Department for
Business, Energy
& Industrial Strategy

Heat Pump Ready Programme

Stream 2: Developing Tools & Technology

Competition Guidance Document

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Any enquiries regarding this publication should be sent to us at: heatinnovation@beis.gov.uk

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1. BEIS's Heat Pump Ready Programme – Summary

1.1 Heat Pump Ready Programme – Overview

The Heat Pump Ready (HPR) Programme forms part of BEIS's £1 billion Net Zero Innovation Portfolio (NZIP), which aims to accelerate the commercialisation of innovative clean energy technologies and processes through the 2020s and 2030s. As a key solution for decarbonising homes, heat pumps will be critical for meeting the UK's legally binding commitment to achieve net zero by 2050. The Heat Pump Ready Programme will support the development of innovative solutions across the heat pump sector.

The Programme is aligned with other BEIS NZIP Programmes, and Ofgem's Network Innovation Fund (NIC) and Strategic Innovation Fund (SIF). Key to the success of Heat Pump Ready is the highly collaborative approach which will be fostered between the Heat Pump Ready Programme; the complementary BEIS Net Zero Innovation Portfolio programmes; and the broader heat pump sector.

The Government's recently published Heat and Buildings Strategy sets out several key commitments for helping to ensure that the transition to low carbon buildings is affordable and achievable for all, including delivering a package of measures to scale up the deployment of heat pumps to 600,000 a year by 2028 and to support industry to reduce the costs of pumps. We set out our ambition to work with industry to reduce the upfront costs of heat pumps by 25-50 per cent by 2025 and to parity with boilers by 2030, as well as making them as cheap to run as a gas boiler. The Heat Pump Ready Programme will support the delivery of these commitments, by developing innovative solutions to:

- Reduce the upfront and running costs of heat pumps.
- Improve the consumer journey.
- Reduce the environmental impact, and
- Ready the electricity network for the widescale deployment of heat pumps.

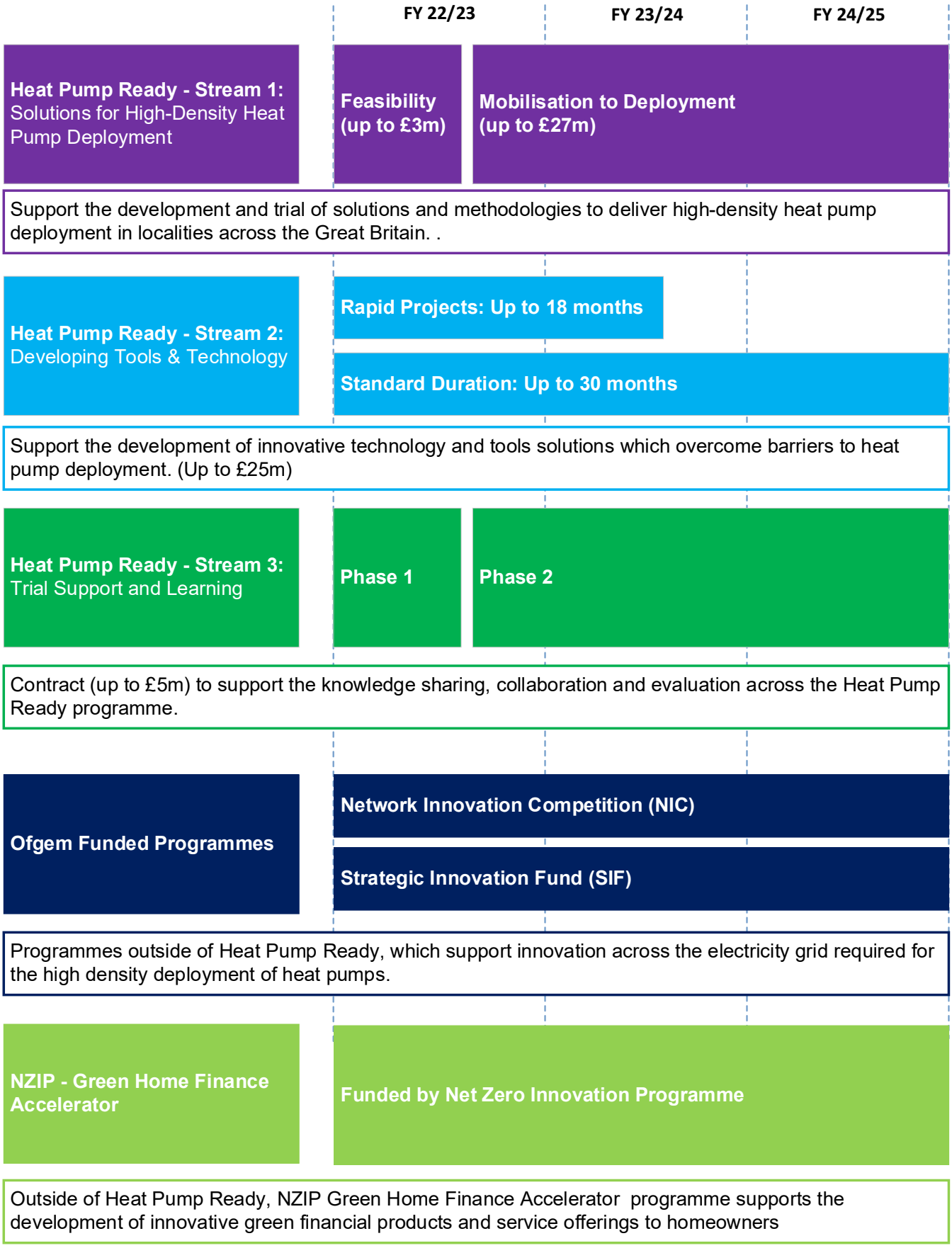

Figure 1: Competition overview and timeline, including key innovation programmes which are delivered and funded outside the Heat Pump Ready Programme.

The overarching objective of the HPR Programme is to create an enabling environment for heat pump deployment at a significantly increased density and scale than the current deployment level. This enabling environment - to stimulate and support the high-density deployment of domestic heat pumps in the UK - will be achieved through the development and trial of innovative technology and tools to address barriers faced across the landscape, in parallel to the development and trial of innovative methodologies and solutions for local coordination of high-density heat pump deployment, consumer engagement and network upgrades.

This translates into the following primary objectives for the Heat Pump Ready programme:

- Reduce the lifetime costs of domestic heat pumps (including capital equipment costs, installation costs and operating costs);
- Improve the lifetime consumer experience of heat pumps (including the experiences of: learning about and choosing a heat pump and how to pay for it; having a heat pump installed in the home and living with a heat pump);
- Stimulate innovative research and solutions to address the impact of domestic heat pumps on the electricity system;
- Improve the interoperability of domestic heat pumps with other smart technology in the home;
- Develop and strengthen partnerships between the many players involved in the domestic heat pump sector;
- Develop effective approaches and products to engage stakeholders effectively on heat pump issues with homeowners and with the key players who can help to deliver high-density heat pump deployment across the UK;
- Establish an evidence base to enable effective design and development of future heat pump policy and regulation.

The Heat Pump Ready Programme is split into three, separate delivery streams:

- ***Stream 1: Solutions for High-Density Heat Pump Deployment.***
- ***Stream 2: Developing Tools and Technology.***
- ***Stream 3: Trial Support and Learning.***

Stream 1, Solutions for High-Density Heat Pump Deployment, will support the deployment of heat pumps through **the development and trial of solutions and methodologies for the optimised deployment of domestic heat pumps, at high-density**, in the UK. Projects supported in this stream will need to demonstrate the cost savings that are secured from the optimised deployment solutions and how the approaches can be sustainable beyond the lifetime of the Programme. A Small Business Research Initiative (SBRI) pre-commercial procurement process will be used to *deliver Stream 1 - Solutions for High Density Heat Pump Deployment*.

Stream 2, Developing Tools and Technology (the subject of this Competition Guidance Document) will support **the development of tools, technology and processes to overcome specific barriers to domestic heat pump deployment** in the UK. This stream will support solutions aiming to reduce the life time cost and increase the performance of domestic heat pumps, minimise home disruption whilst providing high quality installations, develop and trial financial models to support heat pump deployment, improve the heat pump consumer journey and provide a smart and flexible home energy system. The solutions supported in this Stream are expected to be at Technology Readiness Levels 5 to 7 at the start of any funded projects. Stream 2 - Tools & Technology will support development of these innovative tools and technology using grant funding.

Stream 3 - Trial Support and Shared Learnings, will **provide support to ensure knowledge transfer and shared learning across the Heat Pump Ready Programme and with external heat pump stakeholders**. This stream will capture and share progress, evidence, knowledge, and lessons between *Stream 1 - Solutions for High Density Heat Pump Deployment* projects, coordinate interactions between *Stream 1 - Solutions for High Density Heat Pump Deployment* projects and special interest working groups in support of areas of common delivery, and broker relationships between *Stream 1 - Solutions for High Density Heat Pump Deployment* project and the solutions being developed in *Stream 2 - Tools & Technology* and other NZIP programmes, such as the NZIP-Green Home Finance Accelerator programme1. Three work packages will be delivered: the first will deliver activity related to programme and project learning and collaboration; the second will cover research and evaluation activity; and the third will focus on knowledge and evidence dissemination to external audiences throughout the lifetime of the programme.

Further details of the other Heat Pump Ready Streams can be found online at: https://www.gov.uk/government/publications/heat-pump-ready-programme

Heat Pump Ready also has strong links with other innovation programmes, including:

Ofgem Strategic Innovation Fund: the purpose of Ofgem's Strategic Innovation Fund, which is delivered in partnership with Innovate UK, is to support network innovation that will contribute to achieving Net Zero rapidly and at lowest cost; to deliver real net benefits to network companies, energy users and consumers.

NZIP- Green Home Finance Accelerator (GHFA): The GHFA will provide up to £10million grant funding to support UK retail lenders to design, develop and pilot a range of finance propositions which encourage domestic energy efficiency and low carbon heating retrofits. The Green Home Finance Accelerator is intended to drive innovation in the green lending market and support the establishment of a diverse range of green finance products which incentivise domestic energy performance improvements for both owner occupiers and private landlords.

NZIP- Alternative Energy Markets (AEM) Programme: The Alternative Energy Markets (AEM) Programme is exploring what an alternative system of network and policy price signals might look like, whether those signals could be trialled in a real-world environment, how to

undertake any potential trial, and how energy suppliers and consumers may respond within a trial.

NZIP- Longer Duration Energy Storage Demonstration (LODES): The Longer Duration Energy Storage Demonstration competition (closed to applications) is an innovation competition aiming to accelerate commercialisation of innovative longer duration energy storage projects.

Thematic Evaluation: In addition to the evaluation activity carried out in *Stream 3 - Trial Support and Learning* of Heat Pump Ready, there will be a separate NZIP research project looking beyond the Programme. This Thematic Evaluation work will look at the impacts which HPR has had on the broader heat pump sector and at how the Programme has changed the perceptions, intentions and actions of participating and non-participating heat pump stakeholders. More information on the evaluation activities is provided in the 'Monitoring and Reporting' Section later in this document.

1.1.1 Conflict of Interest

Applying for Multiple Heat Pump Ready Streams and Related Activity

For research and analysis, conflict of interest is defined as the presence of an interest or involvement of the contractor, subcontractor (or consortium member) which could affect the actual or perceived impartiality of the research or analysis.

The appointed supplier for Heat Pump Ready *Stream 3 - Trial Support and Learning* will be partly responsible for assessing effectiveness and impact of *Stream 1 - Solutions for High Density Heat Pump Deployment* and *Stream 2 - Tools & Technology* projects and disseminating the work of these Streams.

BEIS therefore considers that there is potential for an actual or perceived conflict of interest if companies who bid for the *Stream 3 - Trial Support and Learning* contract were to bid for other work in or related to this Programme, for example, for the *Stream 1 - Solutions for High Density Heat Pump Deployment* or *Stream 2 - Tools & Technology* roles or for the Thematic Evaluation Contractor. In their tender response, all tenderers (regardless of which competition they are bidding for) are required to ensure that any actual or perceived conflict is declared and satisfactorily mitigated.

Organisations may submit bids for both *Stream 1 - Solutions for High Density Heat Pump Deployment* and *Stream 2 - Tools & Technology* funding but they must declare that they have made applications to more than one stream; and ensure that satisfactory mitigation to any potential conflict of interest is identified in their tender responses.

BEIS reserves the right to exclude any proposals where the bidder has an actual or perceived conflict of interest that cannot be mitigated to the satisfaction of BEIS.

2. Stream 2: Developing Tools & Technology - Overview

2.1 Technology Scope

Heat Pump Ready – *Stream 2: Developing Tools and Technology* will support applied research and development projects, focused on driving down the lifetime costs of domestic heat pump deployment, improving the domestic consumer experience and acceptability of heat pumps through technology, business model and process innovation and improving the home suitability and interoperability of heat pumps with other smart technology and within the wider electricity system.

Up to £25m of grant funding has been allocated in total to this stream of the programme, with applicants expected to demonstrate that their project proposals fall into one of the following 5 different categories (example eligible projects are provided in the Table 1 below). Indicative budgets are provided, however BEIS reserve the right to take a broad portfolio approach across the categories when allocating final budget amounts based on number of applications to each of the categories:

1. **Reducing lifetime cost and increasing performance of domestic heat pumps (up to £8m indicative category budget) – This category supports innovation on the heat pump hardware.** This could include:
   - technology innovation for heat pumps themselves, such as improving the performance of heat pumps with natural/low greenhouse gas refrigerants.
   - improving heat pump form factor, reducing size, minimising noise, improving the aesthetics.
   - optimising performance with existing home heating systems (e.g. micro-bore pipes).
   - improving heat pump efficiency to provide consumers with reduced lifetime costs.
   - heat pump monitoring systems which allow optimisation of the heat pump system including any element of the heating system which could cause inefficiencies.
2. **Minimising home disruption and reducing lifetime low carbon heating costs whilst providing high quality heat pump installation (up to £5m indicative category budget)** – This category supports innovation on **auxiliary equipment** and could include:
   - Innovation focused on cost reduction / increased performance of auxiliary equipment (such as radiators).
   - innovation aimed at supporting personnel involved in heat pump installation, including innovative tools & technology for those conducting home surveys / specifying heat pumps.

