FREEDOM Project:

Flexible Residential Energy Efficiency Demand Optimisation and Management

Customer Engagement Plan

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1. Project Overview

This proposal details the activities involved in delivering an ambitious project investigating the network, customer and broader energy system implications of high volume deployments of hybrid heating systems. The technology, which combines domestic gas boiler and air-source heat pump heating, can be used as fully flexible loads capable of providing significant energy system value.

PassivSystems has established a project team of Western Power Distribution, Wales & West Utilities, Imperial College, City University and Delta EE to deliver a two-phased project. The first phase produces forensic models from which hypotheses of system performance will be derived, alongside detailed market assessments and customer research. In addition, it delivers a pilot installation of the hardware and the customer recruitment activities for the second phase. The second phase will field test the hypotheses developed during phase 1 at 75 homes in Bridgend, south Wales.

The project partners are all experts in their fields and the project builds on market leading controls technology developed by PassivSystems. The ambition is to provide both electricity distribution network operators (DNOs) and gas distribution networks (GDNs) with meaningful insights into the future evolution of the domestic heat sector, the impact on networks in the short and long term and steps that can be taken to best manage future network risk and opportunities arising from a proliferation of hybrid heating technologies.

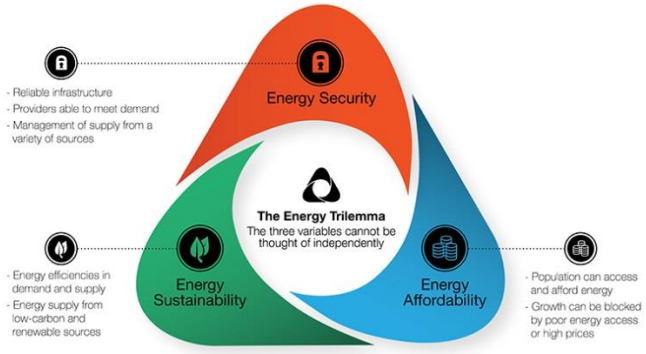
The project brings together the gas and electricity network operators in the field trial region and aims to provide both companies with robust, field tested data which can make a meaningful contribution to long-term network planning and regulatory budget submissions.

The cross sector scope makes this a unique project which aims to set the benchmark for holistic 'whole systems' projects, as articulated in Energy UK's Pathways for the GB Electricity Sector to 2030 (February 2016).

Early findings from the project will be presented at the International Energy Agency 12th Heat Pump Conference at the World Trade Centre in Rotterdam in May 2017.

2. Project Objectives

1. Use the ability of the hybrid heating system to switch between gas and electric load to provide fuel arbitrage and highly flexible demand response services.
2. Demonstrate the customer, network, carbon and energy system benefits of large-scale deployment of hybrid heating systems with an aggregated demand response control system.
3. Gain insights into the means of balancing the interests of the customer, supplier and network operators when seeking to derive value from the demand flexibility.
4. Addressing elements of the Energy Trilemma:



Results and outputs developed by the partners involved in this project will contribute to the reduction of carbon emissions and lower energy bills for domestic customers through increased heating system efficiencies and a reduced unit cost from the energy supplier for energy consumed by the hybrid system.

The project will address all aspects of the energy trilemma and has the potential to be market transformational in delivering solutions that will shape future energy market dynamics.

The project concludes with hybrid heating systems being installed in 75 homes with a 20 month pilot to allow algorithms to be developed and refined based on actual field and market data. The project objectives and contribution to the energy trilemma is below:

(1) The integration of PassivSytems temperature predictive heating controls with highly flexible (electricity and gas) hybrid heating loads and half-hourly metering systems will enable energy suppliers to achieve lower wholesale energy costs. Optimising the hybrid control strategy against wholesale electricity price fluctuations creates cost savings that can be passed back to customers; the demand flexibility (switching between gas and electricity) of the hybrid will be used to lower network charges through triad avoidance and red rate distribution charging mechanisms. Additional demand response services will be provided to WPD to improve security of supply by reducing demand peaks; integration of PassivSystems control and aggregation platform with metering technology and energy supplier systems combined with the enhancement of PassivSystems existing demand forecasting technology allows the optimisation of these outcomes. An energy supplier with 10,000 controllable hybrid heating systems would provide approximately 50 MW of flexible heating load. Reducing electric load at peak will reduce the requirement for non-spinning reserve. The control regime will also take account of the impact of volume switching of fuel type on the gas network, methods for increasing diversity in fuel switching will be investigated.

(2) The creation of a high volume route to market for hybrid heating systems which will greatly increase the market penetration of this renewable heating technology. Hybrid heating forms a key component of DECC's Future of Heating model which forecasts hybrids meeting 29% of domestic heating load by 2020 and 53% by 2030. The project will demonstrate the customer and network benefits and will model the potential carbon benefits and whole system economic benefits of large scale, long term adoption of the technology.

(3) Providing customers with better tools to manage their heating bills to a budget and only heating homes when required will increase energy efficiency, lower domestic heating demand and reduce customer bills. Research into building customer trust for new business models and improving market adoption rates will maximise the uptake of the technology. Details of potential barriers, including cost, technology, regulatory, poltical, cultural and behavioural, will be documentated and assessed.

In addition to the technical objectives set out above, the hybrid heating pilot trial and the main trial will be used to conduct some bespoke customer engagement to further the understanding of customer interaction with, and attitudes to hybrid heating systems. This will be used to inform the trial analysis, and provide a substantial evidence base for future development and deployment of hybrid heating systems.

3. Project Hypotheses

- Heating bills will be lowered as a result of the energy supplier using the flexible load to optimise wholesale energy procurement
- Advanced heating control algorithms and clear, accessible user interfaces will help the customer match their demand to their requirement and reduce their energy consumption
- Aggregated load control will deliver a network balancing capability that allows the GDN, DNO and TSO to make greater use of demand-side services
- The in-home controls will allow for a variety of demand control services without impacting comfort levels.

