Invitation to Tender for:

Smart Meter Enabled Thermal Efficiency Ratings (SMETER) Technical Assessment Contractor

Tender Reference Number: TRN1608/08/2018

Deadline for Tender Responses:
12pm 12th October 2018
Department for Business, Energy & Industrial Strategy

Date: 7th September 2018

The Department for Business, Energy & Industrial Strategy (“BEIS”) wishes to commission a project entitled ‘Technical Assessment Contractor for the Smart Meter Enabled Thermal Efficiency Ratings (SMETER) Innovation Competition’.

Enclosed are the following sections:

- Section 1 (page 5) Instructions on tendering procedures
- Section 2 (page 10) Specification of requirements
- Section 3 (page 41) Further information on tendering procedure

Please register your interest in submitting a tender for this project by emailing builtenvironmentinnovation@beis.gov.uk. This will ensure you receive immediate notification of updates to the ITT process or answers to questions raised by potential bidders. Please also register on the following website: www.delta-esourcing.com.

Please read the instructions on the tendering procedures carefully since failure to comply with them may invalidate your tender. Your tender must be returned by 12 noon 12th October 2018 clearly marked as “TENDER”. Instructions for doing so are set out in Section 1B.

I look forward to receiving your response.

Yours sincerely,

Megan Eldred

E:mail: megan.eldred@beis.gov.uk
Privacy Notice

Identity and contact details of the Data Controller (and where applicable, the controller’s representative) and the Data Protection Officer.

The Data Controller is the Department for Business, Energy & Industrial Strategy (BEIS). You can contact the BEIS Data Protection Officer at: BEIS Data Protection Officer, Department for Business, Energy and Industrial Strategy, 1 Victoria Street, London SW1H 0ET. Email: dataprotection@beis.gov.uk.

Purpose of the processing and the legal basis for the processing

Any personal data contained within submitted tenders will be processed by BEIS or on behalf of BEIS for the purposes of the tender exercise described within the remainder of this Invitation to Tender, or in the event of legal challenge under The Public Contract Regulations 2015 or The Limitation Act 1980.

We are collecting your data as part of our public task.

Any recipient or categories of recipients of the personal data

The data may be shared with other Government Departments or public authorities where necessary as part of the tender exercise.

Details of transfers to third country and safeguards

The data you provide will not be transferred outside the European Union.

Retention period or criteria used to determine the retention period

Unsuccessful tenders will be kept for a period of six months following the date of contract signature. The successful tender will be retained as part of the contract documentation for a period of 6 or 12 years from the date of contract expiry, depending on the nature of the contract.

The rights available to individuals in respect of the processing

A list of your rights under the GDPR is accessible at:


The right to lodge a complaint with a supervisory authority

You have the right to lodge a complaint with the Information Commissioner’s Office (supervisory authority) at any time. Should you wish to exercise that right
The existence of automated decision making, including profiling and information about how decisions are made, the significance and the consequences.

The provision of the information you provide is not connected with individual decision making (making a decision solely by automated means without any human involvement) or profiling (automated processing of personal data to evaluate certain things about an individual.)

Section 1

Instructions and Information on Tendering Procedures

Invitation to Tender for Smart Meter Enabled Thermal Efficiency Ratings (SMETER) Technical Assessment Contractor

Tender Reference Number: TRN1608/08/2018
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A. Indicative Timetable

The anticipated timetable for this tender exercise is as follows. THE DEPARTMENT reserves the right to vary this timetable. Any variations will be published on contracts finder or circulated to all organisations who have registered an interest in notifications.

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<tr>
<th>Tender Timeline</th>
<th>Date</th>
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<tbody>
<tr>
<td>Advert and full invitation to tender issued</td>
<td>7th September 2018</td>
</tr>
<tr>
<td>Deadline for questions relating to the tender</td>
<td>1st October 2018</td>
</tr>
<tr>
<td>Responses to questions published</td>
<td>4th October 2018</td>
</tr>
<tr>
<td>Deadline for receipt of tender</td>
<td>12th October 2018</td>
</tr>
<tr>
<td>Invite suppliers for bid clarification (if needed)</td>
<td>November 2018</td>
</tr>
<tr>
<td>All suppliers alerted of outcome</td>
<td>November 2018</td>
</tr>
<tr>
<td>Contract award on signature by both parties</td>
<td>December 2018</td>
</tr>
<tr>
<td>Contract start date</td>
<td>December 2018</td>
</tr>
</tbody>
</table>

The contract is to be for a period of 26 months unless terminated or extended by up to 12 months at the Department’s discretion.

B. Procedure for Submitting Tenders

The maximum page limit for tenders is 30 (excluding declarations, pricing schedule and CVs).

To apply for this tender please register on the following website www.delta-esourcing.com. Please contact the Delta Helpdesk on 0845 270 7050 for any registration queries. Please upload your proposal before the deadline via BIPSolutions Delta Website.

For questions regarding the procurement process please contact: builtenvironmentinnovation@beis.gov.uk

Tenders will be received up to the time and date stated. Please ensure that your tender is delivered not later than the appointed time on the appointed date. The Department does not undertake to consider tenders received after that time. The Department requires tenders to remain valid for a period indicated in the specification of requirements.

The Department shall have the right to disqualify you from the procurement if you fail to fully complete your response, or do not return all of the fully completed documentation and declarations requested in this ITT. The Department shall also have the right to disqualify you if it later becomes aware of any omission or misrepresentation in your response to any question within this invitation to tender. If you require further information concerning the tender process, or the nature of the
proposed contract, email builtenvironmentinnovation@beis.gov.uk or the Delta Portal at www.delta-esourcing.com. All questions should be submitted by 12pm 1st October 2018; questions submitted after this date may not be answered. Should questions arise during the tendering period, which in our judgement are of material significance, we will publish these questions with our formal reply by the end of 4th October 2018 and circulate – unnamed - to all organisations that have expressed an interest in bidding. All contractors should then take that reply into consideration when preparing their own bids, and we will evaluate bids on the assumption that they have done so.

You will not be entitled to claim from the Department any costs or expenses that you may incur in preparing your tender whether or not your tender is successful.

Tenders should be submitted on the Delta Portal at www.delta-esourcing.com no later than 12 noon 12th October 2018.

C. Conflict of Interest

The Department’s standard terms and conditions of contract include reference to conflict of interest and require contractors to declare any potential conflict of interest to the Secretary of State.

For research and analysis, conflict of interest is defined 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.