- innovative installation and assurance processes.
- Innovative and cost-effective approaches for maintenance of heat pumps.

3. **Financial models to increase heat pump deployment (up to £6m indicative category budget) –** This category supports innovation in business models (such as heat or comfort as a service) which provide a 'bundle' of heat products and services in return for a regular charge. At a minimum, the services developed for this category must include the installation and maintenance of domestic heat pumps and necessary home energy efficiency measures. Project teams will be expected to **develop and test (at small scale) novel business models** which are applicable to a range of homeowners or householders.
4. **Improving the consumer journey (up to £3m indicative category budget)** –This category supports innovation for **consumer facing tools and platforms** to:
   - help create a more seamless consumer experience and reduce barriers such as understanding different heat pump options, finding trusted installers and installation configurations.
   - make it less time-intensive for homeowners to adopt heat pumps.
   - help post-install performance monitoring and fault detection systems and ensure systems continue to operate at an optimum performance through continuous optimisation.
5. **Smart and flexible home energy system (up to £3m indicative category budget)** – This category supports innovation to demonstrate in practice how smart heat pump deployment can:
   - optimise running costs and reduce carbon for consumers through operation at times of clean and cheap electricity generation.
   - provide reliable local, in home, flexibility services through load shifting and demand side response services.
   - to help manage distribution networks, at times of peak and prolonged heating, and as wider sectors also electrify towards net zero, for example transport.
   - Projects in this category will require an element of coordination across devices and can help support the deployment of Home Energy Management Systems (HEMS) to optimise demand across assets beyond heat pumps.

BEIS reserves the right to reallocate technologies to a different category where appropriate. This reallocation will be conducted following BEIS' initial eligibility check and applicants will be notified, requesting agreement, prior to commencement of technical assessment.

An individual organisation may submit as many different applications as they wish, however organisations cannot apply into more than one category with the same technology/project. Applicants should also refer to Section 7.2 which details the total number of awards which will be made to an individual organisation. Each application must be for a significantly different project.

Table 1: Examples of *Stream 2 - Developing Tools & Technology Project* Topics

Project Category	Examples
1. Reducing lifetime cost and increasing performance of domestic heat pumps	Developing a quieter, smaller heat pump unit Developing a heat pumps compatible existing home infrastructure, for example with micro-bore pipes Mass production and 3D printing of components such as heat exchangers Innovation to improve the resilience of the supply chain
2. Minimising home disruption and lifetime low carbon heat costs whilst providing high quality installation	Developing an app to support installers conducting home surveys support accurate heat loss calculations Developing AI algorithms for optimisation, remote diagnostics & predictive maintenance Developing cheaper, easier to fit, higher performing radiators
3. Financial models to support heat pump deployment	Developing and trailing a domestic heat/comfort as a service business model Developing and trailing a domestic heat pump installation, maintenance and energy efficiency finance package.
4. Improving the customer journey	Developing a virtual reality for visualisation app for in-home design for future heat pump installation to allow consumer to 'see' their home post install Develop a consumer app to support them through the heat pump journey from fundamental education through to finding a trusted installer and troubleshooting operational issues. Innovation for the user interface of heat pump systems to significantly improve how easy the systems are to operate, maintain, and troubleshoot.
5. Smart and flexible home energy system	Tools to optimise home energy system – linking/integrating the heat pump to other technologies such as a thermal store, PV etc. Tools to support decision making around home energy system i.e. sizing of a heat pump when combined with thermal store, home battery, etc.

Out of scope: The HPR Programme will not support development of thermal storage technologies which are charged using electricity and which are primarily intended to provide network flexibility – innovation in this type of long duration thermal storage is supported through the NZIP LODES Programme.

Technology development of hybrid heat pumps; other electric heating technologies; and solar pv is also out of scope for this Stream.

2.2 Project Duration and Budgets

Some of the *Stream 2 - Developing Tools & Technology projects* are expected to be completed more rapidly than others – for example, reflecting a higher Technology Readiness Level at the start or a project focused on an innovative process which can be developed and prototyped more rapidly than a product development. Those projects which can be completed on more rapid timescales will have a greater opportunity of being trialled within the *Stream 1 - Solutions for High-Density Heat Pump Deployment* co-ordination trial projects.

The deadline for all applications is **14:00 GMT on 15th February 2022**. Applications submitted after this deadline will not be counted. Applications must detail whether the project is up to 18 months (Rapid) or up to 30 months (Standard) duration as set out in the Table 2 below.

Table 2 also sets out the minimum and maximum level of grant funding that can be awarded to a single *Stream 2 - Developing Tools & Technology project*.

Table 2. *Stream 2 - Developing Tools & Technology Project* Duration and Funding Allocation

Maximum Project Duration	Minimum Project Duration	Minimum BEIS funding per project	Maximum BEIS funding per project
Rapid: Up to 18 months	6 months	£100k	Up to £2m
Standard: Up to 30 months	12 months	£100k	Up to £2m

2.3 Types of Innovation Activity

All projects funded through HPR *Stream 2 - Developing Tools & Technology must* fall within one or other of the following types of innovation activity: Industrial Research or Experimental Development, as defined below.

Industrial Research involves the planned research or critical investigation aimed at the acquisition of new knowledge and skills for developing new products, processes or services or for bringing about a significant improvement in existing products, processes or services. It comprises the creation of components parts of complex systems and may include the construction of prototypes in a laboratory environment or in an environment with simulated interfaces to existing systems as well as of pilot lines, when necessary for the industrial research and notably for generic technology validation.

Industrial Research activities may include:

- the creation of component parts of complex systems;
- the construction of prototypes in a laboratory environment or in an environment with simulated interfaces to existing systems;
- pilot lines, when necessary for the industrial research and notably for generic technology validation.

Experimental Development involves acquiring, combining, shaping and using existing scientific, technological, business and other relevant knowledge and skills with the aim of developing new or improved products, processes or services. This may also include, for example, activities aiming at the conceptual definition, planning and documentation of new products, processes or services. Experimental development may comprise prototyping, demonstrating, piloting, testing and validation of new or improved products, processes or services in environments representative of real-life operating conditions where the primary objective is to make further technical improvements on products, processes or services that are not substantially set. This may include the development of a commercially usable prototype or pilot which is necessarily the final commercial product, and which is too expensive to produce for it to be used only for demonstration and validation purposes.

Experimental development does not include routine or periodic changes made to existing products, production lines, manufacturing processes, services and other operations in progress, even if those changes may represent improvements.

Activities undertaken may include prototyping, demonstrating, piloting, testing and validation of new or improved products, processes or services in environments representative of real life operating conditions where the primary objective is to make further technical improvements on products, processes or services that are not substantially set. This may include the development of a commercially usable prototype or pilot which is necessarily the final commercial product and which is too expensive to produce for it to be used only for demonstration and validation purposes.

3. Additional Requirements of *Stream 2 - Developing Tools & Technology*

3.1 Acceleration Support

Successful *Stream 2 - Developing Tools & Technology projects* may receive acceleration support through the Net Zero Innovation Portfolio (NZIP) Acceleration Support Services.

NZIP Acceleration Support Services are delivered by The Carbon Trust and their consortium partners on behalf of BEIS.

This support will be allocated on a case-by-case basis across successful applicants. The aim of Acceleration Support is to help the applicant to prepare commercial plans and actions that will increase the chance of successfully bringing the innovation to market or reduce the time to market. Companies selected to receive Acceleration Support must participate in a Needs Assessment Meeting to identify Acceleration Support requirements. Capabilities which will be considered in the Needs Assessment include:

- Market engagement and customer value proposition
- Strategy and Sales
- Business processes and controls
- Product-service design, development and launch
- Team and Board
- Funding and investment readiness

The outputs of the needs assessment will inform the development of a bespoke Acceleration Plan. This may include but will not be limited to services such as:

- Tailored support, including coaching and specialist support across the six focus areas
- Group training and learning resources, including sector specific masterclasses and techno-market workshops
- Access to industry and finance networks, providing companies with investor engagement opportunities, pitch training sessions, facilitated market engagement and networking opportunities

BEIS have designed the Net Zero Acceleration Support Services to help ensure that grant recipients achieve maximum commercial impact from the grant. Therefore, receiving the identified Acceleration Support is a condition of the grant award and grant recipients may be required to co-operate with both the Acceleration Planning Sessions and the Acceleration Manager who will oversee the delivery of the acceleration support. Any failure or refusal to support this element of the programme will result in termination of the grant.

To support the delivery of acceleration support, a Memorandum of Understanding (MOU) will be put in place between the project team and the Acceleration Support provider Carbon Trust and their delivery partners.

3.2 *Stream 3 - Trial Support and Learning,* Learning & Evaluation Activities

All *Stream 2 - Developing Tools & Technology* projects will be required to participate in *Stream 3 - Trial Support and Learning* activities. BEIS views the ability to share learning within and outside of the programme, and ability to collaborate on common challenges and opportunities in deploying heat pumps in high density, as key to the success of Heat Pump Ready. *Stream 3 - Trial Support and Learning* will be responsible for facilitating learning and collaboration within and outside of the programme, undertaking evaluation activities, and disseminating knowledge, evidence, and lessons to key heat pump stakeholders.

BEIS expects representatives from *Stream 3 - Trial Support and Learning* to attend all *Stream 2 - Developing Tools & Technology* project monthly meetings with their Project Monitoring Officer (PMO) during the lifetime of the project. PMOs are the project's main point of contact with BEIS during delivery and are responsible for approving invoice payments for work completed. It is in these monthly meetings that projects update on project delivery, including lessons learnt, risks and issues, and therefore present a useful mechanism through which the *Stream 3 - Trial Support and Learning* contractor can stay up to date on project delivery and build relationships with the projects. The *Stream 3 - Trial Support and Learning* contractor will be expected to sign a non-disclosure agreement in order to participate in these meetings.

In addition, each project will be required to enter into a Data Sharing Agreement with the *Stream 3 - Trial Support and Learning* contractor, that enables the sharing of personal data of individuals involved in the delivery of, or participating in, *Stream 2 - Developing Tools & Technology* projects. This will allow the *Stream 3 - Trial Support and Learning* contractor to contact these individuals about participating in their research activities, and would involve the sharing of names and contact information (emails addresses and phone numbers). Where consortiums are involved in the delivery of *Stream 2 - Developing Tools & Technology* projects, the lead consortium partner should ensure that other consortium partners of aware of this requirement. Where this extends to stakeholders participating in a project, but not delivering the project (e.g. consumers who consent to having a particular tool or technology demonstrated in their property, or other organisations involved in a project on a non-contractual basis), the *Stream 3 - Trial Support and Learning* contractor will support *Stream 2 - Developing Tools & Technology* projects in securing permission for this data sharing.

As part of the overall Heat Pump Ready programme, all project teams will be required to participate fully in *Stream 3 - Trial Support and Learning*'s knowledge sharing and dissemination activities, which support the sharing of learnings across project teams in both *Stream 1 - Solutions for High-Density Heat Pump Deployment* and *Stream 2 - Developing*

Tools & Technology. Table 3 below sets out the activities, timings and the required attendees for the activities.

Stream 2 - Developing Tools & Technology applicants may include, as part of the eligible project costs, the associated day rate for the required project staff to participate in the required *Stream 3 - Trial Support and Learning* activities, in addition to travel and subsistence costs. All travel and subsistence for the activities associated with *Stream 3 - Trial Support and Learning* interactions must be in line with BEIS staff policy – the full policy is available on request and a summary is set out in Annex 1.

Table 3: Indicative overview of *Stream 3 - Trial Support and Learning* requirements for *Stream 2 - Developing Tools & Technology* project teams

Activity	Objective	Frequency	Required Stream 2 Participant	Travel & Subsidence Eligible (for required participants only)?
Attend intro workshop with *Stream 1 - Solutions for High-Density Heat Pump Deployment* Projects	This will be in the form of workshops to support collaborations between innovation projects.	Bi-annually	Project Lead	Yes
Attend expert workshops	To support *Stream 2 - Developing Tools & Technology* project leads in ensuring data sharing agreements, consent and processes are in place, the *Stream 3 - Trial Support and Learning* project lead will run an online workshop on data sharing and data access with all *Stream 1 - Solutions for High-Density Heat Pump Deployment* and *Stream 2 - Developing Tools & Technology* project leads in July 2022 (the third month of *Stream 2 - Developing Tools & Technology* project delivery) to	Once	Project Lead	Yes

	ensure requirements can be incorporated into project designs.			
Attend *Stream 2 - Developing Tools & Technology* Learning Workshop	The project lead will organise and facilitate quarterly learning workshops between all *Stream 2 - Developing Tools & Technology* projects to allow project leads to share challenges they face in developing their technology and working in the heat pump sector	Quarterly	Project Lead	Yes
Attend HPR Annual Conference	The conference is focused on the progress and lessons from the programme and attended by all *Stream 1 - Solutions for High-Density Heat Pump Deployment* and *Stream 2 - Developing Tools & Technology* project leads and partners, and key heat pump sector stakeholders	Annually	Project Lead	Yes

Attend industry conference	Organising significant presence of the Heat Pump Ready programme at heat pump focused conferences, workshops and other events organised by other organisations. This may include sponsorship of an event (under BEIS branding), having a stand at a conference, or arranging programme participants and BEIS teams to present.	3 in total lifetime of project	Project Lead	Yes

4. Competition Timetable and Process Overview

4.1 Competition Timetable

The following dates are applicable to *Stream 2 - Tools and Technology* of the Heat Pump Ready Programme:

***Stream 2 - Developing Tools & Technology Tools* and Technology Key Competition Timings**

Application

- Competition open on 22nd December 2021
- Submit application online no later than 14:00 GMT 15th February 2022

Assessment

- Eligibility check and technical assessment and moderation by 5th April 2022
- Inform applicants of outcome of their application by 12th April 2022 (depending on the number of applications, this date may need to revised)

Grant Award

- Contact conditionally awarded and projects able to commence (dependent on due diligence) from 1st April 2022

Completion

- Final approved reports and dissemination completed and submitted to BEIS monitoring officer for approval by: Rapid Projects - by 31st October 2023, Standard Projects - by 27th September 2024 (This date may be revised depending on number of funded projects.)