4. Project Partners and Roles

- Western Power Distribution – electricity distribution network requirements, measurement and modelling
- Wales & West Utilities – gas distribution network requirements, measurement and modelling
- PassivSystems – project management, home energy management system, demand aggregation services
- Imperial College – main field trial design, data analysis, network modelling
- City University – customer trust and technology adoption strategies
- Delta EE – policy implications, market forecasts, commercial models, knowledge dissemination

5. Purpose of this Customer Engagement Plan

This Customer Engagement Plan (CEP) applies to customers participating in the FREEDOM Project. It is accompanied by a Data Protection Strategy (DPS) which sets out the how participant personal data will be collected and managed.

The purpose of this customer engagement plan is to document and agree:

- How the project team will interact with customer during recruitment the initial 4 home pilot to be conducted in January.
- How the project team will interact with customers during recruitment for the field tests in the second phase and how we will communicate with customers throughout the project;
- What information we will provide customers about equipment installation, the duration of the pilot and the main trial and what happens to the equipment at the end of the trial;
- How we will notify customers about any proposed interruption to their supply of gas, electric and hot water (if required) for the installation of the hybrid heating systems and monitoring equipment and also how we will communicate with customers about planned interruptions to selected appliances;
- What arrangements we will put in place for responding to queries from customers or any complaints relating to the project;
- How customers who sign up to the project will be identified, communications flow chart, notifications (e.g. Installation schedule, installation notice, focus group notice, interview notice) and project literature.
- How we support Priority Services Register customers;
- Details of any safety information that may be relevant to the project.

Recruitment of FREEDOM Project customers will not commence until the CEP has been approved by Ofgem.

6. The Customer Engagement Plan

6.1 Overview

The FREEDOM Project will invite residents in the county borough of Bridgend to sign up to the installation of a hybrid heating system, which is an innovative new approach that will enable them to participate in a residential Demand Side Response (DSR) trial. This will give them the opportunity to potentially save cost on their heating bills through the use of the advanced controls provided by the project. Residents will also be able to contribute to carbon reduction and be part of a world leading project.

The initial engagement and recruitment of trial participants will be planned in consultation with Bridgend County Borough Council and Wales & West Housing Association. These organisations will facilitate access to the local community and share information on how best to publicise the project.

6.2 Engagement Approach

For the FREEDOM Project to be a success it requires 75 households to have a hybrid heating system installed and PassivSystems smart controls integrated. The project team believes this number of homes will provide a substantial amount of statistically significant data.

The FREEDOM Project team will identify the ideal household types and customer types for hybrid heating system installations and PassivSystems' platform to provide a mix of social and private housing which will provide a variety of customer and building types. Having varied customer behaviours and properties will enable the FREEDOM Project to more accurately evaluate and model large scale deployments and understand the potential routes to commercialisation of hybrid heating systems.

The recruitment and sustained engagement of participants is critical to the success of the FREEDOM project. The success of this activity is important in two ways;

1. We need to recruit sufficient participant numbers to robustly demonstrate the effectiveness of hybrid heating systems and advanced heating controls incorporating DSR through a scientificially designed field trial.
2. We need to achieve a representative cross-section of housing types and households in order to understand both technical performance and customer outcomes in a range of situations

6.3 Technology

The proposition works by upgrading or replacing the homeowner's current heating asset with the equipment required for a hybrid heating system. A hybrid heating system is a combination of a gas boiler and an external heat pump with PassivSystems Smart Controls.

The project will install a small sample pilot of 4 hybrid heating systems (duration: 1 month) followed by the installation of 71 hybrid heating systems (duration: 6 months). The pilot phase will trial the installation and use of hybrid heating systems with PassivSystems controls while collecting and analysing heat, energy and usage data. The pilot deployment of 4 hybrid heating systems will also be used as part of the procurement evaluation of the installer and the hardware manufacturer for the main field trial. The main field trial deployment of 71 hybrid heating systems will follow the pilot phase, subject to a full review of the recruitment of homes and the installation plan. Customers will be consulted to seek feedback on from the pilot trial to gain their views on potential improvements in processes and information sharing.

The main trial will include a number of hybrid heating system modeling events whereby PassivSystems will control the heating system and will simulate demand response or other constraint actions for discreet periods of time. The trials will be undertaken with and without customer pre-notification of the event to test customer acceptance of each type of arrangement. It will be made clear to all participants that they can manually opt-out of demand response events to ensure that they remain fully in control of the use of their heating system. Through the term of the project, participants will be requested to complete online questionnaires to share feedback on their experiences.

PassivSystems is also exploring the possibility of deploying two different hybrid heating solutions; a new integrated hybrid heating unit and a retrofitted bivalent solution that integrates a new air-source heat pump with the existing gas boiler. This will provide more understanding of different technology solutions and commercial models for the deployment of hybrid heating solutions.

There is no requirement to interrupt our customers' supply to install the hybrid heating system; however there will be interventions on the customer side of the meter that may cause inconvenience during the fitting of the heat pump and the integration of PassivSystems equipment. For example, the gas supply may be switched off after the meter for a short period while a new gas boiler is fitted. The interventions are dependent on the appointed heat pump manufacturer and installation contractor as heat pump specifications vary. At the recruitment stage PassivSystems will provide in its Frequently Asked Questions the expectations of the amount of time the house will be without heating and hot water, typically it's the same amount of time as a boiler replacement.

In the unlikely event that a hybrid heating system or the PassivSystems technology fails, the customer will be supported and a resolution that suits the customer will be implemented. PassivSystems customer support team will maintain a daily check on the performance of the installed systems to ensure that operation is in line with expectations. Often this means that issues are identified before the customer becomes aware, allowing them to be quickly resolved with minimal inconvenience.

6.4 Location

The pilot trial and the main trial will be conducted within the County Borough of Bridgend as both collaboration partners, Wales & West Utilities and Western Power Distribution, operate in this location and have existing networks in place.

Bridgend has been chosen as a target recruitment area because its population has a good demographic spread which is representative of the majority of the GB population as a whole. Bridgend has also been selected as a demonstrator authority for the Energy Catapult's Smart Systems and Heat programme.