Where there may be a potential conflict of interest, it is suggested that the consortia or organisation designs a working arrangements such that the findings cannot be influenced (or perceived to be influenced) by the organisation which is the owner of a potential conflict of interest. For example, consideration should be given to the different roles which organisations play in the research or analysis, and how these can be structured to ensue maintain an impartial approach to the project is maintained.

The process by which this is managed in the procurement process is as follows:

1. **During the bidding process, organisations may contact BEIS to discuss whether or not their proposed arrangement is likely to yield a conflict of interest.** Any responses given to individual organisations or consortia will be published on contract finder (in a form which does not reveal the questioner’s identity). Any organisation thinking of submitting a bid, should share their contact details with the staff member responsible for this procurement, to ensure they receive an update when any responses to questions are published.

2. **Contractors are asked to sign and return Declaration 3 of the application form to indicate whether or not any conflict of interest may be, or be perceived to be, an issue.** If this is the case, the contractor or consortium should give a full account of the actions or processes that it will use to ensure
that conflict of interest is avoided. In any statement of mitigating actions, contractors are expected to outline how they propose to achieve a robust, impartial and credible approach to the research.

3. **When tenders are scored, this declaration will be subject to a pass/fail score**, according to whether, on the basis of the information in the proposal and declaration, there remains a conflict of interest which may affect the impartiality of the research.

Failure to declare or avoid conflict of interest at this or a later stage may result in exclusion from the procurement competition, or in the Department exercising its right to terminate any contract awarded.

**D. Evaluation of Responses**

The tender process will be conducted to ensure that bids are evaluated fairly and transparently, in accordance with agreed assessment criteria. Further details are provided in the specification.

**E. Terms and conditions applying to this Invitation to Tender**

The Department’s Standard Terms and Conditions of Contract will apply to this contract. These are available to download on BiP Solutions Delta website.

**F. Further Instructions to Contractors**

The Department reserves the right to amend the enclosed tender documents at any time prior to the deadline for receipt of tenders. Any such amendment will be numbered, dated and issued by 4th October. Where amendments are significant, the Department may at its discretion extend the deadline for receipt of tenders.

The Department reserves the right to withdraw this contract opportunity without notice and will not be liable for any costs incurred by contractors during any stage of the process. Contractors should also note that, in the event a tender is considered to be fundamentally unacceptable on a key issue, regardless of its other merits, that tender may be rejected. By issuing this invitation the Department is not bound in any way and does not have to accept the lowest or any tender and reserves the right to accept a portion of any tender unless the tenderer expressly stipulates otherwise in their tender.

**G. Checklist of Documents to be Returned**

Application form (found with this invitation to tender on the Delta portal at [www.delta-esourcing.com](http://www.delta-esourcing.com)) consisting of:
- Proposal (maximum 30 pages, excluding CVs)
- Annex A – pricing schedule
• Declaration 1: Statement of non-collusion
• Declaration 2: Form of Tender
• Declaration 3: Conflict of Interest
• Declaration 4: Standard Selection Questionnaire
• Declaration 5: Code of Practice
• Declaration 6: The General Data Protection Regulation Assurance Questionnaire for Contractors
Section 2
Specification of Requirements

Invitation to Tender for Smart Meter Enabled Thermal Efficiency Ratings (SMETER) Technical Assessment Contractor

Tender Reference Number: TRN1608/08/2018
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1. Introduction and summary of requirements

This Invitation to Tender document sets out the context, scope, application process and assessment criteria for procurement of a Technical Assessment Contractor to oversee the testing of tools developed during the Smart Meter Enabled Thermal Efficiency Ratings (SMETER) Innovation Competition, working hand-in-hand with Competition Participants to provide support during the development and testing of their tools.

The Competition focuses on the development of new tools to measure the thermal efficiency of homes. Its aim is to help consumers, energy suppliers, providers of energy efficiency products and services, and policy-makers to save energy, reducing bills and carbon emissions, by providing a better understanding of the energy efficiency of homes. The competition will fund the development, testing and demonstration of tools that can measure the heat transfer coefficient of a home using its energy consumption data, primarily through smart meters, plus other data.

The competition will be delivered in two main phases:

**Phase 1** – Feasibility studies consisting of software and hardware development (if relevant), pilot deployment, and initial testing of algorithms.

**Phase 2** – Field trials and final testing of SMETER products, supported by the Technical Assessment Contractor.

The total potential value of the contract for the Technical Assessment Contractor is £900,000, although BEIS may allocate less than this depending on the quality of the applications.

Note: All applications must be received electronically by BEIS by 12 noon on the 12th October 2018. The application forms can be found with this form on the Delta Portal at [www.delta-esourcing.com](http://www.delta-esourcing.com).

2. Background

**Context**

The Department for Business, Energy and Industrial Strategy (BEIS) works to ensure that the country has secure energy supplies that are reliable, affordable and clean; ensuring that the UK remains at the leading edge of science, research and innovation; and tackling climate change.
The Clean Growth Strategy

The overarching driver for this programme of work is the Clean Growth Strategy\(^1\). It sets out the Government’s plans to grow the economy while reducing greenhouse gas emissions in the UK. Of the total UK emissions, 13% comes from energy consumed in our homes. A key part of this strategy is how to further reduce emissions from homes while ensuring that everyone has a home that is comfortable, healthy and affordable to run.

In the Clean Growth Strategy, the Government committed to the following proposals:

- Support around £3.6 billion of investment to upgrade around a million homes through the Energy Company Obligation (ECO), and extend support for home energy efficiency improvements until 2028 at the current level of ECO funding
- Help to upgrade all fuel poor homes to Energy Performance Certificate (EPC) Band C by 2030 and our aspiration is for as many homes as possible to be EPC Band C by 2035 where practical, cost-effective and affordable
- Develop a long-term trajectory to improve the energy performance standards of privately rented homes, with the aim of upgrading as many as possible to EPC Band C by 2030 where practical, cost-effective and affordable
- Consult on how social housing can meet similar standards over this period
- Following the outcome of the independent review of Building Regulations and fire safety, consult on strengthening energy performance standards for new and existing homes under Building Regulations
- Offer all households the opportunity to have a smart meter to help them save energy by the end of 2020

In addition to these commitments, as part of the Clean Growth Grand Challenge the Prime Minister announced the Buildings Mission which aims to at least halve the energy use of new buildings by 2030\(^2\).