4.2 Competition Process Overview

As outlined in the diagram above, the *Stream 2: Developing Tools and Technology* competition process will be undertaken in three key stages comprising application, assessment, and grant award.

4.2.1 Stage 1: Application

Bidders are asked to submit a competition application form, with supporting information by **14:00 GMT, 15th February 2022**. The notes below explain the details of the application process:

Questions about the Competition: If you have any questions on the competition process after reading these guidance notes, please submit them to heatinnovation@beis.gov.uk by **14:00 GMT, 14th January 2022**. You will find a list of published Q&A on the https://www.gov.uk/government/publications/heat-pump-ready-programme page. We will reply to questions by close on 21st January 2022.

All applicants should take these replies into consideration when preparing their own applications and we will evaluate applications on the assumption that they have done so.

Submission of Application: The full application for the competition must be submitted online by the deadline: **14:00 GMT, 15th February 2022.** The online application form will be closed for submissions after this time.

Application documents: All application documents must be submitted via the online application form. In the form there are opportunities to upload relevant supporting documents. In some sections we specify the supporting information we would like to see uploaded. We **will not accept** any other format of the application.

Submission Content: Each online application must include the following documents:

- Completed Application Form (the online application form can be found here).
- Completed Project Cost Breakdown Form (this should be uploaded in the Finance Section of the assessed criteria in the application form).
- Completed high level project Gantt chart or project plan for the project proposed to be uploaded in the Project Plans section of the assessed criteria in the application form.
- Completed risk register for the project proposed to be uploaded in the Project Success Factors, Risks, and Management section of the assessed criteria in the application form.
- Optional: additional letters of support or other supporting information can also be submitted in the final section before you submit your online application form. Supporting documents should provide substantive information to the proposal. **However, you should not assume that any additional information will be cross-referenced or reviewed as part of the application assessment process**.

You should endeavour to answer all the questions on the application in full, some questions will be 'required fields' in the form and you will not be able to proceed to the next section until these questions are complete. Incomplete applications and any containing incorrect information may be rejected. However, BEIS may, at its discretion, request clarification before making a final decision**. Any applications or supporting documentation received after the application deadline will not be considered**.

Submission Costs: You will not be entitled to claim from the Department any costs or expenses that you may incur in preparing your bid, whether or not your proposal is successful.

4.2.2 Stage 2: Assessment

Applications will initially be assessed against the Eligibility Criteria detailed in Section 5 below. Applications which fail the Eligibility Criteria will not be assessed further, so it is essential to ensure that your project meets these criteria before you submit your application.

The eligible projects will be further assessed against the assessment criteria described in Section 4.2 (Competition Process Overview), by four reviewers, including 3 technical reviewers and one commercial reviewer. The technical reviewers may include both internal BEIS experts and external heat pump technology professionals appointed by BEIS, and the assessments will be quality assured by BEIS. The scores from all the assessors will then be moderated to determine an overall ranking list for each of the five *Stream 2 - Developing Tools & Technology categories*, based on the moderated score for each application, that will be used to allocate the funding for the Competition. Section 7.2 provides details of the funding allocation process.

All applications will be considered against the same assessment areas, summarised below and described in more detail in Section 7.1. To be eligible to receive funding, a project must be allocated a minimum total moderated score of 65% against these assessment criteria.

1. Business Proposition
2. Innovation
3. Impact on Climate Change targets and/or security of supply
4. Project Details
5. Project Funding
6. Experience and skills

The online application form and guidance notes are designed to inform you about the types of information you should provide to BEIS for your proposal to be assessed.

After the assessment stage, all applicants will receive confirmation of whether their bid has been successful or unsuccessful. Applicants will also receive a short summary of key feedback regarding their applications irrespective of whether they are successful or not. BEIS aims to provide feedback when issuing the successful/unsuccessful letters to applicants.

4.2.3 Stage 3: Grant Award

Following notification of a successful application, the eligible costs of proposals will be checked, and the company's financial viability confirmed (See Section 9.2.4 for more detail). Any funding pre-requisites identified will be conditions of the grant. It will be a requirement before issuing the grant that a clear credible plan exists to raise the required company contribution to the work. Where due diligence checks identify any issues with the applicant's project which were not clear from the application documents or which may impact on the successful delivery of the project, BEIS reserves the right not to proceed to the Grant Award stage.

Successful applicants will be given the opportunity to discuss the Grant documents with an official from BEIS to explain the detailed terms and conditions of the grant award and respond to any queries which the applicant may have at this stage.

Acceleration Planning

If acceleration support is agreed for a *Stream 2 - Developing Tools & Technology* project, the Acceleration Planning meeting will be organised and held as close to project kick off as possible. A meeting will be set up with the applicant, the acceleration co-ordinator and manager, and the project monitoring officer. Receipt of the identified acceleration support is a condition of the grant.

5. Eligibility for funding

5.1 Eligibility Criteria

To be eligible for funding, proposed projects must meet all of the following criteria:

1) Innovation and technology readiness:

The Heat Pump Ready Programme is funding the development of technology and tools which are expected to be nearing commercialisation by the end of their projects.

Therefore, we expect hardware projects to be at Technology Readiness Level (TRL) 5 (Critical Function or Proof of Concept Established) or above at the start of a funded project (see Annex 3 for TRL definitions). Technology supported by *Stream 2 - Developing Tools & Technology* should not be at TRL 8 or 9 at the project start but the expectation is that technology developed through *Stream 2 - Developing Tools & Technology* projects will reach TRL 8/9 by the end of the project.

In terms of software this means that projects would be in their Discovery/ Alpha phases, according to Government Phases of an Agile Project (see Annex 4), at the project start but should not be at Beta or Live phase. Software would be expected to reach Live phase by project completion.

All funded projects must fall within the definitions of industrial research or experimental development set out in Section .3 of this document.

2) Scope:

Tools, technology, and processes developed in this Stream must support one of the five challenge categories outline below and detailed in Section 2.1.

1. Reducing lifetime cost and increasing performance of domestic heat pumps and auxiliary technologies
2. Minimising home disruption and reducing lifetime low carbon heating costs whilst providing high quality heat pump installation
3. Financial models to support heat pump deployment
4. Improving the customer journey
5. Smart and flexible home energy system

3) Project Status:

BEIS is unable to fund retrospective work on projects. The impact of retrospective work may, however, be considered in the assessment process. BEIS cannot fund the development of

processes, technology or products which are already at commercial design stage at the start of the project, or which are already commercially or widely deployed in the UK or internationally.

4) Match-funding:

In line with subsidy control principles, only a portion of the total eligible project costs can be funded by BEIS grant funding and applicants will need to have private funding in place to cover the balance of the eligible costs. Such funding may come from a company's own resources or external private sector investors but it may not include funding attributable to any public authority (in the UK or elsewhere).

Before the grant letter is issued, the applicant will need to demonstrate a credible plan to raise the match-funding required for the whole lifetime of the project. Please see Section 6.1 for Grant intensity requirements which show the level of match funding required for different sizes or organisation and different types of innovation activity.

5) Additionality:

Projects can only be funded where evidence can be provided that innovation would not be taken forwards (or would be taken forwards at a much slower rate) without public sector funding.

6) Project Location:

Over 50% of the project's activities (as measured by total eligible project costs) must be conducted in the UK.

7) Grant size:

The total requested grant is minimum £100k and must not exceed £2m. Since BEIS is seeking to maximise the impact of government funding, projects looking for public funding intensities that are lower than the applicable maximum are likely to score higher in the appraisal process.

8) Terms and Conditions:

Applicants must agree to the published Terms and Conditions to be eligible (See Heat Pump Ready Gov.Uk page for T&Cs).

9) Project duration:

When completing applications, project teams will need to indicate the project duration and timescales from the two options (Rapid and Standard) set out in the table below. Projects must be completed by the relevant project end-date listed in the table. BEIS will be not meet claims for any work carried out after the below competition dates.

Stream 2 - Developing Tools & Technology **Project duration and timescales**

Project Duration	Earliest Project Start Date	Minimum Project Duration	Latest Project End Date

Rapid: Up to 18 months	May 2021	6 months	October 2023
Standard: Up to 30 months	May 2021	6 months	September 2024

10) Project Team Composition:

Projects must be delivered by individual UK-based[1], private sector businesses **(sole applicants)** or by a consortium of UK-based project partners led by a UK-based private sector business **(consortium applicants).** Private sector businesses of any size are eligible for funding in this Programme.

Sole applicants: Any sole applicant must be a private sector business registered with Companies House with the necessary skills, experience and capacity to effectively lead the proposed project.

Consortium applicants:

- Consortium projects must be led by a UK-based private sector business registered with Companies House with the necessary skills, experience and capacity to effectively lead the proposed project.
- A single project application must be submitted to BEIS by the lead consortium partner.
- The project team members in a consortium must be:
    - UK-based private sector companies; or
    - UK academic, research, public, third sector or community organisations working as part of a project consortium with private sector organisations.
- The eligible project costs incurred by all non-business partners, carrying out non-economic work (e.g. Universities, Research and Technology Organisations (RTO), public sector, third sector and community organisations) in a consortium must be less than 30% of the total eligible project costs. See Section 6.1 for more details.

5.2 General conditions:

5.2.1 Other Innovation Funding

Recipients of other BEIS or other public sector innovation grant funding (Energy Entrepreneurs Fund for example) may apply for funding for new projects within Heat Pump Ready *Stream 2* -

[1] UK-based means the organisation must have an establishment or subsidiary registered in the UK.

Developing Tools & Technology. Any applications for Heat Pump Ready funding must extend the scope of the previously funded work to substantively new applications or processes or extend the technology readiness. There will be no advantage for previous or current BEIS funded projects applying for further funding in the application process, as all applications will be treated on an equal basis in accordance with the competition criteria. You will be asked to declare any previous BEIS applications during the application process.

5.2.2 Multiple Applications to *Stream 2 - Developing Tools & Technology*

Applicants may not apply with the same project under more than one category. It may be acceptable to submit projects involving the same technology to more than one category as long as the projects are sufficiently distinct and address the scope of the relevant category. In this, the eligible project costs for the different projects must not be shared or allocated to more than one project.

An individual or lead organisation may only submit more than one application to a single category if there is a significant difference between the scope of the projects.

Individual or lead organisations may submit as many applications as they wish for *Stream 2 – Tools and Technology* and all eligible applications will be assessed and scored. However, at the funding allocation stage, BEIS will review the list of projects to be funded to ensure that no more than 3 projects per individual or lead organisation have been allocated funding, across all the *Stream 2 - Developing Tools & Technology* categories. Funding will be allocated to the 3 highest scoring, funded projects which any single individual or lead organisation has submitted.

In this context, an individual or lead organisation is identified at parent company level in cases where the parent company has significant (majority) control of the subsidiary company, i.e. if a company is >50% owned by its parent company, the parent and subsidiary are treated as the same company and regarded as a single organisation for the purpose of applications to this Programme.

6. Funding Levels and Subsidy Requirements

6.1 Subsidy Control Overview

DISCLAIMER: While BEIS will operate within the UK-EU Trade and Co-operation agreement (TCA) requirements and World Trade Organisation (WTO) rules, we may decide to offer lower levels of funding than the maximum permitted under the rules; additionally, the funding rules set out in this Guidance Document for Heat Pump Ready Stream 2 - Developing Tools & Technology are specific to this Competition only.

Stream 2 - Developing Tools & Technology will support successful applicants through subsidies awarded in the form of grants towards the eligible costs of the proposal. Since 1 January 2021, public authorities must comply with the UK's international commitments on subsidies as set out in the UK-EU Trade and Cooperation Agreement[2], and other trade agreements, as well as the WTO rules on subsidies[3]. Subsidy rules affect the types of costs that applicants can claim grant support for, as well as the maximum level of grant funding that they can receive which may differ by organisation type, size, and location.

6.1.1 Rules for Subsidies in Scope of the Northern Ireland Protocol

The rules set out in this document apply equally to all applicants from England, Wales, Scotland and Northern Ireland that are eligible to receive funding. Grants awarded to applicants and partner organisations from Northern Ireland will also be subject to scrutiny from the European Commission in accordance with Article 10 of the Northern Ireland Protocol in the UK/EU Withdrawal Agreement[4].

If the European Commission considers a business or any undertaking to have been incorrectly in receipt of grant funding, that undertaking is likely to be required to repay any aid received to the value of the gross grant equivalent.

6.1.2 Maximum Subsidy Thresholds

The Heat Pump Ready *Stream 2 - Developing Tools & Technology* provides grant support for industrial research and experimental development innovation activity.

[2] https://www.gov.uk/government/publications/ukeu-and-eaec-trade-and-cooperation-agreement-ts-no82021
[3] https://www.gov.uk/government/publications/complying-with-the-uks-international-obligations-on-subsidy-control-guidance-for-public-authorities
[4] https://www.gov.uk/government/publications/complying-with-the-uks-international-obligations-on-subsidy-control-guidance-for-public-authorities/technical-guidance-on-the-uks-international-subsidy-control-commitments#section7

The level of grant funding that a *Stream 2 - Developing Tools & Technology* project can receive will depend upon the size and type of applicant and the type of innovation activity they are undertaking in the project.

Table 6 indicates the maximum level of public funding that can be provided for a *Stream 2 - Developing Tools & Technology* project, as a percentage of the project's total eligible project costs.