Figure 1 Project demonstration location at Bridgend

The project will be publicised across Bridgend and Wales and offers a number of ancillary benefits:

- Tackling Fuel Poverty
- Offering Lower Energy Costs
- Job Creation
- Skill/Training Opportunities
- Health Improvements
- Reduced Carbon Emissions
- Energy Security

Finding appropriate channels to communicate at a community level is a key component to our engagement. We understand that strong partnerships will need to be established in order to deliver this and these partnerships need to be developed quickly by delivering a clear message of what we are trying to achieve and the benefits that it will deliver. We may therefore engage additional marketing resources to help us to communicate what could be seen as a complex message in a digestible and engaging way, through a range of appropriate media channels. Social marketing and communications to achieve behaviour change has been used successfully by Bridgend County Borough Council on previous Catapult/Ofgem projects for a number of years and we are keen to utilise this learning and expertise to ensure that our communications and engagement deliver successful outcomes.

PassivSystems will lead on the local engagement and recruitment of the customers for the FREEDOM Project. PassivSystems will work initially with Bridgend County Borough Council, Wales & West Utilities, Western Power Distribution and potentially the appointed hybrid heating contractor on the recruitment activity. Bridgend County Borough Council will assist PassivSystems by supporting relationships with Local Housing Authorities such as Wales & West Housing. There are also numerous Community and Town Councils through which the Council can promote the FREEDOM Project. As the FREEDOM Project has multiple partners involved and therefore the potential to have many communications channels, it is essential that all communications will be through one entity. In the early stages of the project Passiv will work with the project partners and the local community to develop a project brand and one entity. The project representatives will introduce themselves as a member of the Project Team and all documentation will be clear, simple and branded appropriately.

Bridgend County Borough Council will support the promotion of the project by allowing posters, flyers, etc. to be posted in relevant public buildings (including schools, libraries, leisure centres, etc.) in the target area and by communicating the project via its newsletters, websites, local newspapers, local radio, social media and joint press releases. Bridgend County Borough Council itself is by far the largest single employer in the area with about 7,000 employees. This includes teachers and other school staff, many of whom also live in the county. We will invite employees that live in the target pilot trial and the main trial area to become “community champions” and help us recruit their friends and neighbours.

Bridgend County Borough Council will facilitate contact with community groups and relevant organisations in our trial areas so that we can then engage directly with them. These groups could include scouting groups (i.e. Scouts, Guides, Cubs, Brownies, Beavers, etc.), amateur sports clubs (i.e. football, cricket, rugby, athletics, gymnastics, boxing, swimming, etc.), pensioners groups, housing associations, voluntary organisations (Round Table, Ladies Circle, Rotary, Lions, Women’s Institute, etc.). The list is extensive and all avenues will be pursued to achieve a diverse mix of customer types.

Heat pumps are relatively new in the UK and as a result manufacturers are investing heavily on educating customers. This includes having resource and infrastructure in place to travel the UK to demonstrate how a heat pump operates. PassivSystems will explore this avenue of potentially collaborating with a heat pump partner and promote/educate hybrid heating systems in targeted areas.

PassivSystems will provide the required supporting information about the pilot trial and the main trial to Bridgend County Borough Council and Wales & West Housing. If customers are interested and live in the trial area they will be directed to the project contact information where they can enquire about signing up to participate in the project. At this point we will share the terms and conditions for participation with the customer. Signed acceptance of the terms and conditions by the customer and receipt of the signed documentation by PassivSystems will be the point at which individual participants formally join the trial.

6.5 Recruitment

The recruitment of households for the FREEDOM Project will be conducted in 6 individual stages. Below is a timeline (subject to prior agreement of this plan by Ofgem) for approaching customers which includes the communication methods for each stage of the process:

Stage	Information that will be provided	Communication Method	Completion Date
Approach social housing landlords and private landlords	Original project proposal, project scope and project plan will be presented. Detailed information on hybrid heating systems and PassivSystems controls.	One-to-one meetings Presentations	09/01/17
General promotion of the FREEDOM Project and advertising for project trialists	A summary of the FREEDOM Project and what a hybrid heating system is. Description of the planned outcomes of the project. Details of the incentives for the customer.	Radio Mail shots Email marketing Flyers at public buildings e.g. libraries	16/01/17
Targeted information to interested communities	Provide an overview of the project. Demonstrate a hybrid heating system. Q/A Sessions. Flyer – next steps, contact details to express interest.	One-to-one meetings Presentations/roadshow	23/01/17
Potential homeowners express an interest in being part of the trial and assessment	Any homeowner that expresses an interest in being part of the trial will then complete an online or phone survey. Example questions; property ownership, property style, property size, broadband available?	Telephone survey Possible onsite survey	25/01/17
Issue project terms and conditions and FREEDOM Project trialist application form	FREEDOM Project Team will provide terms and conditions and application form to be completed by the customer.	Electronic copy and hard copy versions of the terms and conditions and application form. Stamped envelope to return completed and signed documents.	25/01/17
Inform applicants if they have been successful/unsuccessful	Electronic and hard copy notifications sent to applicants. Details of what happens next.	Email confirmation and hard copy confirmation.	31/01/17

to take part in the FREEDOM Project			

All potential customers will have access to a complete overview of the project with information about the project, including:

- Trial purpose
- Trial benefits
- Trial duration
- Trial equipment
- How to sign-up
- What happens next
- Full terms and conditions
- A frequently asked questions section
- Enquiry details

There will be regular project updates to all trialists; this will be communicated in multiple channels:

- Email newsletters
- Hardcopy newsletters
- Phone calls
- SMS
- Local events at an appropriate venue

A major focus of the FREEDOM Project is on consumer engagement, which evaluates consumer education, trust, language, terminology and implementation. Delta-ee, Western Power Distribution, Wales & West Utilities, City University and PassivSystems will work with the local community and communicate in appropriate language and terminology to gain maximum engagement. As the project is being conducted in Bridgend, Wales all communications will be in English and Welsh.

6.6 Recording Customer Agreement

Individual participation in the FREEDOM Project trials will require customers to sign up to the Project's terms and conditions. These will be made available in electronic and paper form and will provide details on:

- Trial duration
- Equipment provided
- Data collection requirements and data protection
- Trial termination
- Arrangements for equipment change of ownership / decommissioning
- Participant obligations
- Customer service obligations of the project partners
- Liabilities

PassivSystems Ltd will keep records of all customer acceptances to the trial terms and conditions.

