

Participant Information Sheet

Study Title: LATENT: Residential Heat as an Energy System Service – Field trial

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ERGO number: FEPS/70136

You are being invited to take part in the above research study. To help you decide whether you would like to take part or not, it is important that you understand why the research is being done and what it will involve. Please read the information below carefully and ask questions if anything is not clear or you would like more information before you decide to take part in this research. You may like to discuss it with others but it is up to you to decide whether or not to take part. If you are happy to participate you will be asked to sign a consent form.

What is the research about?

The UK's carbon targets, as defined by the Climate Change Act of 2008, specify an emissions reduction of 80% by 2050, which the government has recently revised down to 'net zero' for 2050. In 2017, 17% of the UK's carbon emissions were associated with non-electric use in the residential sector (64.1 Mt CO₂), the majority of which was associated with natural gas space heating, cooking and domestic hot water. The UK must therefore decarbonise residential heat to be able to meet its climate change targets, but, in combination with electric vehicles (EVs), this could lead to a 200-300% increase in the UK's annual electricity demand. This creates serious capacity issues for a highly intermittent electricity system based on renewables, supported by nuclear, interconnectors and energy storage. In terms of deployment at scale, Air Source Heat Pumps (ASHP) operating either in isolation or as a hybrid gas system appear a key technology as they are not site specific and are applicable to both new build and retrofit. The UK's low voltage (LV) electricity network will not however, be able to operate with unconstrained electrical heating or EV charging loads. Both loads must be deferrable or scheduled in a manner to support the electricity network and maintain substations and feeders within limits.

The LATENT field trial will directly address this through understanding households' acceptance of a deferral of heating approach to provide insight into how to facilitate such a strategy. The field trial will test managing winter peak feeder loads in private household (Good Energy Works customers) ASHP (Air Source Heat Pump) to understand (i) acceptance of automated 3rd party control, (ii) thermal preference and (iii) optimal engagement to encourage and maintain participation.

The LATENT field trial aims to understand actual deferral heating behaviour of households across two heat deferral trial periods (HOTP1=01/2023-04/2023 & HOTP2=10/2023-04/2024). The trial will involve Good Energy Works remotely adjusting a participants' heating system and reducing the household temperature by a small amount (never below 18°C) at peak energy-use times (16:00-20:00) in order to support the electricity network (e.g. a winters day). These periods of deferral will be scheduled by the University of Southampton (UoS), but will be undertaken by Good Energy Works through their web-based platform. A hyperlink will be provided to each household that will enable the participant to override the control (e.g. turn the heating back up) at any time (a Heat Flex Guide with QR code will be sent to each participant via email and letter).

A pre-field trial background survey will be undertaken along with online interviews/focus groups after each heating season to help understand households' acceptance of a deferral of heating approach. The aim here is to determine the influence of householder personality trait (OCEAN±) and energy literacy alongside more traditional Census metrics such as educational attainment, house type etc.

The first heating trial period will test the levels of acceptable deferral in terms of temperature change, time and duration, with bi-weekly surveys asking participants (i) how many times they thought their heating was deferred, (ii) the households' perception / acceptance of the heat deferral

and (iii) any resultant behavioural changes as a result of the heat deferral. The second heating season will trial heating tariff mechanisms, where participants will be offered tailored financial rewards for allowing third party control of their heating. Both of which will help understand (i) potential impact of such a scheme and (ii) key factors in making such a scheme acceptable to the general public.

Why have I been asked to participate?

You have been chosen to take part in this research because you are either (a) an existing Good Energy Works customer who has an installed ASHP with an Good Energy Works service and maintenance contract or (b) a prospective Good Energy Works customer who is planning to have an ASHP installed. We greatly value your time and feedback and we would appreciate your assistance and cooperation to help develop engagement strategies in order to develop acceptable, sustainable energy efficiency measures.

What will happen to me if I take part?

If you agree to participate in this study we will request your consent to all or any of the following activities.