Table 6 - Maximum grant intensity

The maximum grant intensity is the maximum proportion of eligible project costs which can be funded by public sector innovation support – public sector innovation support includes the BEIS Heat Pump Ready grant and any other public sector funding (from the UK or elsewhere).

Where a project involves a mixture of experimental development and industrial research activity (as defined in Section 2.3 of this Guidance Document), the project team must identify in their application the proportion of total eligible project costs which falls into each of the innovation types. They must also provide a clear summary of the proposed division of project activity between the two innovation types and demonstrate that the activities align with the proposed innovation type.

Size of organisation	Type of innovation activity	
	Experimental Development	Industrial Research
Small	60%	80%
Medium	50%	75%
Large	40%	65%

Universities, research or third sector organisations which are consortium partners may be entitled to receive higher levels of funding for eligible project costs if they are not undertaking economic activities in the project.

Research Organisation Definition:

When referring to research organisations, BEIS uses the following definition:

"'*research and knowledge dissemination organisation' or 'research organisation' means an entity (such as universities or research institutes, technology transfer agencies, innovation intermediaries, research-oriented physical or virtual collaborative entities), irrespective of its legal status (organised under public or private law) or way of financing, whose primary goal is to independently conduct fundamental research, industrial research or experimental development or to widely disseminate the results of such activities by way of teaching, publication or knowledge transfer. Where such entity also pursues economic activities, the financing, the costs and the revenues of those economic activities must be accounted for separately. Undertakings that can exert a decisive influence upon such an entity, for example*

in the quality of shareholders or members, may not enjoy a preferential access to the results generated by it."

Within this competition, this means:

- universities (higher education institutions)
- non-profit research and technology organisations (RTOs), including Catapults
- public sector organisations (PSO)
- public sector research establishments (PSRE)
- research council institutes
- research organisations (RO)
- charities

This list is not comprehensive and is subject to change and exceptions.

6.1.3 Public funding

When considering levels of aid intensity (described above), public funding includes the grant and all other funding from, or which is attributable to, other UK government departments or other public bodies, or other Governments or Government organisations outside the UK. Such funding includes grants or other subsidies made available by those bodies or their agents or intermediaries (such as grant funded bodies).

In applying to this Call you must state if you are applying for, or expect to receive, any funding for your project from public authorities (in the UK or elsewhere). Any other public funding will be cumulated with BEIS funding to ensure that the public funding limit and the aid intensity levels are not exceeded for the project.

It is essential to ensure that the total grant funding for the project from public sources does not exceed the permitted percentages stated for the relevant subsidy category.

As part of the assessment process, the added value and additionality of public funding will be tested. Applicants will need to demonstrate why public funding is required to deliver this project.

6.1.4 Adherence to Subsidy Control Requirements

Whilst BEIS will check the information provided to try and ensure that applicants meet the requirements of the subsidy control requirements, applicants should establish that they fall within the relevant grant intensity limits before submitting applications. BEIS requires applicants to notify them of any material change to situation or circumstance during the project which could affect grant funding.

It is the responsibility of applicants to ensure that they are in line with grant intensity limits and any other relevant subsidy control requirements. If there is a breach of subsidy control

requirements, for whatever reason, BEIS will require repayment of any grant received, including interest, above that which was due.

7. Assessment Criteria and Funding Allocation Process

7.1 Assessment Criteria

All applications will be considered against all the assessment areas and ranked against each other. The online application form and guidance notes are designed to inform you about the types of information you should provide to BEIS for your proposal to be assessed.

For the avoidance of doubt, the individual questions listed under the headings below do not constitute assessment sub-criteria but are an indication of the kinds of factors that will be considered in assessing each aspect of a proposal.

We will select projects that offer the best value for money taking account of the following assessment areas:

1. Business Proposition – Questions 1 & 2 (20% weighting split equally between Q1 & Q2)
For this aspect of the proposal assessors will consider a range of questions. These will include (but not be limited to) the following: *Is the market need compelling?* *How large is the addressable market? (niche/small/medium/large) Nature of the market and ease of market penetration?* *Do the route to market and business model ensure that the proposed innovation will be near commercialisation by the end of the project?* *How will the project work with end users and the supply chain to codesign the technology/tool?*
2. Innovation – Questions 3 & 4 (15% weighting split equally between Q3 & Q4)
For this aspect of the proposal assessors will consider a range of questions. These will include (but not be limited to) the following: *How innovative is the project? Is it a simple improvement on an existing product?* *How significant is the potential advantage which this innovation offers over existing solutions or alternative technologies that can meet current market needs?* *Can the innovation be protected?*

3. Impact on Net Zero targets including supporting annual deployment of 600,000 heat pumps in the UK by 2028 (20% weighting split between Question 5 [15% weighting] and Question 6 [5% weighting])

For this aspect of the proposal assessors will consider a range of questions. These will include (but not be limited to) the following:

To what extent does the proposed project offer a potential impact or contribution towards the UK's 2028 heat pump deployment target and 2050 Net Zero targets?

How big are the relative savings against existing products, processes and technologies? How does this compare with existing products, processes, technologies and tools?

How strong is the case for these relative savings to be reflected in reducing the costs to domestic consumers in transitioning to heat pumps from the incumbent? How does this compare with existing products, processes, technologies and tools?

4. Project Details – Questions 7 & 8 (20% weighting split equally between Q6 & Q7)

For this aspect of the proposal assessors will consider a range of questions. These will include (but not be limited to) the following:

Is the technical and methodological approach appropriate to the needs of the project and are the innovative steps achievable through the proposed approach?

Is the project plan sufficiently detailed in comparison to the complexity of the project? Is the timing of key milestones realistic?

Has the applicant demonstrated sufficient resource commitment and capability to undertake the project?

5. Project Funding – Questions 9 & 10 (15% weighting split equally between Q8 & Q9)

For this aspect of the proposal assessors will consider a range of questions. These will include (but not be limited to) the following:

Is the budget realistic for the scale and complexity of the project? Has the applicant provided a realistic budget breakdown?

Do the work packages align with the predicted spend profile shown on the project cost breakdown form?

How strong is the case for added value of public funding?

Assessors will also consider whether or not the proposal offers a good value for money.

6. Experience and Skills – Question 11 (10% weighting)
For this aspect of the proposal assessors will consider a range of questions. These will include (but not be limited to) the following: *Does the business have the right, available mix of skills and experience to deliver the project successfully?* *Is appropriate use being made of sub-contractors where in-house skills are either insufficient or not available in the right timeframe?* *Where sub-contractors are being used, does the management team have experience of managing external contractors? Can any skills gaps be addressed by the acceleration support?*

7.1.1 Assessment Scoring Guidance

We will select projects that offer the best value for money overall based on their assessment against the criteria outlined above. The projects will be scored using the scoring guidance set out in the table below. Projects must score a minimum of 65% (based on total score) to be eligible for funding.

Scoring Guidance Score	Description
1	Not Satisfactory: There is no evidence to very little evidence that the question has been satisfactorily answered and major omissions are evident.
2	Partially Satisfactory: There is little evidence that the question has been satisfactorily answered and some omissions are evident. Much more clarification is needed.
3	Satisfactory: There is reasonable evidence that the question has been satisfactorily addressed but some omissions are still evident and further clarification is needed.
4	Good: The question has been well addressed with a good evidence base, with only minor omissions or lack of clarity

5	Excellent: There is clear evidence that the question has been completely addressed in all aspects, with question answered clearly, concisely with a strong evidence base.

7.2 Funding Allocation Process

The funding award process is set out below:

1. Each project will fall into one of the five application categories and each of these categories will be assigned a maximum budget, which may vary across the categories.
2. Within each of the categories, projects will be ranked based on their final, moderated assessment score.
3. BEIS will assign funding in order of ranking to the projects which score above the threshold assessment score.
4. BEIS will review the list of projects to be funded, ensuring that no more than 3 projects per individual or lead organisation have been allocated funding, across all the *Stream 2 - Developing Tools & Technology* categories. Funding will be allocated to the 3 highest scoring, funded projects which any single individual or lead organisation has submitted.
5. In the event that projects have identical scored at the threshold of funding, BEIS will make the final decision on which of these projects will receive funding.
6. Where additional funding becomes available within a category, due to an organisation already receiving funding for 3 projects, funding will be allocated to the next highest scoring eligible project, within that category.
7. If there is any remaining budget within any Category, (due to insufficient applications or applications failing to score above the minimum threshold score), this budget will be transferred to a *Stream 2 - Developing Tools & Technology* central pool of funding
8. Once the initial allocation has been completed, all remaining unfunded projects, which have scored above the threshold, from categories where funding has been fully allocated will be merged into one combined group, in rank order (based on their moderated assessment score).
9. BEIS will review the list of projects in the combined group and will remove any projects led by organisations which have already been allocated funding for leading three projects across all the *Stream 2 - Developing Tools & Technology* categories.
10. The *Stream 2 - Developing Tools & Technology* central pool of funding will then be allocated in rank order to this combined group of projects until funding runs out.

8. Notification and Feedback Processes

8.1 Notification

Applicants will be informed by email whether their application has been successful, subject to compliance with the terms and conditions of the Conditional Offer that will be received.

BEIS may wish to publicise the results of the scheme which would include engagement with the media. At the end of the application and assessment process, BEIS may issue a press release or publish a notice on its website. These may, for example, outline the overall results of competitions and describe some of the projects to be funded.

Some organisations may want their activities to remain confidential prior to grant award and you will be given a chance to opt out of pre-award media relations activity, should you see this as being absolutely necessary. However, the public description of the project you provide in your application will be made available in the public domain if your application is successful, and you are not able to opt out of the project description being published. In addition, all *Stream 2 - Developing Tools & Technology* project teams are required to work with the *Stream 3 - Trial Support and Learning* supplier and to take part in significant knowledge sharing and dissemination activity during their project.

Any organisation that wishes to publicise its project, at any stage, must contact the Heat Pump Ready team at BEIS before doing so.

8.2 Feedback and right of appeal

A short summary of key feedback regarding the applications will be provided to all applicants, this feedback will be based on the summary comments of the Assessment Stage. The feedback from the assessors is intended to be constructive. No additional feedback will be provided and there will be no further discussion on the application.

There is no right of appeal - the moderated scores are final - so it is important that you make any points you wish to make clearly and concisely in the application form.

8.3 Confidentiality and Freedom of Information

Where any request is made to BEIS under the Freedom of Information Act 2000 (“FOIA”) for the release of information relating to any project or applicant, which would otherwise be reasonably regarded as confidential information, then BEIS will notify you of the request as soon as we become aware of it. An applicant must acknowledge that any lists or schedules provided by it outlining information it deems confidential or commercially sensitive are of indicative value only and that BEIS may nevertheless be obliged to disclose information which the applicant considers confidential.

As part of the application process all applicants are asked to submit a public description of the project. This should be a public facing form of words that adequately describes the project but that does not disclose any information that may impact on Intellectual Property (IP), is confidential or commercially sensitive. The titles of successful projects, names of organisations, amounts awarded, and the description of the project may be published once the award is confirmed as final.

All assessors used during the assessment of applications will be subject to a confidentiality agreement.

9. Grant Award Processes

9.1 Consortium Projects

9.1.1 Lead Partner Role

BEIS specifies that there should only be **one lead company assigned to each project proposal**. Grant Offer Letters for successful applicants will be made out to the delegated lead company and as such BEIS is only responsible for making claim payments to the delegated project lead. Payments to collaboration partners or sub-contracts are the responsibility of the lead company.

BEIS require that all partners in a collaborative application have signed a Collaboration Agreement (CA) prior to a Grant Offer Letter being awarded. The CA should as a minimum specify the work division, intellectual property arrangements and a dispute rectification process. BEIS will, in event of a dispute between partners, look for that dispute to be resolved within the terms of the CA.

9.1.2 Consortium Agreement

If you are applying as a collaboration, you will be asked to submit a copy of the collaboration agreement[5] for your consortium. BEIS will review the collaboration agreement before issuing the Grant Offer Letter to ensure that proposed collaborations are viable and robust.

9.2 Financial Checks and Due Diligence

9.2.1 Project Cost Information

As part of their application, all applicants must complete the Heat Pump Ready Programme Cost Breakdown Form detailing their expected expenditure and spending profile for the project on a quarterly basis. You should complete a single form covering your entire project and, for consortium projects, including all of your partners, clearly identifying which costs relate to which partner.

During the assessment of applications, the project costs and plans that are submitted as part of the application process will be assessed along with the answers to the questions on the application form to ensure they are what might be reasonably expected.

The eligibility of all costs under subsidy rules and the financial viability of your organisation may be checked following the assessment and moderation process but before a formal grant offer is made. Being contacted for this information does not indicate either success or failure in the assessment process.

[5] Heads of Terms as a minimum

While BEIS understands that project costs are subject to change prior to agreeing a Grant award and throughout the course of the project, we do expect the final version of the Cost Breakdown Form to be our guide to project expenditure through delivery and costs should not vary significantly from this without prior agreement of the Department.

9.2.2 Sub-Contract Use

You will be expected to state and justify in your project application the amount of sub-contract funding (if any) within the expected spend of the project. You will be expected to explain the necessity for this spend as opposed to the addition of collaboration partners within the project proposal.

9.2.3 Overhead Rates

The overhead rate must be agreed with BEIS before the Grant award documents are issued and cannot be changed during the work. See Annex 2 for further guidance on overhead rates.

9.2.4 Financial viability checks

BEIS will undertake financial viability checks on all successful applicants, which may also include consortium member and sub-contractors responsible for carrying out significant aspects of the project. These will include looking at the latest independently audited accounts filed on the Companies House database.

Where a business is not required to file accounts with Companies House, other financial information may be requested to enable an appropriate financial viability review to be undertaken. We will be looking for evidence of your ability to resource the project appropriately, so the information we request will be focused on understanding how your business operates in this respect.

Before your project starts, BEIS will ask for credible evidence that you have the funding mechanisms in place to manage your cash flow across the life of your project. This could include letters of credit, letters of intent to invest from individuals or organisations or other such mechanisms. We do not expect you to have cash deposits to cover the entirety of your project at the start but if you do not complete your project due to cash flow problems that you could have anticipated and managed, we may request repayment of any grant already issued to you.