6.7 Customer Installations

Once a trialist has accepted the terms and conditions the following engagement activities will be conducted pre-installation, during installation and post-installation:

- Provide a hybrid heating system fact sheet and FAQ's.
- Top level installation guidelines, what to expect and what the household occupant needs to do.
- Notification of expected window for the installation.
- 4 weeks prior to installation site survey and answers to any final questions.
- Notification 2 weeks prior to installation.
- Installation is completed and emergency contact information is provided.
- Support team remotely inspects the heating system performance 24 hours after installation.

Customers will be provided with a hybrid heating system with all the relevant supporting documentation. The hybrid heating system installation contractor will conduct a face-to-face 'how to' demonstration of the hybrid heating system and the PassivSystems controls. Customers requiring further assistance can use the customer support facilities provided by PassivSystems.

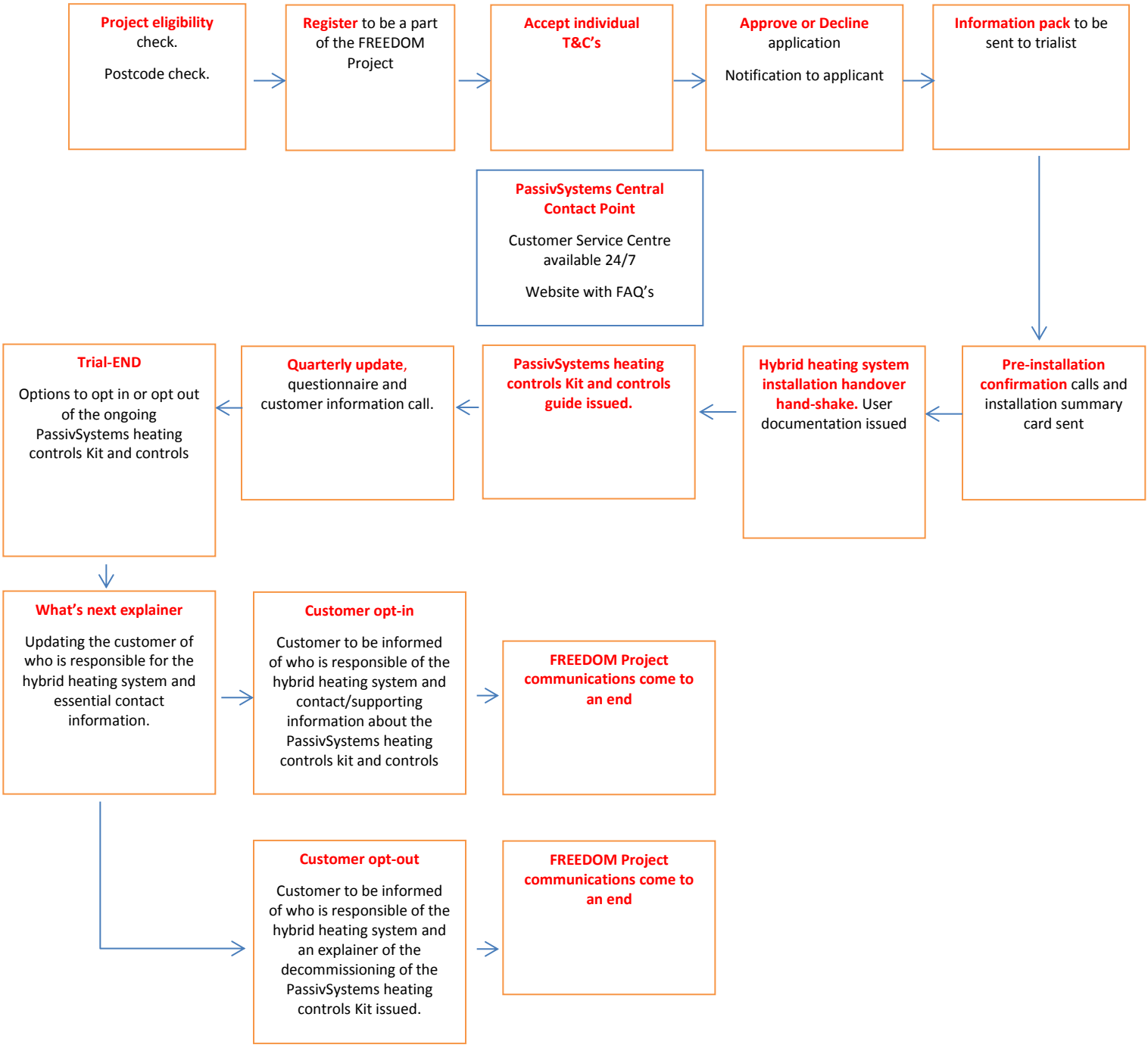
6.8 Ongoing Communications

PassivSystems will provide ongoing customer communication, mainly through electronic channels and traditional mail. We will seek periodic feedback in the form of questionnaires from participants. We will also seek feedback from participants that unsubscribe from the trials to understand their reasons for discontinuing their participation.

All customers will be provided with details of PassivSystems' customer support desk which will provide telephone support during normal business hours and out of hours. Each customer participating in the project will receive individual feedback on the performance of their heating system, the nature of the interventions, the outcomes of those interventions, and the impact on the customer's bill.

6.9 Customer Communications Map

The below communications map provides a step-by-step of each stage of the customer communications journey from initial interest. The communications journey starts from the moment the customer has been made aware of the FREEDOM Project and wants to be involved in the pilot trial or the main trial up until the trial ends. Throughout each stage there is always an available communications/information point via PassivSystems Central Contact Point.



6.10 Customer engagement for primary research

The trial will be used to conduct a substantial amount of new primary research with the trial customers. This engagement will take place pre-trial, during the trial, and after completion of the monitored trial, and has the following aims:

Pre-trial:

- Understanding existing customer perception and expectations of hybrid heating systems
- Identifying potential barriers and concerns about hybrid heating
- Identifying potential attractions of hybrid heating and willingness to pay for additional benefits
- Understanding the interaction with control systems and interfaces
- Outcome: de-risks and helps to ensure success of controls strategy, customer targeting, customer proposition & trial design

During-trial:

- Assessing the installation and commissioning process and lessons learnt
- Reviewing in-use performance of the systems and whether this meets expectations and requirements. What could be improved?