*By making our buildings more energy efficient and embracing smart technologies, we can cut household energy bills, reduce demand for energy, and boost economic growth while meeting our targets for carbon reduction.*

The Standard Assessment Procedure

Many of the policies to reduce future emissions and energy consumption in homes, and help deliver the Clean Growth Strategy and Buildings Mission, are based on having an understanding of the energy performance of homes.

The Standard Assessment Procedure (SAP) is the principal methodology used by the Government to compare and assess the energy performance of dwellings. For existing homes, the required inputs for SAP are not always readily available so a reduced data version, RdSAP, has been developed that infers inputs that are hard to


obtain (e.g. thermal properties) based on a site survey of the property.

Initially, the primary use of SAP\(^3\) was to assess compliance with Part L of the Building Regulations\(^4\). Now more policies are dependent on SAP. In recent years, BEIS and the Ministry for Housing, Communities and Local Government (MHCLG) have extended the use of SAP to serve other purposes, in particular to calculate the Energy Efficiency Rating presented on home Energy Performance Certificates (EPCs) and to calculate annual energy and bill savings for efficiency measures: on EPCs themselves, for the Energy Company Obligation (ECO 'deemed scores'), and in Green Deal Assessment Reports. In turn, EPCs support the operation of the Energy Savings Advice Service (ESAS), and EPC ratings underpin Private Rented Sector regulations and are made available to inform the decision-making of homebuyers, renters, and the financial services sector (which has a stake in home energy efficiency metrics as the basis for designing and informing lending decisions on ‘green’ financial products such as mortgages and home improvement loans).

SAP calculations start by calculating the heat transfer coefficient (HTC) of a home based on its physical and thermal characteristics. This intermediate calculation result – HTC – is a fundamental measure of the thermal performance of the building envelope covering all forms of heat transfer between the inside and outside of the home. Given the HTC, SAP then calculates annual electricity and heating fuel demands based on the efficiency of building services, and standardised assumptions about climate, the number of occupants, and how they use energy in the home\(^5\).

In practice, evidence shows that there are frequently differences between the SAP inputs and the actual construction of a home. For new homes, there are multiple causes for such difference across the housebuilding process - the most comprehensive review has been undertaken by the Zero Carbon Hub\(^6\). For existing homes, RdSAP infers thermal properties from inputs such as dwelling type and age collected by way of a survey and, for example, BEIS research\(^7\) has demonstrated variability in the survey data collected through repeat surveys of the same property. The quality of the inputs impacts on the accuracy of the HTC calculation and further calculations.

Moving from a Modelled to a Measured Approach

An improvement to SAP would be to more accurately measure and input the HTC rather than calculating it within SAP. The best currently available and proven measurement option, the co-heating test\(^8\), is costly and requires homes to be unoccupied for around two weeks meaning this cannot be used as a widespread method for assessing the thermal performance of homes. As such there is great interest in alternative options for measuring the thermal performance of homes in situ.

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\(^3\) In general, references to SAP include the use of RdSAP. Once dwelling characteristics have been inferred from the RdSAP inputs, the process for calculating the energy performance is identical for SAP and RdSAP. RdSAP is only referred to in the text where it is relevant to specify the method of data input for the SAP calculation.


\(^5\) https://www.bre.co.uk/filelibrary/SAP/2012/SAP-2012_9-92.pdf

\(^6\) Zero Carbon Hub. 2014. Performance Gap

\(^7\) DECC 2014. Green Deal Assessment Mystery Shopping Research.

\(^8\) The co-heating test is an experimental method of determining a building’s overall heat transfer coefficient (HTC) due to conductive and ventilation heat losses.
while they are occupied. One such option is to use smart meter data plus other data such as temperature to calculate the HTC.

**The Smart Metering Implementation Programme**

The Government is committed to ensuring that every home and business in the country is offered a smart meter by the end of 2020. At the end of March 2018, there were over 11 million smart and advanced meters operating across homes and businesses in Great Britain.

The smart meter roll-out provides an opportunity to develop new technologies using household specific consumption data from smart meters, combined with other data, for assessing the thermal performance of homes. The smart meter ecosystem, with data available via the Data Communications Company (DCC) or a Consumer Access Device CADs, means that for the first time businesses, with the consumer’s consent, can access recent household energy data to provide related services and products. More information on options for accessing smart meter data is outlined in ‘Smart Meters, Smart Data, Smart Growth’.

Recognising this potential, BEIS made a commitment in the Clean Growth Strategy to "explore measuring actual building performance using data from smart meters" which is a key driver for this programme. A second accompanying Clean Growth Strategy (CGS) commitment is to "explore how the data available through the national smart metering platform can, with customers’ consent, support personalised recommendations for saving energy, more targeted policy interventions and help businesses develop energy saving offers".

**Smart Meter Enabled Thermal Efficiency Rating (SMETER) Products**

BEIS undertook a significant review to understand the market potential to develop and commercially deploy methods for measuring the thermal performance of homes using smart meter data. The review highlighted a significant market potential to develop such methods which could use smart meter and weather data, and potentially other measurements (e.g. indoor temperature and home survey data). These products have been collectively termed ‘Smart Meter Enabled Thermal Efficiency Rating’ (SMETER) products. The thermal performance measurement provided by a SMETER (i.e. the HTC) could be fed back into SAP to enable a more accurate assessment of annual building energy performance for policy use.

BEIS has subsequently seen the need to provide funding to develop, test and demonstrate SMETER technologies to accelerate the improvement the assessment of the thermal performance of homes. This funding is part of the £90m allocated to innovation in the built environment (energy efficiency and heating) as part of BEIS’ £505m Energy Innovation Programme. The Energy Innovation Programme aims to accelerate the commercialisation of innovative clean energy technologies and processes into the 2020s and 2030s.

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Expected Benefits of SMETER Products

Providing a better assessment of the thermal performance of homes using SMETER products could benefit a wide range of stakeholders, from consumers, to policy-makers. Ultimately these could lead to the reduction of energy used in homes, and reduce carbon emissions.

SMETER could deliver the following benefits:

- More accurate and reliable energy efficiency ratings, and advice better tailored to specific properties. This leads to more trust/confidence in energy efficiency metrics and related policies.
- Increased uptake of energy efficiency products
- Larger bill savings for the consumer
- Larger carbon savings
- Drive innovation to improve performance of building fabric energy efficiency measures.