BEIS will not make payments in advance of need. BEIS understands, however, the difficulties which small businesses may face when financing this type of project. BEIS will explore cash flow issues with the applicant as part of developing the financial and milestone profile within the Grant Offer Letter. BEIS may offer flexibility in terms of profiles and payments, within the confines of the requirements for use of public money within which it operates.

9.2.5 Grant Use

Companies should note that the grant may not be used to subsidise commercial activities.

10. Monitoring and Reporting

10.1 Project Monitoring Officer

Successful applicants will be assigned a BEIS-appointed Project Monitoring Officer (PMO) who will be their main point of contact with BEIS during delivery of the project. Projects will meet with their PMO at the project start, potentially before grant award, to agree the delivery plan, the milestones, and the specific outputs that will be delivered, as well as an invoicing schedule. PMOs will be responsible for reviewing evidence submitted as part of an invoicing claim before the invoice payment is approved.

10.2 Regular Reporting Requirements

In addition to participation in the learning and evaluation requirements co-ordinated by the *Stream 3 – Trial Support and Learning* contractor, *Stream 2 - Developing Tools & Technology* projects are required to submit monthly written progress reports to their PMO, and to meet with them monthly to discuss project progress. The *Stream 3 - Trial Support and Learning* contractor will also attend these meetings to allow them to stay up to date on project progress, capture lessons and support in overcoming risks and issues. Projects should raise risks and issues promptly with their PMO as they arise, within and outside of these meetings. The PMO will report to and meet with BEIS regularly and will escalate project issues to BEIS as necessary.

Projects will also be required to report on the NZIP Key Performance Indicators, a set of portfolio-level indicators that help BEIS consistently track, measure, and report on results and progress achieved by NZIP. Templates for reporting KPIs and project progress will be provided to each project. More information can be found in Annex 5.

10.3 Participation in NZIP Built Environment Thematic Evaluation

BEIS is committed to undertaking comprehensive evaluations across all policies and programmes in order to support programme improvements through learning and provide accountability of public spend. Evaluation activity on Heat Pump Ready will occur in two ways. The first is through Stream 3, where evaluation will support programme learning and dissemination activity.

Secondly, Heat Pump Ready will also be subject to a separate thematic evaluation project that identifies how the programme and other programmes operating in the same sector, such as Green Home Finance Accelerator, have impacted the broader sector. The focus will be on understanding whether and how these programmes have influenced the perspectives, intentions and actions of key stakeholders, and the importance of this in the context of Net

Zero targets. This includes assessing the impact of the activities delivered under Stream 3 which will disseminate the evidence, lessons and achievements of Stream 2 projects. Though funded through this programme, the procurements of this project will be a separate activity to the procurement of the three Heat Pump Ready streams.

All programme participants, including Stream 2 project, will be required to support and participate in the thematic evaluation. This may be through the provision of monitoring data, ensuring relevant data sharing and GDPR-compliant agreements are in place and participating in workshops and interviews. Where possible, BEIS will attempt to minimise burden for Stream 2 projects, and use evidence provided through Stream 3's activities.

Part 3

11. Completion of the Application and Finance Forms

11.1 Completion of the Application Form

This section aims to guide you through the completion of the online *Stream 2: Developing Tools and Technology* Application Form. It is important that a response is provided to every question. This guidance is intended to explain what type of information applicants should consider providing to BEIS in order to assess their application effectively.

Applications will be judged based on the information provided in the application form and any supporting information provided. There will not be the opportunity to enter into discussion about your project with the assessors or BEIS. These guidance notes are not intended to be exhaustive; applicants are expected to develop their own responses based on your own skills, knowledge and experience. You are encouraged to be concise and to the point whilst providing all the necessary and relevant information.

Throughout the form there are boxes, in order to answer the question or provide information you should simply click on the box and begin typing or select from the drop-down menu. Questions do have word limits and when the text has reached the word limit you will not be able to add any further information and the text must be edited to fit within the word limit. Please ensure that when you are copying and pasting text into the online application form from any planning documents, that all text has copied across correctly and is within the word count set out.

Any graphs, diagrams or supporting evidence that you are providing to support your application should be uploaded to your submission.

We advise applicants to families themselves with the online application form ahead of time to ensure any technical issues can be resolved ahead of the deadline. Applications will not be considered post deadline. Applications will only be accepted on the online application form, any other formats such as Word, will not be accepted. Any applications or any additional material submitted post deadline will not be considered.

11.1.1 Summary Information, Contact Details and Business Information

The initial section of the application asks you to provide details about your organisation.

Table 9. Summary Information for application form

Section/Field	Guidance
Names of Applicant Organisation	Provide the name of the lead applicant business
Project Title	A brief title that can be used to summarise the project
Tools and Technology Category to which you are applying	Most applicable category for your technology (only one category per technology)
Confirm Start Date	Please confirm May 2022 to start work assuming successful funding
Stream 2 Project duration	Enter the expected duration in months, taking into consideration the maximum project length of 36 months
Location of Main Project Activity	Give the location and postcode in the UK where the majority of the project activity will be taking place.
Total Project Costs	This figure should match the figure calculated in the BEIS Project Cost Breakdown Form. It should be the total value of the project including all eligible costs.
Company contribution	This is the amount of total eligible project costs that you will be paying from your own resources/private sector investment into the project.
BEIS Grant Applied for	This is the amount you will be asking for from the BEIS. You should ensure that you do not request a grant higher than the maximum allowed, taking into account all public-sector funding for the project.
Grant Funding requested as percentage of total funding	This is the percentage of total costs that the grant makes up. It cannot be more than you are eligible for as set out in Section 5.
TRL at start of project	Select the TRL from the drop-down menu that most accurately represents your technology at the start of the

	project. A list of TRL definitions are provided at Appendix 2.
TRL at end of project	Select the TRL from the drop-down menu that most accurately represents where your technology will be at the end of the project. A list of TRL definitions are provided at Appendix 2.
Delivery Phase for software at the start of project	Select the phase from the drop-down menu that most accurately represents your software at the start of the project. A list of software definitions can be found in Appendix 2.1.
Delivery Phase for software at the end of project	Select the phase from the drop-down menu that most accurately represents your software at the end of the project. A list of software definitions can be found in Appendix 2.1.
Contact Details	Name and details of the person who will be the main point of contact for the application process
Organisation Name	Provide the full registered name of the organisation applying for funding
Business Type	Please select from the drop-down menu
Number of employees (including directors)	Number of staff in your organisation (this will help us confirm the nature of your company)
Number of employees that will be directly involved in the proposed project	State the number of employees from your company that you expect to be directly involved in the project you are proposing.
Business Registration Number	Your business registration number as listed by Companies House.
Turnover (in most recent annual accounts)	Please provide your most recent turnover figure from annual accounts and the date of those accounts

Balance Sheet Total (total assets net of depreciation)	Please provide your most recent balance sheet total (total assets net of depreciation) and the date of the calculation.
Business maturity	Please enter the age of the business since its formal formation, this includes any periods of dormancy with Companies House.
Does the business have a parent company?	We need to understand if there any significant shareholders in your business. The parent company details should be provided in the Parent Company details section.
How has the business been funded?	Please select all the types of funding that your company has received to date.
Which grant support category are you applying under?	You must select one of the subsidy categories from the drop-down list. The options are: Support for Research and Development projects – Industrial Research Support for Research and Development projects – Experimental Development For more details on the subsidy requirements, see Section 5 of these Guidance Notes. You must indicate that you comply with the financial obligation rules by providing the relevant information.
Is this a collaborative project?	If you are applying collaboratively, please provide details of the partner organisations in the Heat Pump Ready Programme Application Form. If you are applying as a collaboration you must also submit a copy of formal Heads of Terms agreed between all the collaborators. Prior to the issuing of a Grant Offer Letter, you will have to submit to BEIS a copy of the collaboration or joint venture agreement that you propose to work under. You should be aware that BEIS will not issue a Grant Offer Letter until they have seen, reviewed and approved a final draft of this agreement.

	Sub-contracting work to a third party does not classify as a collaboration.
Parent Company Details	If you have a parent company, or are more than 25% owned by another enterprise, you must provide the details of that enterprise here.

11.1.2 Project Description and Company Status

This section of the application asks you to provide an initial summary of your project and company as an introduction for the assessors.

Section/Field	Guidance
Company Status	This should be a summary description of your company which should set the scene for the assessors and introduce your company. This question is not scored but will be used by assessors to gain a high-level understanding of the company before they start their detailed assessment.

Section/Field	Guidance
Project Description	This should be a summary description of the project which should set the scene for the assessors and introduce your proposed project. You should use language that can be understood by people without specialist knowledge or expertise. This question is not scored but will be used by assessors to gain a high-level understanding of the project before they start their detailed assessment.

11.1.3 Business Proposition: Market, Competitive Landscape and Route to Market

This section focuses on the business opportunity that you believe exists, the potential return on investment and the products, processes, or outcomes from the project and how you plan to derive value from them.

Section/Field	Guidance
Question 1: **What are the business opportunities/market problems that this innovation and project address?** Describe the first addressable market for your innovation, including the size of this market. Describe the specific market sub-sectors that will be the initial target markets for your innovation in the first three years of commercialisation. Describe the problem that your innovation overcomes for this target market(s) and the customer value proposition. Describe the competing solutions/technologies to your innovation. Describe the Unique Selling Point of your innovation that enables you to differentiate it from the competition. Describe what	You should outline the business opportunity and technical solution that you have identified. You should describe the size of the market opportunities that this project might open up, including details of: Current nature of the specific market(s) at which the project is targeted (e.g., is it characterised by price competition amongst commoditised suppliers? Is it dominated by a single leading firm? Is it a UK market or a global one?). The dynamics of this market including quantifying its current size, value, actual and predicted growth rates. For highly innovative projects, where the market may be unexplored, you should explain what its size might be, (national/global), how the project will seek to explore the market potential and what sources you have used to reassure yourself that sufficient demand exists to justify the investment. You should describe the particular problem or issue that is facing your business, marketplace or customers that your innovation addresses. For example you should be setting out the current Heat Pump Deployment barriers and how the project addresses it. You should explain what the competing solutions to the problem are and what differentiates your innovation from these and why this would be a more attractive solution. You should provide evidence for your statements, including any independent corroboration, about the addressable market for project outcomes and set out any assumptions you have made.

independent justification/market research you have to substantiate all the above information.	

Question 2. **How will the outcomes for the project be commercially exploited?** Describe the business model that your company will use to generate value from the innovation (i.e. how will you generate revenue?). Describe the likely route to market for your innovation and the evidence as to how your project will lead you to a product the market wants. Describe and quantify the potential sales pipeline for your business based on the target markets described in Question 1.	You should describe the business model and route to market and how this will generate value / revenue by the end of this project. You should explain what you will be doing to address the market described in the previous question successfully, within the desired timeframe and cost. Applicants should list the potential exploitable outcomes of the project such as: Products or services Processes Applications You should describe how these outcomes will be exploited including where applicable protection of intellectual property rights, changes to business models and business processes and other methods of exploitation and protection. You should explain your anticipated routes to market, highlighting the initial one(s) and outline your strategy for developing market share with evidence. You should explain the projected market share for the project outcome, with justification in the light of any potential competitors. If you have customers or potential customers already in place these should be identified and evidence of their support provided, including any market research carries out. In addition to the immediate practical exploitation of the outcomes, you should identify and quantify the likely impacts of a successful project on your business and

	indicate the timelines over which these impacts will be realised. You should provide a potential sales forecast based on the target markets identified previously, showing both sales and revenues. For highly innovative projects, where the market may be unexplored, you should explain what the route to market could or might be using previously gathered evidence. You should provide evidence for your statements, including any independent corroboration, about the route to market for project outcomes and set out any assumptions you have made.

Assessor's questions to consider:

Question 1: To what extent are the business opportunity and market problem that this innovation and project address compelling?

Is there a clearly identified problem that this innovation is solving?

Has the applicant clearly identified and understood their target market?

For TRL 5+ (the minimum requirement for your project) justification for market selection would be expected.

Is the market opportunity large enough to support a business?

Does the applicant demonstrate an understanding of the customer value proposition appropriate to its TRL level?

How strong is the evidence for market potential?

Does the venture demonstration an understanding of the competitive landscape?

Does the innovation have a Unique Selling Point compared to competitor solutions?

Is the overall business opportunity and market realistic and compelling?

Question 2: To what extent is the proposed commercial exploitation of the outcomes for the project realistic? Has a route to market and business model been identified by the end of the project? Is the understanding and description of the business model and proposed route to market commensurate with the stage of the technology/project and in your view, is it realistic/does it make sense? TRL 5+ are expected to have a better developed understanding of their proposed business model and route to market. How robust is the case for exploiting the project outcomes to generate value? Does the applicant demonstrate a realistic understanding of market potential and future sales? How strong are industry / supply chain relationships? Are these at a level appropriate to the development of the innovation/applicant? Please provide letters of support. Are the plans to exploit the outcomes of the project realistic?

11.1.4 Innovation

This section focuses on the degree of innovation in your proposed project, the performance and cost of your innovation and the current and anticipated TRL level. You should complete the table in question 4 in as much detail as possible, where an innovation is at an early stage you should still complete the tables to demonstrate that you have considered these issues.

Section/Field	Guidance
Question 3. **Is your project predominantly software or hardware?** **a) Hardware** **b) Software** **c) Equal**	You should describe the stage of your technology/software and choose a TRL number if the project is predominantly technology. TRL levels indicate the level of maturity of the product or process. Using the guidance in Appendix 2 of this document, you should choose the TRL you feel most appropriate to the current state of your technology. The TRL chosen should be supported by the information provided.