Post-trial:

- Identifying the successes and failures of the trial to feed into future systems design
- Clarifying the requirements of customers and what the market needs to offer

A range of engagement activities will be used to obtain information including:

- Surveys
- Focus groups / workshops
- Tele-depth interviews
- Face to face interviews

A detailed customer engagement framework will be developed early in phase 1 of the work. This will provide a detailed plan of the engagement throughout the trial, including identifying areas where engagement may be required from multiple team members so that the process can be rationalised and the impact on customers minimised. Figure 2 shows a draft of the customer engagement framework, indicating the type of engagement, and the periods during which this will occur. It also identifies the role of each team member so that the engagement can be efficiently coordinated and impact on customers minimised.

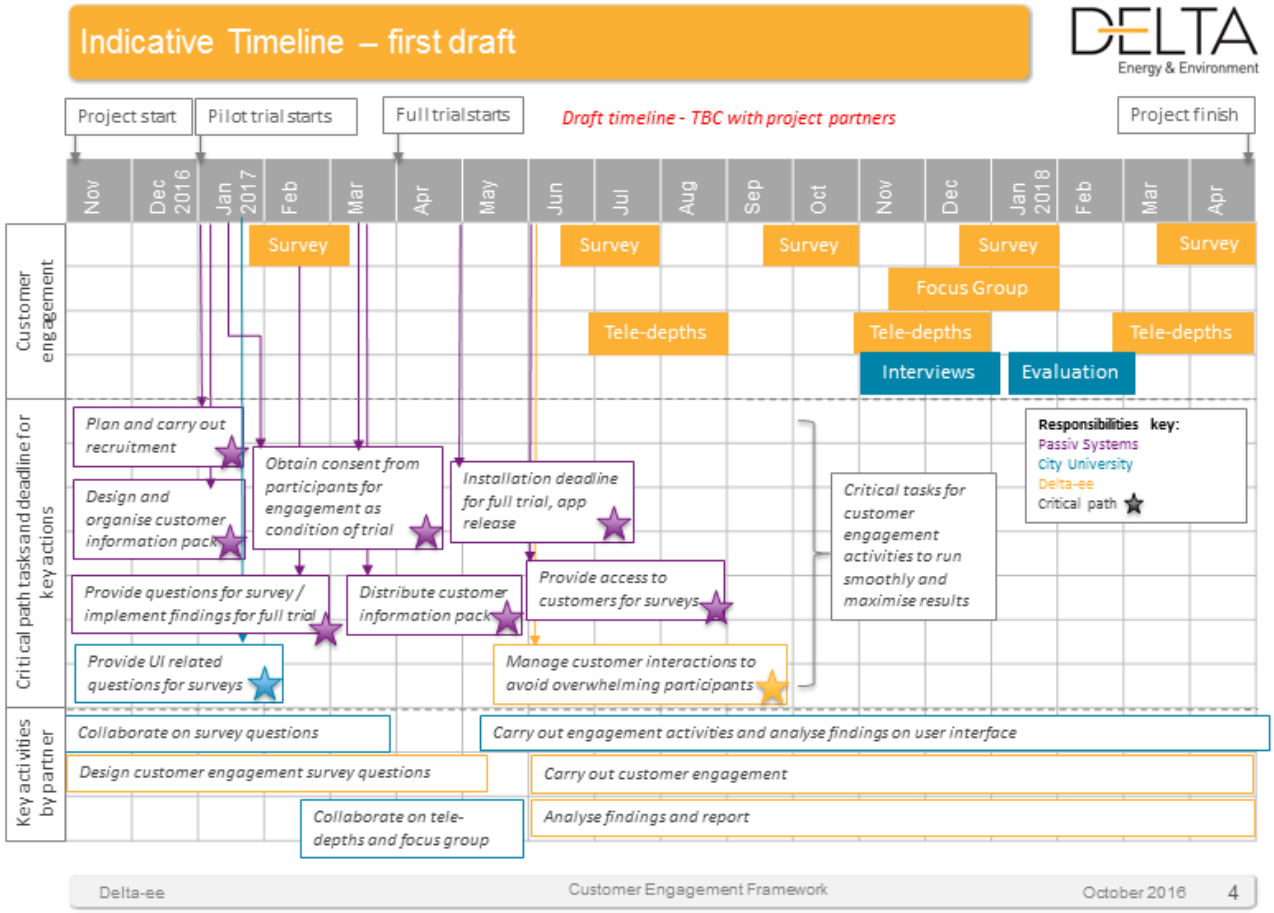


Figure 2 Draft outline of the customer engagement framework. This will be developed in detail during phase 1 of the project.

6.11 Customer Data Protection

The following definitions relating to the Data Protection Act 1998 are taken from the Information Commissioners Office guidance:

"Data subject" means an individual who is the subject of personal data.

"Personal data" means data which relates to a living individual who can be identified –

1. from those data, or
2. from those data and other information which is in the possession of, or is likely to come into the possession of, the data controller, and includes any expression of opinion about the individual and any indication of the intentions of the data controller or any other person in respect of the individual.

"Sensitive personal data" means personal data consisting of information as to -

1. the racial or ethnic origin of the data subject,

2. their political opinions,
3. their religious beliefs or other beliefs of a similar nature,
4. whether they are a member of a trade union (within the meaning of the Trade Union and Labour Relations (Consolidation) Act 1992),
5. their physical or mental health or condition,
6. their sexual life,
7. their commission or alleged commission by him of any offence, or
8. any proceedings for any offence committed or alleged to have been committed by them, the disposal of such proceedings or the sentence of any court in such proceedings.

The only sensitive personal data collected as part of this project will be the acknowledgement of any priority service customers so that risk assessments can be undertaken to ensure that they can safely participate in the trials if they wish to do so.

"Data controller" means a person who (either alone or jointly or in common with other persons) determines the purposes for which and the manner in which any personal data are, or are to be processed. PassivSystems is the Data Controller.

"Data processor", in relation to personal data, means any person (other than an employee of the data controller) who processes personal data on behalf of the data controller.