These benefits could help improve the execution of or inform the improvement of key energy efficiency policies and services, including 10:

- Energy Company Obligation (ECO)
- Private Rental Sector Regulations
- Social Rental Sector improvements
- Fuel Poverty
- Energy Savings Advice Service (ESAS)
- Smart Meter Implementation Programme (SMIP)
- Part L of the Building Regulations

SMETER products could also deliver the following benefits to the following non-government stakeholders:

**Homeowners and occupants:** Having a better understanding of the thermal performance of their homes will make them more informed customers of energy efficiency products leading to greater energy bill savings and improved thermal comfort.

**Green Mortgage / Finance Providers:** An increased in energy efficiency metrics will boost confidence to invest in energy efficiency related financial products

**Commercial businesses:** Businesses could help demonstrate performance and provide guarantees for energy efficiency products or provide new commercial

10 BEIS and MHCLG are currently considering ways in which the use of Energy Performance Certificates could be improved. In July the two departments launched a Call for Evidence on EPCs which closes on 19 October. One possibility described in the Call for Evidence is that smart meter and other building data could be used to improve the accuracy of the EPC rating which is an output of the SAP calculation e.g. through the HTC generated by a SMETER.
offerings e.g. energy advice services, and green financing.

Learning from the outcomes of this competition can also inform options for measurement of building performance of non-domestic buildings for which there is currently a significant information gap.

SMETER products could also help Government to achieve some of its ambitions set out in the recently announced Construction Sector Deal11 between industry and Government:

- Digital techniques deployed at all phases of design will deliver better, more certain results during the construction and operation of buildings. This will contribute to the improvement of safety, quality and productivity during construction, optimising performance during the life of the building.
- Whole life asset performance will shift focus from the costs of construction to the costs of a building across its life cycle, particularly its use of energy.

3. Aims and Objectives

The overall aim of the SMETER programme is to develop and demonstrate methods to robustly assess the thermal performance of dwellings that are suitable for policy applications. It is focussed on methods to measure the heat transfer coefficient (HTC) of homes, and therefore integrate with SAP (including RdSAP) which underpins many existing policies. The programme objectives are discussed below.

Objectives of the SMETER Programme are:

The objectives of the SMETER programme are to:

1. Accelerate development of SMETERs to the point that they are close to market readiness
2. Develop SMETERs that:
   a. Have an improved accuracy compared to the current application of SAP and RdSAP
   b. Are value-for-money for policy application
   c. Are acceptable to households
3. Test and demonstrate SMETERs to provide BEIS with the confidence that they meet these objectives

These objectives will be delivered through two main components:

- Development of SMETERs by the Innovation Competition Participants

Objectives of the Competition Participants

The Competition Participants will be developing, testing and demonstrating their SMETER to ensure it meets the programme objectives.

To meet these objectives, we expect Competition Participants to:

1. Develop SMETERs that:
   a. Have an improved accuracy of assessing the thermal performance of homes compared to current application of SAP and RdSAP
   b. Provide value-for-money to implement for policy application
   c. Are acceptable to households
2. Develop SMETERs that are ready to be trialled in real homes during the SMETER programme.
3. Work with the Technical Assessment Contractor to support development and testing of their SMETER.

Objectives of the Technical Assessment Contractor (TAC)

The aim of the Technical Assessment Contractor (TAC) is to support the testing and demonstration of SMETERs to provide BEIS with the confidence that they meet the programme objectives.

The primary objectives of the TAC are to:

1. Independently test and validate SMETERs at key points in the programme and report back to BEIS on their performance.
2. Assess and report on the user acceptability of SMETERs related to the impacts of deployment (installation, any ongoing maintenance, fault resolution, and uninstallation);
3. Support Competition Participants to improve the development and deployment of SMETERs – by working with Competition Participants, and providing feedback at key points such as:

• Testing and demonstration of SMETERs by the Technical Assessment Contractor to be procured alongside the Innovation Competition.

The Competition Participants will be procured separately to the TAC, but their objectives and activities are outlined in this document to provide tenderers with the context needed to support their application.
a. defining the methodology for calculating the accuracy\(^{12}\) of SMETERs for real world applications;

b. establishing appropriate test processes for determining the accuracy and user acceptability of SMETERs in agreement with BEIS;

c. supplying appropriate datasets for development and testing of SMETERs;

d. recruiting an appropriate mix of homes to take part in field trials;

e. ensuring adequate and safe deployment of SMETERs, and their effective operation through a field trial, respecting the privacy and practical needs of participating households and the intellectual property-related confidentiality expectations of Competition Participants; and

f. providing testing feedback and expert advice to Competition Participants based on the TAC’s previous experience.

4. Provide a robust evaluation of to what extent, and how, the programme has achieved its objectives and contributed to longer term desired outcomes. This will be achieved by collecting independent evidence from Competition Participants and stakeholders.

5. Make recommendations to BEIS at the end of the competition on the suitability of SMETERs for future policy use.

The performance of the Competition Participants’ SMETERs needs to be assessed at two stages in the competition:

a. at the end of the first phase of the competition to ensure that only SMETERs capable of meeting BEIS’s objectives by the end of the competition receive support for further development and field trial deployment; and

b. at the end of the competition to establish and report on the final accuracy and usability of SMETERs.

These objectives are to be achieved through working collaboratively with the Competition Participants while maintaining objectivity. Details of this are described in section 4.

Full details of the SMETERs to be developed by Competition Participants and tested by the Technical Assessment Contractor will not be provided until the TAC is under contract, so tenderers should write their proposals to the specifications set out in this ITT. Through the competition process BEIS will ensure a spread of technologies are funded by assigning proposals to 4 different technology families which are described below for the purpose of assisting the tenderer with their proposal.

\(^{12}\) covering ‘trueness’ and ‘precision’ as defined in ISO 3534 Statistics – Vocabulary and Symbols
Technology Families

The different technology families to which each proposal will be assigned are described below:

Family 1: SMETER inputs required are universally available (i.e. the SMETER supplier does not need to install equipment into the home as part of their commercial roll-out). This will include smart meter and external weather data alongside other 'big data' (must not be subject to access restrictions);

Family 2: SMETER inputs required are those from Family 1, a communications device AND 1 additional measurement device, which may measure either a single data item (e.g. internal temperature) or integrate multiple data measurements (e.g. temperature, humidity, occupancy etc.);

Family 3: SMETER input data and measurement equipment are in excess of Family 2.

Family 4: The proposed SMETER involves any of the following (OVERRIDES Families 1 – 3): does not propose to use data from smart meters or related infrastructure; has limits on applicability in the housing stock in addition to those set out in the scope of the SMETER programme (e.g. application planned exclusively for particular heating system type (e.g. only electric main heating), dwelling tenure (e.g. social housing), etc.)