Undertake online survey (10-15 minutes)

For those that agree to the online consent form, Good Energy Works will send the customer's name and email address to UoS, where a researcher will identify whether they have previously completed the LATENT background survey (ERGO 62684). If a participant has not completed the survey, the UoS will send an email with a link to the online survey outlining that the survey needs to be completed to participate in the field trial with all bar essential questions optional. The survey has 6 distinct parts; demographic, household composition, heating, thermal comfort, energy literacy and personality trait questions. **Customers that fail to respond to the survey will be sent two additional reminders to complete the survey and if they fail to complete the survey, after three invitations they will not be considered for the field trial.** All participants that complete the online survey will be entered into a prize draw, where 1 in every 50 participants will win a £100 voucher for either Amazon, John Lewis or Marks and Spencer. Please note the prize draw will take place every time we have 50 unique participants so the UoS cannot provide an exact timeline of when prize draws will take place.

Installation of ASHP hardware

Those that have either previously completed the background survey or completed the survey as part of this trial will have their details sent to Good Energy Works for them to arrange and manage installing the field trial hardware. This will be conducted either during the installation or annual service of the ASHP or as a one-off visit. Once the hardware is installed the customer will be officially considered as part of the field trial, with Good Energy Works providing free heat pump service and warranty for the duration of the field trial.

Invited to participate in online focus group (30 minutes)

An invite email will be sent which will include a doodle poll link asking them to select multiple times and dates in the forthcoming weeks. Those that select a time and date with 2+ participants will then be emailed a calendar invite in advance of the focus group. The online focus group will include a minimum of 2 and a maximum of 6 participants where the role of the moderator (2 researchers will be fully trained in the process) will be to provide any tech support, focus the discussion, respond to specific points not answered by other participants and time keeping. The focus group will proceed as follows:

- (1) Introductory slide showing summary of project's overall concept including aim, methods, time commitments and expected outcomes
- (2) Verbal welcome from the moderator for participants when joining
- (3) Start of focus group, moderator will allow up to 3 minutes for late attendance:
 - a. Thank participants for attending,
 - b. Outline the aim of the research, reasons for recording the session and the format and time of the focus group,
 - c. Highlight the ground rules of a focus group: only one person speaks at a time, all data will be treated confidentially and pseudonymised (artificial identifiers will replace personal

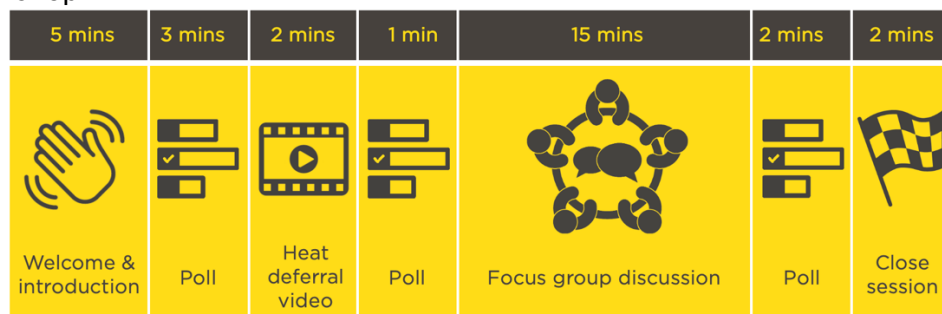
identification), the session is open, everyone's views are important

(4) Main topic:

- Participants will be asked to complete a short poll on whether they would accept heat deferral and their existing knowledge of heat deferral
- Shown a video introducing and explaining the reasons for and impact of heat deferral
- After watching the video participants will be asked to complete another short poll (same questions shown earlier).
- 15-minute discussion on the video shown.
- Asked to complete a closing poll post discussion (same questions once more).

(5) Conclusion: Thank the group for their participation; explain briefly what will happen with the data.

(6) Refer to the possible interviews and feedback questionnaire which will be sent by the UoS post-workshop.



Visualisation of online workshop sequencing

All participants that complete the online focus group will be rewarded with a £25 digital voucher for either Amazon, John Lewis or Marks and Spencer.

Field trial heating season 1 (January 2023 – April 2023)

UoS will email participants in late December 2022, reminding them that the heat deferral trial will begin in January 2023, outlining the levels of heat deferral and the possible overriding mechanisms providing multiple contact points for customers with any queries/concerns.