PassivSystems, Delta-ee, City University and Imperial College are the data processors.

This project will adopt the principles of privacy by design and seek to anonymise data for all research purposes. The anonymisation guidance within the code of practice "Anonymisation: managing data protection risk" published by the Information Commissioners Office in 2012 shall be followed to create a rich data resource whilst protecting individuals' personal data.

Only the data processor shall handle the full personal data set and be able to see any link between consumption data / household information and the names and addresses of individual participants.

PassivSystems will collect the data and store it on their servers which Delta-ee and City University will have access to but no one else will have access to the link between the hybrid heating system data and the name and address of individual participants.

All project partners shall only have access to anonymised data.

6.11.1 The Use of Personal Data

The FREEDOM Project will recruit customers to take part in hybrid heating trials and personal data will be collected to facilitate the operation of the proposition. The data protection strategy is based on the principle of privacy by design and data will be anonymised for research purposes.

6.11.2 Personal Data

- Participant contact information will be used by PassivSystems to enable the delivery of hybrid heating systems and PassivSystems heating control kits and to notify users of times of network constraint via email, SMS, etc.
- PassivSystems will use data from the hybrid heating system to analyse its performance.
- PassivSystems will ensure that other project partners only have access to anonymised data.

The key principle of anonymisation on this project is to disassociate the identity of the participants from the household information that they provide and from the energy consumption data obtained from the equipment located in their premises.

- PassivSystems will allocate a unique reference to each participant which will be used as an anonymisation key. Only PassivSystems will see the entire customer data set.
- Imperial College who are part responsible for the hybrid heating system modelling, will have access to no personal data other than the whole house load profile and so will not be able to make any link between this data and the participant name and address.
- Research partners will be provided access to anonymised data where the unique reference number is used in place of personal data (i.e. name and address) that would otherwise link the identity of the trial participant to their energy consumption data and any household information that they provide.
- Wales & West Utilities and Western Power Distribution will have visibility of the name, address and contact details of all participants but will not be able to see any link between this data and the household information provided energy consumption data. PassivSystems will use name, address and contact details data to invite feedback from customers and also to cross-check with the priority service register customers. Customers will be asked to accept terms and conditions that allow their name and contact details to be provided to PassivSystems. All feedback received via customer surveys will be anonymised prior to any publication.
- Performance information will be aggregated by our research partners against different variables (such as household types, postcodes, etc.) to enable an understanding to be developed on how different types of users engage with The FREEDOM Project. Only anonymised data will be published by the project.

6.11.3 Personal data collection

Personal data will be collected from participating households in a number of ways including:

- Via the trial application form on sign-up and during the course of the trial:
  - Contact details including name, address, email address
  - Household details such as house type, occupancy, age ranges, type of heating, etc.
- Ongoing feedback such as response to participant experience questionnaires, etc.
- Via the in-home smart energy kit

6.11.4 Personal data storage

PassivSystems are the suppliers of the monitoring and control equipment and will collect the consumption data from these devices and store it on their servers.

Only PassivSystems has the full data set we will ensure that data is stored and processed in compliance with data protect regulation and meets strict security standards for access and storage of its data. Access to the data is via a secure connection which requires authentication details to read/write and ensures the data is encrypted during transmission.

6.11.5 Personal data processing & anonymisation

The personal data will be processed by the PassivSystems platform, which will use participants' personal data to verify their monitoring and control equipment and account.

6.11.6 Consent for the Use of Personal Data

In order to participate in the FREEDOM Project trials, participants must sign up to the project terms and conditions and, in doing so, give their consent for the FREEDOM Project to collect, store and use the personal data and for PassivSystems to have access to their name, address and contact details. Details of this data will be made clear throughout the registration process and in the terms and conditions and privacy policy, to ensure that all participants are made aware of:

- The personal data that will be collected on registration and during the trial,
- The use to which their personal data will be put during the trial,
- What happens to their personal data after the trial or if they withdraw from the trial early,
- How anonymised data will be obtained from their personal data for research purposes during the trial and that anonymised data will be retained for potential future research thereafter.

PassivSystems will keep a record of all customers' acceptance of the terms and conditions of the trial.

Participants' personally identifiable data will be stored securely by PassivSystems and shared only in anonymous form with specified project partners for research and service improvement purposes.

No data associated with individual participants collected as part of this trial shall be passed on to other third parties for marketing purposes.

6.11.7 Personal Data Ownership

All personal data collected by the PassivSystems platform sign-up process will be owned by PassivSystems. This will be made clear to participants when they sign up to the trial.

Responsibility for personal data collection, storage and processing lies with PassivSystems, who will anonymise the association between the household data and the energy data streams collected from the smart home energy devices from any information that could reveal the identity prior to sharing with research partners.

Delta-ee and Imperial College will have access to the anonymised data set and any data that they produce from the processing of this anonymised data shall be owned by PassivSystems.

6.11.8 Retention of Personal Data

All Personal Data collected will be retained by PassivSystems until the end of the FREEDOM Project trial unless otherwise instructed by the data subject themselves. All personal data will be destroyed by PassivSystems after completion of the trial in May 2018 unless PassivSystems develops it into an ongoing business proposition and the participant indicates a wish to continue engagement with PassivSystems to participate in other hybrid heating projects/markets after the completion of the FREEDOM Project.

Anonymised load profile data will be retained by all project partners for the duration of the project and will be available to the project partners for further analysis beyond the completion date of the trial. All data shared and used for further analysis and learning will be fully anonymised to ensure individual participants cannot be identified.

Details of the arrangements for personal and anonymised data retention will be contained in the Terms and Conditions, and made clear to participants prior to registration.