4. Methodology

Tenderers should set out how they propose to work with Competition Participants during the course of the programme, but a suggestion for how to do this is provided in this ITT.

To deliver the SMETER programme, the Technical Assessment Contractor (TAC) will establish the testing and trialling approach, provide some development and testing support, and independently assess SMETER performance, working alongside the Competition Participants. The TAC and the Competition Participants will have the following complementary roles:

- **Technical Assessment Contractor:** The TAC will define the accuracy of SMETERs, draw-up test protocols and agree these with BEIS (with input from Competition Participants), produce simulated datasets and assemble real-world datasets for testing, and administer accuracy tests and assess the all-round performance of SMETERS. The TAC will also define the number and mix of homes required for field trials, recruit sufficient homes, and carry out all on site
activities (including installation, any troubleshooting, etc.) for field trials to run from Q4 2019 to Q4 2020.

- **Innovation Competition Participants** – Each Competition Participant will undertake: technical development of calculation algorithms and any measurement and communications equipment required for their SMETER, development of their deployment (installation, communications, etc.) protocols, desk- and lab-based testing, piloting of their SMETER (including recruitment of pilot homes), supporting field trials, undertaking final testing, and marketing and roll-out preparation.

The innovation competition will be divided into two phases as summarised below:

**Phase 1 – Feasibility:** the TAC will finalise testing protocols (for both phases of the competition) and the design of the field trial, agree these with BEIS taking account of input from the Competition Participants, observe the piloting of Competition Participants’ SMETERs, administer initial testing, and recruit homes for the field trial; the Competition Participants will focus on advancing the development of their SMETERs, arrange and undertake piloting, and engage in initial testing.

At the end of Phase 1 the TAC will support BEIS to review the current performance (based on initial testing and piloting) and potential performance (by the end of the competition) of Competition Participants’ SMETERs. Any that are judged not to be on track to meet the competition objectives by the end of the competition would not progress to Phase 2.

**Phase 2 – Field Trials:** the TAC would deliver all on-site activities to enable the field trialling of Competition Participants’ SMETERs including recruiting the field trial homes, installing SMETERs and maintaining them as and where required, undertaking co-heating tests of a subset of homes, surveying homes and householder experience, and would administer final testing of SMETER accuracy; the Competition Participants would support the TAC to ensure the effective deployment and operation of their SMETERs, continue with SMETER development, and engage in final testing.

An outline design for the testing and assessment of SMETERs is presented below. This has been developed to support the Invitation to Tender for the innovation competition, which is running in parallel with this ITT for the TAC, and serves as a basis for Competition Applicants to prepare their proposals. The tenderer for this ITT may propose an alternative or modified methodology that better meets the programme objectives. In any case, the tenderer shall provide further details in their proposal of how the testing and assessment design will be delivered. The tenderer should budget for two meetings with BEIS and the innovation Competition Participants (BEIS will organise these meetings) to agree any further refinement of the design post-contract to account for the particular characteristics of the SMETER methods proposed by the selected Competition Participants.
In the outline testing design, there are six testing steps to be undertaken over the two phases. The respective roles of Competition Participants and the Technical Assessment Contractor at each step of the outline testing programme described above are summarised in the table below.

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<tr>
<th>Step</th>
<th>Activity</th>
<th>Time-table</th>
<th>Roles</th>
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<tr>
<td></td>
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<td>TAC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Phase 1 – Feasibility</strong></td>
</tr>
<tr>
<td>1</td>
<td>Assessment methodology</td>
<td>Nov ’18 – Jan ’19</td>
<td>(From Nov ‘18) Develop accuracy definition, test protocols &amp; field trial design; start field trial recruitment</td>
</tr>
<tr>
<td>2</td>
<td>Simulated datasets</td>
<td>Jan – Aug ’19</td>
<td>Produce &amp; provide development &amp; test datasets; administer &amp; evaluate test</td>
</tr>
<tr>
<td>3</td>
<td>Pilot deployment</td>
<td>By end Aug ’19</td>
<td>Observe SMETER deployments and assess installation impact</td>
</tr>
<tr>
<td></td>
<td>Gateway</td>
<td>Sep ’19</td>
<td>Report; advise BEIS on Competition Participants for Phase 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Phase 2 – Field Trials</strong></td>
</tr>
<tr>
<td>4</td>
<td>Field trial</td>
<td>Oct ’19 – Nov ’20</td>
<td>Physical survey (to produce RdSAP HTC) &amp; user survey, install SMETERs, run household helpdesk and resolve on-site issues</td>
</tr>
<tr>
<td>5</td>
<td>Controlled, in situ accuracy test</td>
<td>By end Dec ’20</td>
<td>Measure reference input data; co-heating test (to produce reference HTC); evaluate SMETER inputs &amp; results vs. reference inputs &amp; HTC</td>
</tr>
<tr>
<td>6</td>
<td>Accuracy test with real data</td>
<td>By end Dec ’20</td>
<td>Measure reference input data; co-heating test (to produce reference HTC); provide reference input dataset; evaluate SMETER results vs. reference HTC</td>
</tr>
<tr>
<td></td>
<td>Final reporting</td>
<td>Jan ’21</td>
<td>Report to BEIS</td>
</tr>
</tbody>
</table>

The TAC and Competition Participants will be expected to develop a strong
collaborative approach. In particular, the TAC's experience and global oversight of trial and testing results means they can support Competition Participants in interpreting trial and test results so that hardware and calculation problems can be diagnosed and fixed, helping each SMETER to reach its full potential.

To enable innovation Competition Applicants to prepare and price their proposals, they have been provided with the following assumptions about the numbers of homes that could be in sample sets during the various steps of the indicative test and trial programme outlined in the methodology above:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>a. Maximum number of SMETERs included in the competition</td>
<td>10</td>
</tr>
<tr>
<td>b. Number of dwelling types in simulated datasets &amp; field trial</td>
<td>6</td>
</tr>
<tr>
<td>c. Minimum number of homes in which a given SMETER is deployed</td>
<td>20</td>
</tr>
<tr>
<td>d. Number of homes in which a given SMETER is deployed and a co-heating test is carried out</td>
<td>10</td>
</tr>
</tbody>
</table>

The total number of homes for which a reference HTC value is established (assumed in this outline testing design to be by way of a co-heating test) will depend on the TAC tenderer’s assumptions, e.g. about the average number of SMETERs that can be installed in homes that are also subject to co-heating tests. **The TAC tenderer should develop the most robust testing proposals possible within the resource and time constraints of the programme and not be unduly constrained by the indicative test design and sample sizes.** In particular BEIS is interested in proposals that maximise the number of homes in which a given SMETER is deployed and a co-heating test is carried out as this appears to offer the clearest basis for assessing SMETER performance. Any change in design should not substantively impact on the tasks and role of the Competition Participants as presented in this section.