Temperatures will never drop below 18°C and participants will have the option to override any power limitations applied to the system in order to resume normal heating operations through a mobile application. **During the heating season participants will be sent a short (2-3 minute) bi-weekly survey via email, if they do not respond they will be sent a single reminder and if the participant fails to respond four times in a row they will be told that they need to complete at least one survey within the next two weeks or will be removed from the field trial.**

Invited to participate in an online interview (20-30 minutes)

Following the first trial period all active participants will be invited to participate in a short interview which will expand on the experience of the field trial. The interviews will be a similar process to the focus groups in that a scripted introduction and conclusion will be prepared to bookend the discussion. Where the interviews differ is that the discussion will be more focused and involve participants mind-mapping the barriers and opportunities of heat deferral. The interview's tools will be open-ended questions and mind-map software (e.g Miro.com) and the same option of £25 voucher rewards will be offered as incentive for completing an interview.

Field trial heating season 2 (October 2023 – April 2024, excluding December 2023)

The second heat deferral trial period will last from October 2023 – April 2024, excluding the winter holiday period (15/12/2023–07/01/2024), and participants will be contacted in late September 2023 reminding them that the trial will begin again in October reiterating the advice sent previously and explaining that this heating season will test heat tariff incentive mechanisms. The heat control operations and bi-weekly survey will mirror those applied in heating season 1 while the incentive mechanisms will be personalised for each participant. Information about their tariff will be within the September email and if this tariff changes (which may be the case for some participants) they will be notified two weeks in advance of any change.

All participants that complete the field trial will be provided with an additional 12 months of ASHP service warranty from Good Energy Works.

Invited to participate in a second online interview (20-30 minutes)

Following the second trial period, participants will be invited for another short interview following the same invitation and incentive process for the earlier interview.

During the process the research team will have continual email communication where they will remind participants that they are able to opt out at any time.

Are there any benefits in my taking part?

Your participation will help us to determine whether household electric heating has the potential to operate as a significant deferrable load which would provide benefits across scale to the UK, DNO, heat pump suppliers, householders and electricity suppliers. During the study there will be a number of incentives which include

- Participants that complete the background survey will be entered into a prize draw, where 1 in every 50 participants will win a £100 voucher.
- Participants that complete an online focus group will be awarded a £25 voucher.
- Participants that complete an interview will be awarded a £25 voucher (if you complete two you will get two £25 vouchers).
- During the field trial, participants will be provided a free heat pump service warranty from Good Energy Works. This will last for the duration of the field trial, if a participant withdraws from the field trial (which they can at any point) their free warranty will end.
- Those that complete the field trial (both heating seasons) will be provided a further 12-month Good Energy Works heat pump service warranty.
- During heating season two, the UoS will trial a heat tariff incentive mechanisms. The incentives will be in the form of vouchers where participants will be provided a personalised rate.

Please note that all vouchers will be digital vouchers for either Amazon, John Lewis or Marks and Spencer.

Are there any risks involved?

There are not any risks associated with this research, all contact with the University of Southampton will be virtually. All matters concerning your ASHP, including the installation of hardware and the control of the ASHP during the field trial will be undertaken by Good Energy Works who will cover any potential issues.

What data will be collected?

The LATENT field trial includes 1) initial contact by Good Energy Works with a link to the consent form 2) online survey 3) Good Energy Works customer information transfer 4) historical energy data request from participant's energy supplier 5) online focus groups and interviews 6) field trial 7) post-evaluation feedback form.

- 1) Initial contact by Good Energy Works will provide information on the LATENT field trial project and how it is a collaboration between themselves and the University of Southampton, stating that if someone decides to participate in the project they will be contacted by the UoS. The email will provide a link to the participant information sheet and to the online consent form. Potential participants will be advised that the consent form will ask them to confirm that they have read and understood the participant information sheet. The consent form will inform participants on what is involved in taking part and the use of their information for the project and beyond and provide authorisation for UoS to (a) contact their energy supplier (b) view their Good Energy Works customer data and (c) request that Good Energy Works control their ASHP (with the option for participant override). Participants that sign the consent form will have their name, email address and signed consent form sent to UoS for a researcher to send them a link to the survey (unless they have previously completed the survey, which will be checked by the UoS researcher). Those that explicitly opt out or fail to sign the consent

form will no longer be considered part of the project.