6.11.9 Management of Personal Data

The project's approach to data management and sharing takes into account the advice in The Information Commissioners Office 'The Guide to Data Protection' and 'Anonymisation: managing data protection risk code of practice' The following principles outlined in Schedule 1 of the Guide have been considered:

Requirement	Application
1. Personal data shall be processed fairly and lawfully and, in particular, shall not be processed unless: a) at least one of the conditions in Schedule 2 (Conditions relevant for purposes of the first principle: processing of any personal data) is met, and b) In the case of sensitive personal data, at least one of the conditions in Schedule 3 (Conditions relevant for purposes of the first principle: processing of sensitive personal data) is also met.	The personal data collected shall be only that required for the set up and operation of the PassivSystems platform proposition plus a small amount of additional household information required for research purposes. The personal information shall be processed by PassivSystems and only available to the research partners in anonymised form. The only sensitive data to be collected relates to whether an applicant is on the Wales & West Utilities/Western Power Distribution Priority Service Register, which shall only be used to protect the interests of the PSR customer. PassivSystems will know which customers are on the PSR but only Wales & West Utilities/Western Power Distribution know the specific nature of the registration.
2. Personal data shall be obtained only for one or more specified and lawful purposes, and shall not be further processed in any manner incompatible with that purpose or those purposes.	The personal data shall only be used for the operation of the PassivSystems Platform being trialled by the FREEDOM Project and no other purpose. Anonymised data shall be used for research purposes on the FREEDOM Project. Data that enables any association between electricity consumption and individual trial participants shall not be passed on to any third party. All published data shall be anonymised.
3. Personal data shall be adequate, relevant and not excessive in relation to the purpose or purposes for which they are processed.	The data set is relatively small and consists only of that required for the operation of the PassivSystems Platform proposition being trialled by the FREEDOM Project and the development of the hybrid heating system control.
4. Personal data shall be accurate and, where necessary, kept up to date.	The accuracy of the personal data is dependent upon the accuracy of the participant at the point of registration. It can be amended via customer services.
5. Personal data processed for any purpose or purposes shall not be kept for longer than is necessary for that purpose or those purposes.	The personal data held by PassivSystems for the purpose of the FREEDOM Project trials shall be destroyed by PassivSystems at the end of the project unless there is a mutual desire for the participant and PassivSystems to remain in contract. Wales & West Utilities/Western Power Distribution will destroy survey responses that contain participant names. Delta-ee and Imperial College will retain anonymised research

	data, including anonymised survey reports, beyond completion of the project and make this available to other DNOs / researchers.
6. Personal data shall be processed in accordance with the rights of data subjects under this Act.	The data subjects will be informed and asked to agree to: • The personal data that shall be collected and the purpose for its collection • Who shall have access to and process the personal data • The personal data being anonymised for research and publication • The form in which the data subject shall have access to their own data
7. Appropriate technical and organisational measures shall be taken against unauthorised or unlawful processing of personal data and against accidental loss or destruction of, or damage to, personal data.	The PassivSystems platform will ensure that data is stored and processed in compliance with data protect regulations and meets strict security standards for access and storage of its data. Arrangements shall be made to ensure that only the data processor has access to personal data, all other partners have anonymised access.
8. Personal data shall not be transferred to a country or territory outside the European Economic Area unless that country or territory ensures an adequate level of protection for the rights and freedoms of data subjects in relation to the processing of personal data.	The PassivSystems ensure that data is stored and processed in compliance with data protect regulations.
9. Delete data and information	PassivSystems will delete personal data and information within 6 months of the project end date.

6.12 Health and Safety

All hardware used in this trial is commercially available CE marked equipment specifically designed and sold for home use by customers. The monitoring and control kits will be supplied by PassivSystems. The heat pump manufacturer and installation contractor will be selected through a formal tender process which will be developed by Delta-ee and executed by PassivSystems.

The PassivSystems control equipment is low risk and can be overridden at any time by the occupant of the household. The equipment will be installed by an approved PassivSystems installer.

The hybrid heating systems will be installed by a manufacturer approved installer. Prior to installation the occupant will receive details on the installation process, including timelines, standard step-by-step events of the installation. This is to inform the occupant of the household of what to expect and what to be aware of when an installation commences.

All equipment will be accompanied by the manufacturers standard installation and operating instructions, which include safety guidelines, and will also be sent out with additional information about operation of the equipment on the FREEDOM Project. PassivSystems will provide installation support for the monitoring and control and a troubleshooting installation guide will be included in the FAQ's which will be available in multiple forms.

PassivSystems will follow the policies of the collaboration partners Wales & West Utilities and Western Power Distribution when visiting a household.

6.13 Customer Support

Support information will be provided by the FREEDOM Project customer support team to enable customers to find solutions to any issues that they may encounter during the registration, installation and participation phases of the trial. However, it will not be possible to anticipate every question or circumstance that could arise and so the FREEDOM customer support team will also provide the facility for participants to ask questions via an online feedback form where we are targeting a one working day turnaround for an email answer or a telephone call back from the party best placed to answer the query.

The PassivSystems customer services team will be briefed about the FREEDOM Project and on how to handle and direct enquiries that relate to it in the event that a customer needs to speak to someone urgently outside normal working hours. The PassivSystems customer services team will ascertain the problem and, if they are unable to deal with it, will contact a relevant member of the project team, based upon the nature of the need, to call the customer back.

PassivSystems will keep an anonymised register of customer contact issues and their resolution so that the FAQs can be kept up to date. This register will be accessible to all project partners to enable learning and continual improvement. Customer complaints shall be separately identified and any complaints that cannot be satisfactorily resolved will be escalated to the PassivSystems Project Manager for resolution.

Customers will have the right to terminate their involvement in the trial at any point. Metrics of sign-ups and drop outs will be maintained and customers that do drop out will be requested to provide their reasons.

6.14 Priority Services Register (PSR) Customers

The Priority Services Register is in place to help PassivSystems to prioritise restoration and provide appropriate support to certain customers under power cut situations.

PassivSystems will have access to the registration details and will contact any PSR customers that have signed up and undertake a risk assessment to ensure that the customer can participate safely. The categories of PSR customers are set out below:

Category A: Electrically Dependent

Fully electrically dependent customers: Where loss of power presents a critical risk for these customers, for example, where an electricity supply is used for a kidney dialysis machine or other machine that relies on electricity and is critical for life.

Category B: Additional Medical Requirements

Customers that have long-term or temporary critical medical conditions: Though not life threatening, some customers may not be able to cope with sustained interruptions to their gas or electricity supply, perhaps due to their medical treatment or their recovery from an operation.

This would include customers who need to use equipment such as a stair lift or bath hoist, were disabled or had dementia, or had other conditions that significantly added to their inconvenience from a power cut.