**Phase 1 – Feasibility**

1) **Develop testing methodology**

**Aims:** One of the main objectives of the TAC will be to assess the accuracy of Competition Participants’ SMETERs. The final accuracy of SMETERs is expected to be established in Phase 2 relative to reference values of whole-house heat transfer coefficient measured by carrying out co-heating tests of homes. Clear definitions for the accuracy of SMETERs (i.e. how it will be calculated from test data), and related project protocols for calculations and reporting, need to be established at the start of the project to be clear about how this critical performance metric will be calculated and reported throughout the project. It is important to know what types of dwellings will be represented in test datasets and the field trial, to allow consideration of any effects of dwelling type on the accuracy of SMETER results. Some elements of the standard testing procedures may not be suitable for some SMETERs. In those cases, the TAC will also need
to develop alternative testing procedures for those SMETERs that enable equivalent assessment of performance.

**Tasks and roles:** The TAC will draw up a definition for the accuracy of SMETERs and agree this with BEIS accounting for input from the innovation Competition Participants. The accuracy definition will address what accuracy means – e.g. trueness and precision – and how it will be calculated from test and field trial results. This is distinct from establishing performance targets for accuracy, which will be determined elsewhere. The TAC will also establish a set of dwelling typologies that will be represented in all test datasets used in the competition and which should, as far as is practical, cover the archetypes most commonly found in the UK housing stock. It is expected that as a minimum the dwelling types covered will include detached, mid-terraced, and semi-detached / end terrace houses and combinations with solid and cavity wall construction. It is expected that the TAC would start recruiting homes for the field trial as soon as the target size and composition of the field trial pool is established.

**Tender considerations:** Tenderers should make clear in their proposals the number of dwelling archetypes they propose to represent in their test datasets with commentary on the extent to which these reflect the overall housing stock. Responses to this ITT should include rationale and commentary on the selection of dwelling types for testing (in both phases) and for the overall field trials. Tenderers should set out their approach to recruiting homes for the field trial, addressing considerations such as geographic spread or clustering, meter types and communications devices in place (and related implications / assumptions regarding SMETER deployment and testing), etc. and providing a rationale for the proposals made. Proposals for a larger or smaller number of dwelling types than indicated to Competition Applicants (see section above), and the implications in terms of overall project outcomes and costs, should be clearly explained.

2) **Develop and test SMETER algorithms using simulated datasets**

**Aims:** SMETER developers will require datasets for algorithm development, and providing these to Competition Participants should save time, duplication of effort and cost. BEIS also wants to assess the potential performance of Competition Participants’ SMETERs early in the competition to ensure that funding is only provided for field trials of SMETERs that show a realistic prospect of achieving target levels of accuracy and other programme objectives by the end of the competition. Producing thermal simulation models of dwellings, where both the input data that would be measured by any given SMETER and the corresponding heat transfer coefficient (HTC) are known based on model inputs, enables the production of datasets for both development and initial testing of SMETERs.

**Tasks and roles:** The TAC will produce simulated data sets for dwelling archetypes and provide them to Competition Participants for both development and testing of their SMETERs. It is assumed that datasets would be produced using dynamic building thermal modelling software. The software and any pre- and post-processing used should be capable of generating the items of input data (e.g. gas and electricity meter readings, internal temperature, external weather
conditions, etc.) at the temporal resolution (e.g. at least half hourly) required by the SMETERs to be tested. Simulated datasets would be used for:

(a) Initial development – both the input data and the HTC results would be shared with the project teams.
(b) Initial testing – just the calculation inputs that each SMETER is capable of measuring itself will be provided to the project teams. The Competition Participants will return their HTC results to the TAC to compare their estimates with the values calculated by the modelling software based on the known characteristics of the thermal envelope of each dwelling archetype. As part of the testing methodology (developed in Step 1) the TAC will establish the procedure for feeding back test results and the arrangements for re-testing.

Progression to Phase 2 of the competition would be conditional on SMETERs achieving an acceptable level of accuracy, which would be considered alongside the deployment cost, intrusiveness and any additional desirable outcomes provided by each SMETER. BEIS will expect input from the TAC on accuracy thresholds and the assessment criteria to be used to decide the progression of SMETERs to Phase 2. This is required prior to Competition Participants entering into contract (i.e. very soon after the TAC’s appointment).

**Tender considerations:** Tenderers should set out their approach to providing datasets for initial SMETER development and testing. If an alternative approach is proposed, e.g. using real rather than simulated datasets, the implications in terms of TAC project costs and overall competition outcomes should be clearly explained. Any implications for Competition Participants should also be outlined.

3) **Pilot deployment and data collection**

**Aims:** Competition Participants need to be confident that they can successfully deploy their SMETER in the field and collect the data required to enable an HTC calculation. BEIS needs some assurance that Competition Participants’ SMETERs will be deployable by the start of the field trial period and that the impacts on trial households are acceptable. The TAC needs to understand the levels of intrusiveness and of any household participation required in the installation process for each SMETER to inform the mix of SMETERs installed in each household in the field trial.

**Tasks and roles:** The TAC will be expected to observe a representative pilot deployment to understand the level of intrusiveness and householder participation involved in installing (and if relevant removing) each Competition Participant’s SMETER. Competition Participants will be expected to pilot the process of deploying their SMETER, particularly the installation of any additional measurement equipment beyond the smart meters already in place, and the collection of data from the home, which is likely to be transmitted to a remote location for processing via a communications network. Competition Participants are expected to find their own pilot homes and to take primary responsibility for related data privacy and protection.

**Tender considerations:** Tenderers should set out their approach to observing representative pilot deployments and assessing the impacts on households.
Gateway assessment for progression to Phase 2

The TAC will be expected to support BEIS: to develop assessment criteria prior to the completion of contract negotiation with selected Competition Applicants at the outset of the innovation competition (i.e. November / December 2018); and to assess the progress of projects based on evidence from the initial testing and piloting. Quantitative assessment criteria for progression to Phase 2 are likely to cover:

1. Accuracy – Trueness and precision based on the results of initial testing;
2. Speed – Time period required to measure HTC; and
3. Cost – Indicative cost per home to deploy SMETERs.