- 2) The background survey has 6 distinct parts; demographic, household composition, heating, thermal comfort, energy literacy and personality trait questions. The Demographic section collects information such as age, education, children, gender and income which are all known factors that can influence behaviour, e.g. previous studies have shown there is a significant difference in thermal sensation, and in turn, heating behaviour between gender (Karjalainen, 2011). It also asks for name and email which are mandatory as they are required in order to undertake the prize draw and to act as participant identifiers. Dwelling questions include whether they own their own home, occupancy, years living at the address and total useable floor area. Heating questions include current heating system, control appliances, heating schedules and approval and potential acceptance of heat deferral. Thermal comfort questions ask how participants perceive their home environment in terms of temperature and comfort, and are taken from BS EN ISO 10551:2019. Energy literacy includes energy education preference, actions and knowledge, with the latter including energy finance and awareness. Lastly a personality trait question includes a standard 15-part question (BFI-S) to determine a participant's personality along with questions concerning risk attitude, environmental concern, impulsivity, and personal norms all factors needing to be considered when considering behaviour change. Participants may choose not to answer any question except for those that are crucial for the modelling of behaviour and household thermal performance (these questions will allow participants to respond with '*rather not say*'); this requirement is made clear in the general info section at the start of the survey.
- 3) Customers that provide their consent and complete the survey will then have a number of contact details sent by Good Energy to the University of Southampton including; Good Energy Works customer number, first 4 digits of postcode and house data e.g. house type and size. The customer information being passed on is useful for statistical and sampling purposes and prevents participants having to answer the same question multiple times. In addition, UoS will be granted moderated access to measurements on the participants household and system including (a) heat pump power consumption, (b) heat pump power-in limitation level (heat deferral mechanism), (c) room-stat state (on/off), (d) number and timestamp of each override event and (e) internal temperature via Bluetooth sensor. Data will not be passed on to the UoS until they have completed the survey and consent form.
- 4) In advance of the first heat trial period the UoS will contact the participants' energy supplier on their behalf to request access to their historical household electricity and gas consumption. UoS will write to a participants energy supplier stating that said person has given permission (through the signed consent form) for UoS to request their historical bill records.
- 5) The online focus groups and interviews will be audio & video recorded and then fully transcribed by a third party (University approved supplier). This is to ensure that the dynamics of the group discussion are not disturbed by the moderator taking notes. Once fully transcribed (artificial identifiers will replace personal identification) audio and visual recordings will be destroyed.
- 6) During the field trial, alongside monitoring the household and system data as outlined in point 3, the UoS will send out a web-based, bi-weekly survey which will obtain data on (i) how many times the participant thought their heating was deferred, (ii) the households' perception / acceptance of the heat deferral and (iii) any resultant behavioural changes as a result of the heat deferral.
- 7) The online post-evaluation feedback survey is answered only after completion of the online focus groups and interview which will ask participants to evaluate the study

process, in particular the virtual focus group and interview method. Once more participants may choose not to answer any questions.

Will my participation be confidential?

Your participation and the information we collect about you during the course of the research will be kept strictly confidential.

Only members of the LATENT project (listed at the start of this document) and responsible members of the University of Southampton may be given access to data about you for monitoring purposes and/or to carry out an audit of the study to ensure that the research is complying with applicable regulations. Individuals from regulatory authorities (people who check that we are carrying out the study correctly) may require access to your data. All of these people have a duty to keep your information, as a research participant, strictly confidential.

Gathered data and results will be safeguarded so as to prevent loss, destruction or unauthorised disclosure. The researchers are aware of the Data Protection policy of the University and handling, storage and retention of data will comply with the Data Protection Act 2018 and the General Data Protection regulation ((EU)2016/679) ("GDPR"). The participants' information will be pseudonymised and will not be identifiable without a 'key' file. The key file will be stored securely on the University of Southampton Microsoft OneDrive service with restricted access. Only LATENT project members will be given access to parts of the information as required for research purposes. Video recordings of online focus groups and interviews will be transcribed by a University approved transcriber and then destroyed with all participants aware that all discussion will be kept confidential and all transcriptions will be pseudonymised by allocating a participant number.

Do I have to take part?

No, it is entirely up to you to decide whether or not to take part. You will need to sign a consent form to show you have agreed to take part.