[If answered a…] What is the current status of your technology and what has been completed or proven to date? Describe how your technology is innovative compared to existing/competing solutions. If appropriate, please include a photograph and/or schematic as a separate attachment. Describe the probability of overcoming the technical risks on delivering the stated aims of the project. **[If answered b…] What is the current status of your software and what has been completed or proven to date?** Describe how your software is innovative compared to existing/competing solutions. If appropriate, please include a photograph and/or schematic as a separate attachment. Describe the probability of overcoming the technical risks on delivering the stated aims of the project.	If predominantly software, please indicate the phase of the software. This should be reflected in the Project Plan on question 7 and 8. You should detail what has been done to date, (lab or bench demos, component tests, development prototypes, engineering or operational prototypes) and over what timescale. What is the latest position with the innovation and where is it located? If you were showing the innovation to us today, what would we see? Describe any break downs of assumptions and definitions you may have. This includes any legal restraints that may arise. Outline any results that you have had to date and any sources of technology/software you have used. You should demonstrate the level of reliability and current effective run time (if appropriate) of your innovation. You should justify credibility of the approach with relevant pilot/demo data. You should describe the evidence you have which substantiates your belief that the intended work is innovative – this should not be based on your opinion alone. Evidence could include the results of patent searches, competitor analyses, literature surveys etc. If applicable, you also should briefly outline your own background IPR, as related to the project. You should also include any data that you may already have collected that demonstrates the performance of the innovation. You should describe the probability (low/medium/high) of overcoming the known technical risks associated with successfully delivery the aims of the project. Describe the approach taken to known technical risks and how you intend to overcome them. You should provide evidence for your statements, including any independent corroboration, and set out any assumptions you have made.

Describe, if conducted, any discovery phase testing that has taken place. **[If answered c…] What is the current status of your technology/software and what has been completed or proven to date?** Describe how your technology/software is innovative compared to existing/competing solutions. If appropriate, please include a photograph and/or schematic as a separate attachment. Describe the probability of overcoming the technical risks on delivering the stated aims of the project.	
Question 4. **Complete the Table below to describe the cost and performance of your technology. Quantify the expected improvements in the cost and performance as a result of undertaking this project.**	You should select the type/area of benefit which your innovation offers from the drop-down list. The options are: Cost of Energy reduction Cost of Process reduction Greenhouse gas reduction Energy Efficiency Conversion efficiency Other

	N.B. Exceptionally, if you have selected “Other”, you must explain this in the text box below the drop-down list. You should complete the table to describe the current cost and performance of your technology; the expected cost and performance of your technology at the end of the project; and the target costs and performance for your technology within 5 years of commercialisation. You should specify: The unit size of the innovation at each stage The estimated performance of the innovation at this size, using industry standard metrics, for example: Conversion ratio Cost per kWh or MWh Efficiency factor Operating level Levelised Cost of Energy (LCOE) The estimated cost of each unit of the innovation at that size The estimated price per unit The estimated sales volume of units The estimated gross profit margin per unit as a percentage You should set out a comparison of your innovation’s costs and performance against incumbent / competing technologies and you should demonstrate the source of your comparators. You should provide evidence for your statements, including any independent corroboration, and set out any assumptions you have made regarding sales forecast and overheads. You should demonstrate that your margin is sufficient to cover your overheads, i.e. that the business is viable.

	You should describe any infrastructure your innovation may require, including information on how these may change over time or with scale, for example: Geographical location Site co-location System integration, inputs or conditions You should describe any environmental impacts directly or indirectly resulting from your innovation. Include how these may vary over time, for example: Emissions Noise or vibration Visual intrusion You should describe any regulatory requirements critical to the success of commercialising innovation, including how these may vary over time, for example: Planning consents Environmental permitting Other industry specific requirements

Assessor's questions to consider include (but not limited to):
Gateway question: Is the innovation technically feasible?
Question 3a: To what extent is the TRL chosen an appropriate assessment of the technology readiness based on the description, costs and activities to date? Is the TRL chosen an appropriate assessment of the technology readiness based on the description, costs and activities to date? To what extent does the technology demonstrate innovation over existing/competing technologies? Is the innovation well-planned and based on reasonable technical assumptions and/or proven data points?

Is the probability assigned to the technical risks reasonable? Can the technical risks be overcome? **Question 3b: To what extent is the software phase chosen an appropriate assessment of the software maturity based on the description, costs and activities to date?** Is the software phase chosen an appropriate assessment of the software maturity based on the description, costs and activities to date? To what extent does the software demonstrate innovation over existing/competing technologies? Will the software be ready for Live phase by competition of the project? Is the innovation well-planned and based on reasonable technical assumptions and/or proven data points? Is the probability assigned to the technical risks reasonable? Can the technical risks be overcome?
Question 4: How far does the innovation show performance / cost improvements over incumbent or competing technologies? Are the costs of the technology well understood? Does the technology demonstrate an achievable pathway to commercially viable costs? Will the project result in tangible improvements in performance of the technology? Does the project contribute to reducing the cost of the innovation? Does/will the technology demonstrate performance improvements of over incumbent technologies?

11.1.5 Impact on Climate Change Targets and/or Security of Supply

This section focuses on the impact on climate targets and/or security of supply that you believe your innovation will have.

Any data or references that might help to support your answer that cannot be included in the application form should be provided to BEIS as a separate attachment. These may include for example tables of data, diagrams.

Section/Field	Guidance
Question 5. **How will the innovation impact on carbon targets and/or security of supply and over what timescale?** For a single unit of your product or service, quantify the tonnes of carbon saved and compare this against the estimated unit costs (given in Question 4) to give a price/tonne of carbon saved (state all assumptions). Please state the carbon/greenhouse gas emissions savings that your product/service could enable o nce it is established in the marketplace and over what timescale. Please state the market penetration and sales volume assumptions you have used.	You should highlight how your innovation will make an impact on climate change targets and/or security of supply. For example: Is it through change in user behavior resulting in reduced energy usage? Does the innovation reduce the cost of installation and/or maintenance for existing equipment? Is it through improved performance characteristics of a component or a material leading to greater efficiency? You must quantify the potential impacts on greenhouse gas / CO2 emissions. Using data provided in previous sections around market size, share and assumptions around market penetration you should highlight the potential for car bon or energy savings. Where impacts are around cost reductions and savings, the size and scale of these should be estimated. You should use the cost information provided in answer to Question 4 to calculate the cost per tonne of CO2 saved. You should describe to what extent the proposed level of grant from BEIS represents value for money in terms of the future installed system cost per tonne CO2 saved by that system or product. You should justify this, for example explaining where the product / technology would sit on the Vattenfall/McKinsey abatement curve. You should identify the timescales over which the impact will take place taking into account when the innovation would expect to reach market and its uptake within the marketplace. You should consider whether any technologies that are currently being developed will supersede your innovation. These technologies should be

	highlighted and the potential impact on the timescales considered. Where possible, you should also provide relative data against existing technologies, products or processes to highlight the comparative savings. Applicants may also wish to consider calculating the payback period for the innovation to demonstrate the benefits of their innovation. Applicants may also wish to consult BEIS's guidance for valuation of energy use and greenhouse gas emissions at the link below. This provides data and information and a toolkit for calculating the impact of changes in energy usage. https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal You should outline your methodology and provide evidence for your statements, including any independent corroboration, and set out any assumptions you have made.
Question 6. **How will the project work with end users/ the supply chain to codesign the technology/tool?**	You should demonstrate how you will collaborate with end users/ throughout the supply chain, and a fair and responsible approach to working with supply chain partners/ end users in design of the technology/tool. Demonstrate with evidence how you will influence staff, suppliers, customers and communities through the delivery of the contract to support resilience and capacity in the supply chain. Analyse and describe how the delivery of the technology/tool will support social value.

Assessor's questions to consider:

Question 5: How attractive is innovation's impact on carbon targets and/or security of supply?
Are the carbon numbers quoted Heat Pump Ready Programme Specific? Does the innovation save carbon directly or is it an enabler? What is the time of innovation to market? What is the chance of success of market adoption? What is the likely scale of market adoption? What are the likely impacts over different timescales? What are the comparative benefits against similar technologies? Does the technology represent (or potentially enable) reduced carbon abatement costs respective to its target market? Is the offered impact on 2050 targets or security of supply attractive at this stage of development? When commercialised, would this technology offer an impact on carbon targets or security of supply in its target market?

11.1.6 Project Plans

This section focuses on what work you plan to do during your project, the key milestones and timings, risks associated with the project and how you propose to manage the project. A project Gantt chart (or similar) should also be submitted as a separate file. The details provided below should match what is provided in the Gantt chart.

Section/Field	Guidance
Question 7. **Describe the Scope of Work, key work packages and milestones for the project.**	You should describe the programme of work you intend to undertake with the funding. You should provide an overview of the technical approach you propose to take including the main objectives including an estimate of the minimum level of technical or cost performance that the proposed project needs to demonstrate (how big a step is this?). You should state the relevance to the competition objectives.

Describe the technical approach which is being taken to develop and demonstrate the technology. Include an explanation as to why this is the most suitable technical approach. List other individuals / organisations that you plan to contract/work with as part of delivering this project. Describe how the components you are proposing to develop are different from those already commercially available. Describe where the innovation will be at the end of the project and state what TRL you expect to have reached.	You should include alternate R&D strategies that could be used and explain why the approach you have chosen will provide better outcomes. The timeliness and novelty of the research aspects of the project should be highlighted and explained in an industrial/business context. If your project includes software, you should confirm that you are able to complete the software in the timelines set out. Identify the key milestones of the project and any interdependencies between the various work packages. Please note that this includes when projects should take part in stage gate reviews. Applicants should also outline the key deliverables for the project. Identify any go/no-go decision points in the project (e.g., dependencies on achieving particular performance milestones or component solutions). You should identify who will be carrying activities out (including any collaborators, customers, suppliers, subcontractors, research organisations, certifying bodies, etc.) and outlining the resource and management requirements and highlighting any sub-contracted work and how you propose to manage the project. This includes demonstrating sufficient resource commitment and capability/experience to undertake the project, with clear management reporting lines identified. Using the guidance in Appendix 2, you should choose the TRL they feel will be most appropriate to your innovation at the end of the proposed project. You should justify the TRL which you have selected. If using predominantly software, please choose the phase you feel most appropriate to the innovation at the end of the project as outlined in Appendix 2.1. You should demonstrate the expected level of reliability and effective run time (if appropriate) of your innovation by the end of the project. If you were showing the innovation to us at the end of the project, what would we see?

	You should provide evidence for your statements, including any independent corroboration, and set out any assumptions you have made.
Question 8. **What are the project success factors, risks and management for these?** Describe the top three critical success factors for this project. Describe how these success factors will be measured. Describe the top three challenges to delivering this project. Please provide a risk register covering: key commercial, regulatory, operational, environmental risks including how these will be monitored and managed Summarise the key risks associated with the project and how these will be monitored and managed.	You should describe the critical success factors for your project. You should explain why these are important, how you will measure them and how they will be managed during the project in an appropriate project work plan. You should describe the main challenges to delivering the project, which should link to the risk assessment description. Identify key project management tools and mechanisms that will be implemented to provide confidence that sufficient control will be in place to minimise operational risk and, therefore, promote successful project delivery. This should include the arrangements for managing any significant sub-contractors. In addition to the basic risk register template provided in the application form, you may provide a separate Risk Register for your project. You should consider risks and issues of the following types: Operational Commercial Technical Personnel / Health and Safety Regulatory BEIS recognises that projects of this type are inherently risky. However, it seeks assurance that the projects it funds have adequate arrangements for managing this risk. In the summary risk register, describe the main risks, and then rate as High/Medium/Low (H/M/L) for both impact and probability. Describe whether each described risk can be accepted, transferred or mitigated. Assign the residual risk to the project as Red/Amber/Green.

Assessor's questions to consider:
Question 7: How appropriate is the technical approach for the demonstration and development of the technology/tool? Are the milestones realistic? How appropriate is the technical approach for the demonstration and development of the technology? Are the work packages and milestones realistic? (e.g., is it well planned, thought through, costed, under/over ambitious for the timeframe, skills in place or to be recruited). Will the deliverables demonstrate tangible progress/value inflection? Given the stage of the technology development and the context of what the project wants to achieve, give your view of the strength of the industrial/partner relationships that are mentioned in the application (e.g., is there indication that they have the necessary relationships for this next stage of development)? Is the outcome TRL/stage chosen commensurate with the activities and outcomes of the project?
Question 8: How well have the critical success factors and the management of risk been considered and evidenced? Based on your experience, does the project scope look feasible and what are the key risks for project delivery? Please score your view of relative delivery risk. How well have project challenges been described? How well does the venture recognise the critical success factors and risks for the project? How well has the management of success factors and risks been evidenced?

11.1.7 Project Funding

This section focuses on the finances of the project and the justification for the funding that you require. The BEIS Project Cost Breakdown / Finance Form should also be downloaded, completed and submitted as part of the application. The numbers provided in the application form should match those within the Project Cost Breakdown Form.

Any data or references that might help to support your answers that cannot be included in the application form should be provided to BEIS as a separate attachment. These may include for example tables of data, diagrams.

Section/Field	Guidance
Total company contribution	This is the amount of total eligible project costs that you (and any partners / collaborators) will be paying from your own resources/private sector investment into the project.
Source of company contribution	Please state the source of your company contribution to the total costs (your match funding). If you have partners / collaborators, include their contributions here as well.
Amount of BEIS grant applied for	This is the amount you will be asking for from BEIS. You should ensure that you do not request a grant higher than the maximum allowed, taking into account all public sector funding for the project.
Other Public sector funding applied for	Please provide full details of other funding that you are currently applying for or have already applied for or received in relation to this particular project. This data is important as other public sector support is counted as part of the grant you can receive for the project and total subsidy contribution. Do not include grants that have been used to reach this point in the development process and are now completed. Please include this information in 1.1.
Total project value	Please add total company contribution, amount of BEIS grant applied for and other public sector funding applied for to give the total value of the project
Grant funding requested as a percentage of total funding	Input percentage calculated in the Project Cost Breakdown Form. N.B. This figure must be compliant with the relevant subsidy category under which you are complying.