Performance assessment is also expected to consider:

4. Intrusiveness and user experience at deployment; and
5. Desirable outcomes – the additional capabilities of SMETERs, beyond calculating HTC.

The overall assessment will consider Accuracy against Cost with Intrusiveness and Desirable outcomes considered on a qualitative basis. Further details on Phase 1 assessment criteria will be made available to selected Competition Applicants as part of contract negotiations.

BEIS expects to undertake the gateway assessment in a two week period before the start of Phase 2, and a common deadline for Competition Participants to submit the required information will be set. The other constraint on the timing of Phase 1 activities will be agreement between the Competition Participants and the TAC on scheduling of initial testing, feedback and any re-testing of SMETERs, and observation of piloting. If the gateway assessment finds, based on performance relative to contractual milestones set for the end of Phase 1, that a Competition Participant is not on track to meet programme objectives by the end of the competition, that Competition Participant’s funding for Phase 2 may be withdrawn, as allowed for under 21 of the competition terms and conditions. (Note: BEIS’s planned approach to allocation of funding for the competition is intended to support all Competition Participants through both Phases and does not require the removal of Competition Participants prior to the Phase 2 Field trials.)

Phase 2 – Field Trials

4) Field trial

**Aims:** The field trial with a long period of data collection serves three purposes. It should enable: assessment of the repeatability of each SMETER (using data from different time periods and accounting for the variability of HTC with outdoor conditions, particularly wind); comparison of results between different SMETERs applied to the same home; and feedback from households on the impacts of installation and any ongoing intrusiveness of SMETERs.

It is assumed that multiple SMETERs could be deployed in each home in the field trial, with a regard to the overall burden on householders in terms of intrusiveness.
and any participation required for installation. It is expected that not all SMETERs would be fitted in each field trial home.

There is a need to ensure that any on-site equipment required as part of Competition Participants’ SMETER deployments is safely and adequately installed, that any problems with on-site equipment are fixed quickly, that the privacy of households is respected and disruption minimised, in particular that there is strict compliance with applicable data privacy legislation and the smart meter Data Access and Privacy Framework, and that the intellectual property interests of Competition Participants are protected. Experience from other field trials suggests that the best way to ensure these outcomes is to centralise responsibility for on-site activities and for a single party to undertake activities at any given site. As such the TAC will undertake all on-site activities for the field trial, Participants will not visit field trial homes, and the TAC will anonymise data before sharing it with Participants.

**Tasks and roles:** Homes will have been identified and recruited by the TAC to encompass a sufficiently diverse sample to capture common dwelling types and characteristics (see Step 1). The TAC is expected to take primary responsibility for data privacy and protection in relation to field trial households. The TAC will undertake a site survey of each home in the field trial to establish the physical characteristics of each dwelling, as a minimum recording the data required for an RdSAP assessment and establishing the corresponding SAP HTC for comparison with SMETER results (and where relevant co-heating test measurements). It is assumed that the TAC would deliver all on-site activities required to deploy Competition Participants’ SMETERs during the field trial, including any installation, troubleshooting and uninstallation of measurement and communication equipment required. The innovation Competition Participants would train the TAC to install and uninstall on-site equipment and support any troubleshooting required, and should prepare and provide supporting documentation as required. The TAC must ensure that an appropriate level of installation training is received for each SMETER in good time prior to the start of the field trial. The expectation is that multiple SMETERs would be tested in each home over a period of at least one year. The exact selection of SMETERs applied in any single home will need to take account of the demands placed on the household in terms of installation effort and disruption. During the field trial, the TAC will survey households to obtain feedback on the impact (intrusiveness and experience) of the SMETER installation (and where relevant uninstallation) process.

**Tender considerations:** Tenderers should set out their approach to recruiting, surveying and managing the field trial, deciding the mix of SMETERs per home (given that the details of SMETERs in the competition, in terms of measurement and communications equipment to be installed etc., will not be known until the end of the tender process), implications in terms of the overall number of homes needed. BEIS anticipates that the field trial may include SMETERs with a range of equipment installation requirements. Some SMETERs may need no additional equipment (energy and weather data only), some may need just a temperature
sensor and a consumer access device (CAD), and some (anticipated to be a minority) may require an extensive suite of measurement equipment. Tenderers should consider the nature and timing of training required to enable them to install SMETERs for the field trial, in general terms given that the details of SMETERs in the programme is not yet known. Tenderers should outline the potential variability in TAC project costs for installation training. If proposing that SMETERs be trialled in significantly more or fewer homes than indicated to Competition Applicants (see section above), the rationale should be explained and the cost and other implications for both the TAC and Competition Participants outlined as clearly as possible.

5) **Controlled test for accuracy on 'seen' homes (own in situ measurement)**

**Aims:** SMETERs have two components: (i) the calculation algorithm and (ii) the deployment (including installation, measurement equipment, and communications) which provides the data required by the algorithm. Deficiencies in either component could make SMETERs insufficiently accurate and repeatable, so it is important to test both of these components in a controlled way to ensure that the overall SMETER implementation works as expected. SMETER accuracy will be defined relative to a reference HTC from a co-heating test. So the ideal test is to compare the HTC result(s) from a SMETER deployed in a real occupied home with the co-heating test result(s) for the same home (which must be undertaken while the home is unoccupied for the period of the co-heating test). Each SMETER would be tested in a proportion of the homes for which the corresponding HTC is measured using a co-heating test undertaken during the competition.

**Tasks and roles:** During the field trials the TAC will carry out co-heating tests, in either the 2019/20 or early 2020/21 heating season, in a subset of homes where SMETERs are deployed and it is expected the TAC will also independently measure the key input data for SMETER calculations throughout the field trial in those homes to check against Competition Participants’ measurements of the same data. If independent measurement is not possible, the TAC may specify alternative methods to assure data quality such as independent calibration of measurement equipment.

**Tender considerations:** Tenderers should make clear in their proposals the number of homes in the field trial for which they propose to undertake co-heating tests. Tenderers should set out their approach to selecting the sub-sample of homes to undergo co-heating tests and to undertaking control measurements of input data and the proposed timing and methodology for the co-heating tests themselves. Proposals for a larger or smaller number of co-heating tests than indicated to Competition Applicants, and the implications in terms of TAC project costs and overall competition outcomes, should be clearly explained. The expected cost implications for Competition Participants should also be outlined.