Category C: Elderly or Transient Vulnerability

Customers that may have other long-term or temporary support requirements: Elderly customers, those with young children (under the age of 5), or households in fuel poverty, may each find a power cut and/or interruption to the gas supply to their home more difficult to deal with and may benefit from additional advice and support.

Whilst those in this category would not automatically qualify for the additional support and compensation available for those who are dependent or have additional medical requirements, we would seek to provide additional support where warranted by their individual circumstances.

Category D: Additional Communication Needs

Customers that require different methods of communication: For example, those who are deaf or hard of hearing; or blind or have sight impairments. They require different methods of communication than our standard approach; as do customers who experience language difficulties or in some instance those with mental health difficulties or learning difficulties.

Whilst most in this category would automatically qualify for the additional support and compensation available for those in this category we would seek to provide additional support where warranted by their individual circumstances.

Priority Service Registered customers will not be precluded from participating in this trial and, whilst PassivSystems hybrid heating controls can be overridden, it is essential that any prospective Priority Service Registered participants understand how their involvement in the trial will affect the operation of the hybrid heating system. This is important for all customers but, to ensure that Priority Service Registered customers are sufficiently informed, we will ask all trial participants during The FREEDOM Project sign-up process, to identify whether they are registered PSR customers with their Gas and Electricity Suppliers. As a safety net, PassivSystems will also cross reference all the applicants who join the project during the pilot trial and the main trial against Wales & West Utilities and Western Power Distribution's Priority Service Register.

We expect that the project will reveal customers in the trial area who need to be added to the Wales & West Utilities and Western Power Distribution's Priority Service Register and will proactively use this project as an opportunity to raise awareness and add customers to the register. PassivSystems will provide information through electronic channels, a helpline number and links to relevant pages for anyone who isn't already registered as a PSR customer but who think that they ought to be and want to apply to join our Priority Service Register. Customers that elect to join the PSR will have access to all its benefits which could include specialist support and referrals to agencies they might not be aware of.

Individual risk assessments will be undertaken where appropriate for PSR customers joining the trial.

6.15 Managing Customer Risk and Priority Services Customers Risk

As part of the FREEDOM Project is installing a new hybrid heating system and developing custom controls there is associated risk. Although unlikely, it is important to highlight risks which are potentially the loss of power, heating not working and no hot water. Below is a table of the FREEDOM Project Risk Assessment Approach:

Category	Description	Risk Assessment Approach
Category A: Electrically Dependent	Loss of power presents a critical risk for these customers. For example,	We do not expect that many customers from PSR Category A and

	where an electricity supply is used for a home kidney dialysis machine or another machine that relies on electricity and is critical for life.	B will want to take part in the FREEDOM Project but our policy is to be inclusive and, as such, we will undertake one-to-one risk assessments with any PSR customers in these categories who want to participate. We will include them when safe to do so and advise them if we think they should not take part for health or safety reasons. PSR customers in level one and two who want to participate in the FREEDOM Project will be fully briefed on how to do so safely during their one-to-one visit. We will help them to identify suitable appliances to offer up for direct control and they will also have access to this information via the communication channels and in hard copy form after the visit. We will ensure they understand that hybrid heating systems and PassivSystems Controls should not be connected to any machine that is critical for life or any equipment which customers rely on for a disability or illness. During the feasibility trial PassivSystems will provide additional support for this group in the form of home visits, one-to-one advice and a helpline number. Our experience during the feasibility stage will help us to understand to what extent this group is able to participate and what additional support they will need to do so. This knowledge will inform our plans for the sustainability phase and further roll out of the project.
Category B: Additional Medical Requirements	Though not life threatening, some customers may not be able to cope with sustained interruptions to their gas or electricity supply, perhaps due to their medical treatment or their recovery from an operation. This would include customers who need to use equipment such as a stair lift or bath hoist, were disabled or had dementia, or had other conditions that significantly added to their inconvenience from a power cut.	
Category C: Elderly or Transient Vulnerability	Elderly customers, those with young children (under the age of 5), or households in fuel poverty, may each find a power and/or interruption to the gas supply to their home more difficult to deal with and may benefit from additional advice and support.	During the trials PassivSystems will offer support to anyone in this category who wants to take part in the FREEDOM Project. This could include home visits, one-to-one support, and energy saving tips and advice.

Category D: Additional Communication Needs	For example, those who are deaf or hard of hearing; or blind or have sight impairments. They require different methods of communication than our standard approach; as may, for example, those with mental health difficulties, learning difficulties, or even when English is not a strong language.	In line with the international web accessibility standards and to improve overall usability, the FREEDOM Project will provide advice and recommendations on how to alter websites font size and colour (helpful for anyone with visual impairments or conditions like dyslexia). The FREEDOM Project will provide advice and recommendations on free translation tools for anyone for whom English is not their first language.

6.16 Post-Trial Decommissioning

The owner, landlord or housing developer will own the hybrid heating system once it is installed. When supplying the hybrid heating system, the hybrid heat pump supplier contractor will be responsible for the service and maintenance throughout the project and for a period after the project ends.

Customers that remain signed up to the end of the trial will be given the option to either retain or return the PassivSystems equipment after completion of the project. If the customer decides to opt-out, then PassivSystems will arrange a suitable visiting time with the hybrid heating system contractor to decommission the project specific equipment and install standard controls.

If customers drop out and unsubscribe mid-trial, they investigate the reasons for opting-out with the customer in order to understand if there are mitigating actions that can be taken. If the FREEDOM Project Team feel that the best resolution is for the customer to leave the project, PassivSystems will liaise with the appointed hybrid heating system installation contractor to decommission the project specific equipment and reinstate a standard heating system. Issues that could potentially result in a customer leaving the project include noise, heating performance, energy costs or other attributes that are creating an unacceptable level of disruption to the customer.

The following communications will take place if a hybrid heating system is replaced or removed:

- Top level installation guidelines, what to expect and what the household occupant needs to do.
- Notification 2-4 weeks prior to installation.
- Installation manager to visit 2-4 days prior to installation.
- Installation is completed and emergency contact information is provided.
- Installation project manager inspects the hybrid heating system replacement and house 24 hours after installation.