Project Start Date and End Date	Please indicate when (subject to approval) you would expect to be able to start your project, and when you expect it to complete. Please be aware that there are restrictions on project length and make sure your project completes within the maximum time allowed. The start date should only be considered as an indication. Should you start your project before final approval any costs will be incurred at your own risk, will not be eligible for grant, and will not be included in project costs you can claim against.

Section/Field	Guidance
Question 9. **Provide a summary of the main areas of spend within the project. Including information on the expected origin of your company contribution.**	Please provide a narrative description of the anticipated project costs, making clear the level of contribution from the business and the level of funding required from BEIS. This should match the details provided at the start of the application form as well as within the Heat Pump Ready Programme Project Cost Breakdown Form, with any supporting information and explanation provided in this section of the application form. This is the section where you can describe the breakdown of costs between your organization and any partners / collaborators. You should attempt to demonstrate that: The budget you are proposing is realistic for the scale and complexity of the project. If applicable financial commitment from other sources is demonstrated for the balance of the project costs. The budget breakdown is realistic and consistent with what is being proposed. The spend profile matches the work packages and project plan. Please state the amount of sub-contract funding (if any) within the expected spend of the project and

	justify the necessity for this spend as opposed to the addition of collaboration partners. Please state the amount of funding requested for academic partners (if any) and justify this spending using the Transparent Approach to Costing (TRAC) methodology to calculate 80% full economic costs. Guidance on eligible costs is provided in Appendix 1.
Question 10. **Please provide a summary of your funding and spending history on the innovation to date.** Provide the total invested in the innovation to date, itemised by category e.g.: Grant funding, own cash invested, external funding received/invested, non-cash investment i.e. personnel resource etc. Provide a high level breakdown of how funds have been spent to date. Describe the other sources that you have approached, organisations and companies that you have contacted.	You must provide a clear breakdown of previous funding and spend on your innovation, including any grants or awards received, and how these have been deployed, which should reflect your answer to Question 3. You should differentiate and value different types of funding / investment. You will need to demonstrate the added value of public funding for your proposed project. To demonstrate this, you will need to provide evidence that: There will be an increase in your total Research & Development spend on low carbon technologies in the UK; and either: Why you are not able to wholly fund the project from within your business's own resources; or How BEIS's funding would allow you to undertake the project differently or more quickly and why this would be beneficial to the UK. Please provide full details of other public funding that you have received, including but not limited to grants and investments, received to date, in relation to this, or related, projects. Related projects mean any projects using resources or assets (including intellectual property) which are being used by this project. You must include any grants that have been used to reach this point in the development process and are now completed or close to completion and any for which an application is underway or in progress.

	You should describe other sources of funding you have explored to fund this project and the outcome of these discussions. Public funding should not be the first option for your project.

Assessor's questions to consider:
Question 9: How appropriate is the proposal financially? Is the overall budget realistic and justified in terms of the aims and methods proposed? Do the project costs provide fair market value? How well thought out and appropriate are the project financial plans? Is the overall budget realistic in terms of the aims and methods proposed? Is the project's match funding realistic? (If required) Is the case for sub-contract funding well made as opposed for sub-contractors being consortium partners? (If required) Is the case for academic partner spend well justified?
Question 10: To what extent has the applicant demonstrated value for money in previous funding? How strong is the case for added value of public funding? Has appropriate progress been demonstrated in the innovation given the level of funding received to date? Is the case for public funding justified? How strong is the case for public funding? Have alternative sources of funding been explored and explained? What added value does public funding bring to the development of the innovation? What added value to UK PLC would public funding bring?

11.1.8 Experience and Skills

This section focuses on the experiences, skills and track record of your business and its personnel.

Section/Field	Guidance
Question 10. **Please summarise the company's relevant experience in delivering projects and evidence relevant experience of the key personnel involved in the project.** **Please demonstrate that you have all the necessary industry and supply chain relationships in place to deliver this project.**	You should highlight the experience of your management and delivery team and key personnel within your organization (and any partner organisations) that are involved in the project. This should focus on experience in project management, technology commercialisation, business development and raising finance (i.e., loans, equity finance). You should detail any track record individuals involved or your business has in undertaking and exploiting the results of research and development projects, to show your capability to develop and exploit the technology. If you feel the acceleration support aspect of the scheme might be able to provide additional skills or knowledge necessary for the successful completion of the project you should highlight these in this section. You should detail and explain and industry or supply chain relationships which are necessary, or which will help you to deliver this project. You should demonstrate sufficient resource commitment and capability to undertake the project, as described in Question 7 and your Gantt Chart, with clear management reporting lines identified.

Assessor's questions to consider:
Question 10: To what extent does the organisation and delivery team have the right skills and experience to deliver the projects intended benefits to time and quality? Can any skills gaps be addressed by the acceleration support? Have all the partners / sub-contractors been described? Has the delivery team been described? Are there any skills gaps, if so, is the applicant aware of them?

How will any skills gaps be addressed? Are industry / supply chain relationships adequate to deliver the proposed project? N.B. please consider within context of the TRL of venture and expected team experience/size for a venture of that TRL and/or with regards to software, the Government Phases for Agile Projects (Appendix 2.1).

11.1.9 Public Statement

This section provides a public statement that BEIS can use for publicity purposes.

Section/Field	Guidance
Public statement	This should be a brief summary of the project which should describe your company and project. You should use language that can be understood by people without specialist knowledge or expertise. It should explain why the project is innovative and describe the key aims and objectives. BEIS reserves the right to amend the description before publication if necessary but will consult you about any changes. This should not contain reference to any intellectual property as this description will be made available in the public domain if the application is successful. This question is not scored.

11.2 Completion of the Heat Innovation Programme Project Cost Breakdown Form

You will need to complete the financial details in the Financial Summary section of the application form and also complete the BEIS Project Cost Breakdown Form. The information in both sections should be consistent.

You should only submit one project cost breakdown form for the project, which should combine the costs of all project partners. Within the project cost breakdown form and the application, you should make clear how funds will be split between partners.

The BEIS Cost Breakdown Form consists of 9 worksheets:

Summary

Project Location

Labour and Overhead costs

Material costs

Capital equipment costs

Stream 3 - Trial Support and Learning Participation costs

Sub-contract costs

Travel and subsistence costs

Other costs

Each of these sheets can be accessed by using the scroll bar at the bottom of the worksheets.

Within the spreadsheet there are grey cells which are auto-calculating based on data in the manual entry cells, information should not be entered into these. All blue cells are manual entry boxes or drop down boxes into which data can be input; Each tab provides example in the first row on how to fill out the form. Additional guidance on exactly what information should be input often be found by clicking into cells.

Guidance on eligible costs is provided in Appendix 2 of these guidance notes.

Guidance on what needs to be entered in some fields is provided within the sheet when you click on the box.

Worksheets only need to be completed if you have costs in those categories, so for example, if your project has no planned capital equipment or sub-contract costs, the form will assume these entries are £0 and calculate without them.

11.2.1 Project Quarterly Breakdown Worksheet

This worksheet provides the breakdown of all costs across the duration of the project. It represents the spending profile you expect for your project. In entering this information you

should ensure that the profile is consistent with the timings of the various work packages you are proposing within the project plan.

You must ensure that the total, in the spread-sheet, for each category matches the total that has been calculated on the individual worksheets.

12. Annex 1 – Travel and Subsistence Policy Summary

Applicants may include, as part of the project costs, the associated day rate for staff to participate in the required *Stream 3 - Trial Support and Learning* activities, in addition to travel and subsistence. All travel and subsistence for the activities associated with *Stream 3 - Trial Support and Learning* interactions must be in line with BEIS staff policy which is summarised below (full policy available on request):

Accommodation: When required as part of attending *Stream 3 - Trial Support and Learning* activities to stay overnight prior to or after an event that is a significant distance from your home or work, accommodation may be claimed at the following rates:

- London: £140 per night – including breakfast
- Elsewhere (UK): £100 – including breakfast

Travel:
Rail travel is the preferred method of transport due to the options available for cheap, advanced tickets, journey comfort and having a relatively low environmental impact compared to other forms of transport. Rail travel must be booked at standard class however by exception, first class travel may be permitted where BEIS is satisfied that:

- it would constitute a “reasonable adjustment” under the Equality Act;
- a temporary “reasonable adjustment” is required e.g. due to injury or pregnancy related, or a condition where it will impact safety or cause a worsening or adverse effect on the condition;

First class travel must be approved by BEIS ahead of travel.

Car travel is not a favoured form of transport for BEIS unless travelling as part of a group. Where travelling as a group, mileage is claimable at a rate pf 45p per mile for up to 10,000 miles per year, with a 5p mile supplement per passenger. It is the responsibility of the driver to ensure car is in good working order of their car, compliance with MOT regulations, and suitable insurance for work purpose; the associated cost of these are not eligible under BEIS policy.

Taxis are permissible where:

- staff travelling alone or in small groups feel more secure than taking public transport;
- this is an appropriate reasonable adjustment (this includes journeys to work where agreed with HR); and/or
- it is the most economical transport available considering journey time or number of travellers.

Subsistence:

Breakfast (early start from home) – rather than staying overnight ahead of *Stream 3 - Trial Support and Learning* activities, attendees may claim £5 for breakfast where they leave their home 90 minutes earlier than usual to attend the event

- Lunch - where lunch is not provided at the event, £5 may be claimed.
- Evening meals: dinner, or evening meal may be claimed when staying overnight, with an expense of £15 per night, which includes a soft drink only.

For each of the above, project teams should retain their receipts to be reviewed by their Monitoring Officer.

13. Annex 2 – Eligible Costs

13.1 General Guidance on Eligible Costs

BEIS will only provide the grant to cover eligible project costs incurred and defrayed in the period between acceptance of the BEIS grant and the deadline specified in the grant offer letter for completion of the project.

The definition of eligible costs includes the applicant's own costs, eligible costs incurred by consortium members and eligible costs incurred by companies connected to any of these incurred in delivery of the agreed *Stream 2 - Developing Tools & Technology* project. The cost of work contracted to connected companies, to consortium members or to companies connected to consortium members should be on the basis of eligible costs.

Costs must be denominated in GB pounds. Applicants should indicate where conversion has been made to GB pounds from other currencies and indicate the rate and assumptions used.

13.2 List of Eligible Costs

Eligible costs are defined as the following:

- Personnel costs: researchers, technicians and other supporting staff to the extent employed on the project, including participation in required dissemination and knowledge sharing activity (co-ordinated by the HPR *Stream 3 - Trial Support and Learning* contractor);
- Costs of instruments and equipment to the extent and for the period used for the project. Where such instruments and equipment are not used for their full life for the project, only the depreciation costs corresponding to the life of the project, as calculated on the basis of generally accepted accounting principles are considered as eligible;
- Costs for buildings and land, to the extent and for the duration period used for the project. With regard to buildings, only the depreciation costs corresponding to the life of the project, as calculated on the basis of generally accepted accounting principles are considered as eligible. For land, costs of commercial transfer or actually incurred capital costs are eligible;
- Costs of contractual research, knowledge and patents bought or licensed from outside sources at arm's length conditions, as well as costs of consultancy and equivalent services used exclusively for the project;
- Additional overheads and other operating expenses, including costs of materials, supplies and similar products, incurred directly as a result of the project.

13.3 Guidance on Rates for University Consortium Partners

University partners can be part of a *Stream 2 - Developing Tools & Technology* consortium where they are needed to add value to a project. Where higher education institutions are carrying out non-economic activities, they can claim 80% of the Full Economic Costs (FEC) of their project work, calculated using the Transparent Approach to Costing (TRAC) methodology. This is in line with the approach taken by other Government funding bodies which are funding higher education institutions. If higher education institutions are carrying out economic activities on a *Stream 2 - Developing Tools & Technology* project, they will be allocated grant funding at the relevant grant intensity level for the size of the organisation and the type of innovation activity undertaken (see Section 6.1 for guidance on grant intensity levels).

13.4 Guidance on Overhead Rates

Overheads are additional, indirectly incurred costs that are necessarily incurred by the applicant in undertaking the work. BEIS normally calculate overheads as a fixed percentage of all direct labour costs at 20%, but in exceptional circumstances, that must be fully detailed in the application, BEIS will generally pay overhead rates between 10% and 40% of labour rates. The overhead rate is agreed with BEIS before the Grant award documents are issued and cannot be changed during the work.

13.5 List of Ineligible Costs

Under no circumstances can the grant be claimed or used:

- For activities of a political or exclusively religious nature;
- In respect of costs reimbursed or to be reimbursed by funding from other public authorities or from the private sector;
- In connection with the receipt of contributions in kind (a contribution in goods or services as opposed to money);
- To cover interest payments (including service charge payments for finance leases);
- For the giving of gifts to individuals, other than promotional items with a value no more than £10 a year to any one individual;
- For entertaining (entertaining for this purpose means anything that would be a taxable benefit to the person being entertained, according to current UK tax regulations);
- To pay statutory fines, criminal fines or penalties; or
- In respect of VAT that you able to claim from HM Revenue and Customs.

13.6 Guidance on Costs of Key Senior Staff

BEIS would not normally expect to see staff in key, most senior positions, e.g. CEO, FD, etc, included in applications as core project staff. Exceptionally, where BEIS is willing to provide a grant which covers the cost of staff in key senior positions, the day rate attributed to each member of key staff within the project must be agreed with BEIS at the outset and cannot be varied without written agreement.

14. Annex 3 – Technology Readiness Levels (TRLs)

Technology Readiness Levels are an indication of the maturity stage of development of particular technology on its way to being developed for a particular application or product. Below are some broad definitions of the TRLs.

Research	
TRL 1 – Basic Research	Scientific research begins to be translated into applied research and development.
TRL 2 – Applied Research	Basic physical principles are observed, practical applications of those characteristics can be 'invented' or identified. At this level, the application is still speculative: there is not experimental proof or detailed analysis to support the conjecture.
Industrial Research (guideline)	
TRL 3 – Proof of technical concept	Experimental proof of critical technical functions and validation of feasibility for application. Active research and development is initiated. This includes analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology. Examples include showing the performance of critical technical features or components are feasible (even if not yet integrated or representative of real-life environment).