What happens if I change my mind?

You have the right to change your mind and withdraw at any time without giving a reason and without your participant rights being affected. If you decide to withdraw please contact the LATENT research team (latent@soton.ac.uk), or one of the UoS researchers, either Dr Philip Turner (P.A.D.Turner@soton.ac.uk, 023 8059 3940) or Dr Tom Rushby (T.W.Rushby@soton.ac.uk, 023 8059 2174) both of the University of Southampton.

If you withdraw from the study, we will keep the information about you that we have already obtained for the purposes of achieving the objectives of the study only.

What will happen to the results of the research?

Your personal details will remain strictly confidential. Research findings made available in any reports or publications will not include information that can directly identify you without your specific consent.

Pseudonymised results and findings of the project will be used for the preparation of reports, conference materials, business cases, research publications and media releases. Any publications, anonymised and pseudonymised data relating to the research will be made available through the institutional repository and through other sources as required by the funding organisation and our partners' policies.

Where can I get more information?

Dr Philip Turner – Research Fellow
[Energy and Climate Change Division](#)
Civil, Maritime and Environmental Engineering
Room 4037, Building 178
Boldrewood Innovation Campus
University of Southampton
SO16 7QF
Telephone: 023 8059 3940

Email: latent@soton.ac.uk or P.A.D.Turner@soton.ac.uk

What happens if there is a problem?

If you have a concern about any aspect of this study, you should speak to the researchers who will do their best to answer your questions. Please do not hesitate to contact Philip Turner on 023 8059 3940 (p.a.d.turner@soton.ac.uk) or Tom Rushby on 023 8059 2174 (T.W.Rushby@soton.ac.uk), both from the University of Southampton.

If you remain unhappy or have a complaint about any aspect of this study, please contact the University of Southampton Research Integrity and Governance Manager (023 8059 5058, rgoinfo@soton.ac.uk).

Data Protection Privacy Notice

The University of Southampton conducts research to the highest standards of research integrity. As a publicly-funded organisation, the University has to ensure that it is in the public interest when we use personally-identifiable information about people who have agreed to take part in research. This means that when you agree to take part in a research study, we will use information about you in the ways needed, and for the purposes specified, to conduct and complete the research project. Under data protection law, 'Personal data' means any information that relates to and is capable of identifying a living individual. The University's data protection policy governing the use of personal data by the University can be found on its website (<https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page>).

This Participant Information Sheet tells you what data will be collected for this project and whether this includes any personal data. Please ask the research team if you have any questions or are unclear what data is being collected about you.

Our privacy notice for research participants provides more information on how the University of Southampton collects and uses your personal data when you take part in one of our research projects and can be found at <http://www.southampton.ac.uk/assets/sharepoint/intranet/Is/Public/Research%20and%20Integrity%20Privacy%20Notice/Privacy%20Notice%20for%20Research%20Participants.pdf>

Any personal data we collect in this study will be used only for the purposes of carrying out our research and will be handled according to the University's policies in line with data protection law. If any personal data is used from which you can be identified directly, it will not be disclosed to anyone else without your consent unless the University of Southampton is required by law to disclose it.

Data protection law requires us to have a valid legal reason ('lawful basis') to process and use your Personal data. The lawful basis for processing personal information in this research study is for the performance of a task carried out in the public interest. Personal data collected for research will not be used for any other purpose.

For the purposes of data protection law, the University of Southampton is the 'Data Controller' for this study, which means that we are responsible for looking after your information and using it properly. The University of Southampton will keep identifiable information about you for 5 years after the study has finished after which time any link between you and your information will be removed.

To safeguard your rights, we will use the minimum personal data necessary to achieve our research study objectives. Your data protection rights – such as to access, change, or transfer such information – may be limited, however, in order for the research output to be reliable and accurate. The University will not do anything with your personal data that you would not reasonably expect.

If you have any questions about how your personal data is used, or wish to exercise any of your rights, please consult the University's data protection webpage (<https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page>) where

you can make a request using our online form. If you need further assistance, please contact the University's Data Protection Officer (data.protection@soton.ac.uk).

Thank you.

Thank you very much for reading the information sheet and considering to take part in the research project.