project did not quantify total visit reductions across the portfolio, early evidence suggests that remote recommissioning could significantly cut reactive maintenance demands,

particularly in social housing contexts where multiple systems are managed remotely. This improves the customer experience, particularly for social landlords managing large portfolios.

- **Guru Systems** also advanced the **Guru Pinpoint** analytics platform to support ongoing monitoring of heat pump performance. The platform provides installers and operators with real-time access to key metrics such as flow rates, return temperatures, Seasonal Performance Factor (SPF) values and power consumption. Poorly performing systems are automatically flagged, enabling early diagnostics and reducing the risk of prolonged inefficiencies or faults. Field trials across 116 homes demonstrated the system's ability to provide fleet-level oversight of heat pump performance.

These projects highlight how remote diagnostics, commissioning and monitoring can improve performance and reduce servicing costs. However, it should be noted that feedback from customer research undertaken by other projects within Heat Pump Ready suggests that when making high-value decisions such as purchasing a heat pump system, many homeowners still require a level of face-to-face engagement. See, for example, the case study from the EDF Project Catalyst. A site visit or in-person discussion often builds more trust than a rapid online assessment or digital-only journey. This highlights the need to balance the efficiency of digital tools with the reassurance of personal interaction in customer-facing services.

2.5 Customers can contribute to the survey process to accelerate installations

Several projects showed that customers are not only capable of contributing to data collection, but often welcome the opportunity, especially when it saves time or gives them greater visibility.

- **Hoare Lea** saw five households successfully install a self-test kit containing four wireless temperature sensors and a data gateway. The average setup time was under 30 minutes, and all tests passed data quality checks. Customers were able to monitor performance in real-time, and some reported feeling more confident in the design process as a result. This opens up new models of homeowner-led data collection to support accurate heat loss assessment.

- **Heatly** empowers customers to scan their homes using a phone and upload floorplans or building information. The interface provides real-time feedback and renders a digital twin, making the system more transparent and participatory. Beta testers responded positively to the simplicity of the user experience and appreciated the ability to visualise the system layout before committing.

- **Hildebrand** developed a customer-facing digital Property Passport that allows users to upload energy data, EPC information, radiator measurements, and heat loss calculations. This data is shared with installers via the platform, giving them a detailed pre-installation profile and reducing the need for installers to repeat data collection. Customers also contribute to installation case studies, providing transparent insights into system performance and helping demystify the heat pump journey for others.

- **Q-Bot** is designed for homeowner use from the outset. Customer testing highlighted that a balance of simplicity and optional detail (via dropdowns) created the best user experience. The platform was also tested with retrofit contractors to confirm suitability for dual use.

- **Thermly** enabled customers to complete a self-guided survey through its web platform, generating preliminary cost estimates and installer quotations. Customers were supported with simple, non-technical guidance informed by SEO research into common customer questions (e.g., “Are heat pumps noisy?”). Thermly reported that more engaged customers were better able to complete the forms accurately, improving quotation quality and saving installers time at the survey and design stage.

These findings highlight the potential for new customer engagement strategies that reduce installer time and help customers make informed, confident decisions.