	This stage is beyond “discovery science” (TRL1) and applied research (TRL2) and investigates a novel technological or scientific advance with some category of application in mind. The scientific principles of the novel or innovative aspect are already characterised with hard experimental data points that enable prediction of performance, but the science is not necessarily in the final engineered format. In this stage, analytical and experimental studies measure parameters of interest, characterise properties and performance, and validate the theoretical predictions. For example, with new materials or combinations of materials, a range of formulations or combinations may be tested to explore the boundaries of performance and to select a combination with the necessary properties for commercial exploitation. System components are not yet fully integrated e.g. the lab demonstration of a new photovoltaic material may show desired properties in a controlled atmosphere but applications will require a suitable encapsulation method. Technology principles may be demonstrated in computer models and computer simulated environments where appropriate. A key output from this stage is to identify how results differ from the expected or necessary performance for future applications and where improvement is necessary.
TRL 4 – Lab and Test Bench Demonstrations	Lab and Test Bench Demos of sub-systems & key components. Modelling & experimentation with parameters representing future conditions. Application proof-of-concept. Modelling and experimentation with data or parameters that represent future conditions (cf. TRL4). “Bench” demonstrators’ show that the core technology components or subsystems based on the lab research could be engineered in practice, behave as predicted, and results indicate that the performance needed for a future application is achievable albeit with further optimisation. Bench demonstrations may focus on the key innovative component of the proposed system/product or

	demonstrate an entire system with simulated inputs or use of substitute subsystems. For large scale technologies the “bench” demonstration may be at smaller scale and would include tests of scale models in tanks and tunnels. If new manufacturing methods will be required, the feasibility of these will be investigated at this stage.
TRL 5 – Development Prototypes	The system, sub-system, components, or sub-scale units are integrated with reasonably realistic supporting elements so it can be tested in a simulated or representative environment. Critical cost assumptions are carefully investigated and the feasibility of the proposed manufacturing process is tested. A new manufacturing step may require a separate “product development” process for the manufacturing equipment. Prototype components and sub-systems are developed and improved to show that all the proposed technical components can provide the performance which will be required for future application (including: longevity, reliability, energy efficiency). Representative hardware and software components are tested in way that realistically simulates anticipated operating conditions or allows realistic predictions to be made. A relevant environment may be: laboratory test rigs with simulated use conditions, a controlled operational environment, or basic field tests. A test rig for new component technologies may be a version of the end-product. Intended functionality, size/form factor, and performance features are known at this stage. Successful development prototypes (components) become the basis for a demonstration prototype for full field tests.
Experimental Development (guideline)	
TRL 6 – Engineering or Demonstration Prototype	Full-scale system in representative conditions - Engineering Prototype. Representative full-scale

	prototype system is tested in a relevant environment. Proof-of-application. Critical cost factors and new manufacturing capability are refined at this stage e.g. use of cost effective materials, demonstration that new components can be manufactured, demonstration of any new manufacturing steps or processes. Not all secondary interfaces or user features are (necessarily) available yet. Representative prototype is demonstrated in a relevant environment to prove engineering feasibility. The component/sub-system designs selected at previous stage are validated. Demonstration prototypes are typically fitted with a range of monitoring/measurement systems and operated in real-life systems and conditions with continual adjustment to confirm or optimise performance claims. Core functionality, size/form factor, and benefits of the proposed product should all be demonstrable but not all end-user features or interfaces are necessarily available at this stage. Some third part measurement validation or tests are usually best done at this stage (particularly to validate improved performance over other technologies or to confirm any necessary certification and approvals that need to be obtained).
TRL 7 – Operational Prototype (Alpha Product)	Near or at planned operational system, requiring demonstration of an actual system prototype in an operational environment. Prototype for prolonged use at “tame” client or user site. All planned functions, interfaces integrated for monitored trials under the developer’s control. Alpha product prototypes are at or close to the proposed final product configuration which can be fully tested in an “in-house” trial in operational or client-like environments with integration to all systems or interfaces which will be experienced in-use. Alpha trials should validate in-use performance and also test the following: integration to all other relevant systems, features needed to

	support proposed installation and maintenance procedures, exposure to all other influences likely to be experienced in the “user-environment” etc. All the manufacturing steps will be tested at this stage and repeatable samples provided. Third party specialist tests would be done at this stage if not possible earlier. Prototypes may have minor re-designs following alpha tests but should not be subject to major re-designs if earlier stages have been completed properly. “In-house” means the developer runs and the trial and has access to the system(s) during the trial. Performance is not public but Alpha tests could be at "tame client" sites. Companies would not typically expect to sell prototypes at this stage.
TRL 8 – Production Prototype (saleable Beta product)	System Incorporated in Commercial Design - Production Prototype (or process). Development is complete, final design and feature set, limited release to appropriate number of clients, all fulfilment procedures trialled and documented. Trials under client / users control and operation. Technology is proven to work - technology design for production or roll-out is completed and qualified through test and demonstration. Development complete, final design and feature set, limited market release to appropriate number of clients, all fulfilment procedures trialled and user documentation complete. Saleable product. (cf. TRL 8 / 9) A beta or pre-production prototype is the configuration which the venture expects to sell repeatedly. These designs are finalised to a product specification and ready for repeat production. Client trial would validate: all the features and functions of the system perform as needed under expected conditions. A full product beta test includes trialling sales processed (to some extent by signing up “beta-clients”), delivery and installation procedures,

	integration and commissioning procedures, instructions for use, monitoring, support and maintenance procedures. Suppliers will provide short-runs of components or assembled product. There needs to be a sufficient number of beta-sites to validate the product or solution is repeatable and reliable. At the end of a successful beta test the company should be in a position to sell the product to a client for reliable on-going use. Repeated sales may be measured in 10's or 1000's depending on the technology and the cost of making iterations or improvements to the product design. However, by the above staged process, when the "beta" product prototype is prepared the venture has confidence that they could make repeated sales which will not require a re-call or levels of remedial support that would hamper the company's future progress.
TRL 9 – Marketable Product	Marketable Product: proven in repeated use - Product being sold in market, scaling up sales volumes. Actual application of technology is in its final form - Technology proven through successful operations.

15. Annex 4 - Agile Phases for Software Development

The table below provides a summary of the software development phases in agile delivery. Please see https://www.gov.uk/service-manual/agile-delivery for full descriptions.

Phase	Definition	Duration	Stages

Discovery Phase	Before you commit to building a service, you need to understand the problem that needs to be solved. That means learning about: - your users and what they're trying to achieve - any constraints you'd face making changes to how the service is run - for example because of technology or legislation - the underlying policy intent you've been set up to address - this is the thing that government wants to change or make happen - opportunities to improve things - by sharing data with other teams, for example What you learn during discovery should help you work out whether you want to move forward to the alpha phase. Running an alpha means you've decided that the benefits of looking further into the problem outweigh the cost.	There's no set time period for a discovery, but around 4 to 8 weeks is typical. If you're working on a problem that no one's researched before, you might need a bit longer.	Set your goal for delivery Define the Problem Focus on learning: - Understanding users and their context - Understanding constraints - Identify Improvements you might be able to make - Consider how to measure success Consider how to share learnings
Alpha Phase	Alpha is where you try out different solutions to the problems you learnt about during discovery. Spend alpha building prototypes and testing different ideas. With any online solutions you try out, build things that are just complex enough to let you test different ideas, not production quality code. Expect to throw away any code - and lots of the ideas you test - at the end of alpha. By the end of alpha, you should be in a position to decide which of the	Alphas tend to last between 6 and 8 weeks. Which means you should book your alpha assessment within a fortnight of starting your alpha.	A crucial part of alpha is identifying your riskiest assumptions and testing them. What these are will depend on the service you're building. There are a couple of points in the standard you'll want to pay particularly close attention to at alpha. Point 2 of the standard says you need to work towards solving a whole problem for users. Point 3 of the standard says your service needs to work

	ideas you've tested are worth taking forward to beta.		well across all the channels a user might use to access it. Test Accessibility Alpha is finished when you've got a prototype that's substantial enough to help you make a decision about whether to move on to the beta phase or not.
Beta Phase	The beta phase is where you take your best idea from alpha and start building it for real. It also involves thinking about how your service will integrate with (or start to replace) existing services, and preparing for the transition to live. Structure your beta phase so you can roll out the service to real users - while minimising risk and maximising the potential to learn and iterate the service. You'll start out in 'private beta'. This involves inviting a limited number of people to use your service so you can get feedback and improve it. Once you've improved the service and are confident you can run it at scale, you take an assessment to move into 'public beta'. This involves opening up your service to anyone who needs it. If you're replacing a legacy service, keep the legacy service running until your new service moves into its live phase.	You should book your assessment 6 weeks before you want to be assessed.	During beta, focus on making sure that the solution you've chosen works as well as possible by carrying out user research and starting to gather data on how successful the service is based on the success metrics you identified in alpha. Iterate the service based on what you learn. Meeting points 2 and 3 of the standard at beta involves slightly different things than it did at alpha. Point 2 of the standard says you need to work towards solving a whole problem for users. Point 3 of the standard says that you should work towards providing a service that works well across all the channels a user might use to access it. You'll need to show that you're making reasonable progress in improving the

			user's experience in different channels. As part of providing a service that everyone can use, at your beta assessment you'll need to show how you've run regular accessibility testing on your service and run research sessions with disabled people.
Live Phase	The live phase is about supporting the service in a sustainable way, and continuing to iterate and make improvements. You'll also: - continue to address any constraints you identified at beta - continue to develop the service and work with other organisations providing services that are part of the same journey, so that you're iterating towards solving a whole problem for users - transition or integrate any existing transactions that meet a similar need to yours - making sure that what you end up with has a scope that makes sense to users	Dependant on Project	You'll need to work out how to run your service sustainably during live. This does not necessarily mean having an agile team on the service 100% of the time. Spend time during public beta working out what level of continuous improvement it makes sense to support, and who you'll need on the team.

16. Annex 5 – Net Zero Innovation Portfolio Key Performance Indicators

BEIS requires all funded projects under the Net Zero Innovation Portfolio (NZIP) to report on key performance indicators (referred to as NZIP KPIs) to provide a consistent approach to reporting evidence, and to track and measure key outputs, outcomes and impacts. The evidence collected is used to demonstrate the impact of the NZIP on achieving the government's Net Zero ambitions and is necessary to be able to run future competitions.[6]

Project lead organisations will be required to report on KPIs at various intervals for each project, including at the start of the project, during project delivery, at project closure and for three years after project closure. BEIS will supply funded projects with a reporting template to complete at set intervals, and recipients are expected to return the template to their Monitoring Officer upon completion, who will review and quality assure it. At project start, your BEIS Monitoring Officer will provide further details about the calculation of these KPIs and assist with the initial completion and measurement.

Please note that it may at times be necessary to make changes to the NZIP KPIs, data collection modes or frequencies. We will endeavour to keep all changes to a minimum and communicate any implications to you via the Monitoring Officers in advance of collection.

Beyond these NZIP KPIs, BEIS conducts independent evaluations of many of its programmes. The funded project organisation will be required to collaborate in reasonable evaluation activities, including, but not limited to, providing programme-specific KPIs, completing questionnaires or surveys, participating in interviews and workshops, communicating the learnings from the project, providing costs/sales data and elaboration of any of the measures covered in the NZIP KPIs.

BEIS will be collecting the following KPIs, with data provided by Monitoring Officers marked in *italics*. Not all data will be collected annually.

KPI	**KPI description**	**Metrics**
KPI 1	*Number of NZIP projects supported*	• *Project start and completion.*
KPI 2	*Number of NZIP projects that have met objectives*	• *Extent to which project objectives have been met to date* • *Change in objectives and reasons for change*
KPI 3	*Number of organisations supported to deliver the project*	• *Lead partner delivering the project: name, organisation size and number of jobs*

[6] However KPIs are not used as a project management tool and the KPI collection process is not designed to have a bearing on project delivery decisions (such as invoice payments).

		supported within the organisation to deliver the project. • *Other partner organisations involved in delivering the project as named on the Contract or Grant: name, organisation size and number of jobs supported within the organisation(s) to deliver the project.*
KPI 4	Number of active contractual and non-contractual business relationships supported	• Number of contractual relationships: name and type of contractual relationship. • Number of formal non-contractual business relationships: name and type of non-contractual relationship • Extent to which your organisation expanded its network of business relationships as a result of the project
KPI 5	Technology Advancement	• Technology Readiness Levels (current and anticipated) • Other technology improvement indicators: patents applied for or granted; academic, technical or non-technical publications generated and knowledge exchange events attended (such as conferences)
KPI 6i	*Initial Financial Leverage to deliver project*	• *Project funding structure: Amount in £m of BEIS, Other Public Sector and Private Funding.*
6ii	Follow-on Funding secured	• Amount of follow-on funding raised and the source (public or private).
KPI 7i	Reduction in energy costs	• Scope and scale of impact on reducing energy costs • Route to reducing energy costs
7ii	Increased energy efficiency/ Reduced energy demand	• Scope and scale of impact on reducing energy demand/ increasing energy efficiency
7iii	Increase in energy system flexibility	• Scope and scale of impact on energy system flexibility • Route to increasing energy system flexibility
KPI 8	Commercialisation advancement	• Commercial readiness levels (current and anticipated) • Steps towards commercialisation incl. licensing agreements, commercial partnerships, product certifications etc.; national/ international standards passed • UK and International sales secured and their value (£m)
KPI 9	CO2 emissions reductions	• Scope and scale of project impact on carbon emissions • Route to achieving carbon emissions reductions

KPI 10	Policy impact	• Whether, how, and to what effect evidence from the project has informed policy development • Whether projects have engaged in activities with industry or civil society

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