6) **Test for accuracy using data from 'unseen' homes (third party data)**

**Aims:** An assumption in this outline field trial and testing design is that it will be impractical to install all of the Competition Participants’ SMETERs in a single
home. Therefore each home subject to a co-heating test will only contain (be ‘seen’ by) some but not all of the Competition Participants' SMETERs. Using the datasets from homes subject to co-heating tests but ‘unseen’ by a SMETER increases the number of accuracy tests that can be undertaken for each SMETER. The downside is that the input data will not have been collected with the SMETER’s own measurement equipment or approach (see FIGURE_TBC).

**Tasks and roles:** The TAC will assemble and provide Competition Participants with a final dataset to test their SMETER calculation method / algorithm. As a minimum, this will consist of data from the field trials for homes ‘unseen’ by each SMETER, but could also include other suitable datasets to which the tenderer can obtain access. Competition Participants will be provided with just the calculation inputs required, that must correspond with the data they are able to collect with their demonstrated SMETER deployment (data measurement and communication). The TAC will compare the results produced by the Competition Participants against corresponding HTC values from co-heating tests. The TAC will feed the accuracy results back to the Competition Participants. Once the accuracy results for SMETERs have been established and as far as possible agreed with Competition Participants, the TAC will report final findings on the accuracy and usability of Competition Participants’ SMETERs to BEIS.

**Tender considerations:** Tenderers should set out their approach to providing final test datasets for SMETERs for homes where they have not been installed. In particular, access to any suitable datasets from outside the competition should be explained.
As previously noted, this outline testing design and related indicative sample sizes are provided to enable Competition Applicants to develop and price their proposals. The tenderer for this ITT may propose an alternative or modified methodology that better meets the programme objectives. Tenderers should develop the most robust testing proposals possible within the resource and time constraints of the programme.

5. Outputs Required

The Technical Assessment Contractor will be expected to deliver outputs both to inform and support Competition Participants and as reports to BEIS, as follows:

**Phase 1:**

**Information and feedback to innovation Competition Participants:**

1. Definitions of the accuracy and repeatability of SMETERs.
2. Home typologies to be represented by the simulated datasets and in the field trial sample.
3. Simulated datasets for SMETER development and testing in a format accessible by Competition Participants and BEIS.
4. Testing protocols, including any bespoke protocols for specific SMETERs types that need additional / alternative arrangements.
5. Field trial design.
6. Feedback to Competition Participants during development, piloting and testing prior to final assessment of Phase 1 test results.

**Reports to BEIS on programme oversight and outcomes:**

The TAC will be required to send BEIS draft versions of all the items to be provided to Competition Participants to enable Phase 1 activities (specified above) at least two weeks prior, to comment on and agree changes, before final versions are sent to the Competition Participants. In addition, the TAC will provide:

7. Support to develop gateway assessment criteria prior to the completion of contract negotiations with Competition Participants.
8. Testing design report. Contents: introduction setting out background; items 1 – 5 above (accuracy definitions, home typologies, simulation datasets, testing protocols, field trial design) with supporting contextual and methodological explanations and commentary.
9. Phase 1 completion report. Contents: introduction; accuracy test methodology; accuracy based on simulated dataset tests; pilot deployment observations; conclusions and recommendations to BEIS on SMETERs that should advance to Phase 2 of the competition.
Phase 2:

Information and feedback to innovation Competition Participants:

10. Reference input datasets for real homes covering at least 1 year (for which corresponding co-heating test result(s) may be produced in the 2019/20 or the 2020/21 heating seasons), for ‘unseen’ accuracy tests.
11. Reference input datasets from homes subject to co-heating tests, for checking measurement accuracy of equipment deployed by individual SMETERs.
12. Accuracy (trueness and precision), results for SMETERs.

Reports to BEIS on programme oversight and outcomes:

The TAC will be required to send BEIS draft versions of all the items to be provided to Competition Participants to enable Phase 1 activities (specified above) at least two weeks prior, to comment on and agree changes, before final versions are sent to the Competition Participants. In addition, the TAC will produce:

13. Phase 2 completion report including final accuracy and household impact assessments.

General – Phase 1 & 2

Monthly Reporting

Monthly meetings are to be held between BEIS and the Technical Assessment Contractor in both phases. These include a review of the progress of the programme (progress to date vs plans, future planned work, key risks and issues arising and how best to manage) and an evaluation of the results to date. A monthly progress report and risk register should be circulated at least 3 working days in advance of the meetings. All reports and data are to be provided in common accessible formats.

Monitoring and Evaluation Activities

BEIS expects the TAC to lead an evaluation workstream to provide robust evidence on the impact, effectiveness and learning from the programme. This will enable BEIS to:

- establish the outcomes from the intervention
- capture the learning from how the programme and competition was structured and administered so that future interventions can be informed by this learning.

This is likely to involve a combination of dialogue with project stakeholders, to
evaluate success in meeting programme objectives, as well as analysing intended and unintended outcomes. A package of work will be developed which draws on evidence collected through the normal course of the programme, TAC activities, and collects further evidence to answer the evaluation objectives discussed above. This will be analysed and findings and recommendations will be presented. Interim reporting and real time feedback to the programme should be maximised to improve delivery, and policy, as opportunities arise. Tenderers will also need to coordinate the collection of Key Performance Indicators for the project (see Annex A). There will be two key reports: an Interim Report to be delivered on completion of Phase 1 and a Final Report on completion of the SMETER Programme.

The tenderer should provide an outline rationale, design and plan for evaluation activities, describing how and why activities will be undertaken and in what sequence. Assurance that these activities will be methodologically defensible, conducted by skilled people, will be needed. While this is a modest workstream proportionate to the small scale and risk of the programme, standards should be broadly in line with social research and evaluation good practice (e.g. HMT Magenta Book).

6. Ownership and Publication

Ownership

BEIS will assume ownership of all outputs from the project. Therefore, the contractor must obtain permission from us before using any of these outputs, other than what is publicly available, for purposes other than our work.

Pending this permission from us, BEIS encourages the use of the data and interpretation from this project for the purposes of original research. Where the contractor uses outputs from this work in research published in a peer-reviewed journal, we request that you keep us informed about it.

Publication

BEIS expects to be able to use and share the results and outputs of the demonstration activities with other Government Departments, industry and other stakeholders to further understanding and progress technology development and deployment.

Following completion of the Programme, BEIS will publish on its website a summary of the funded activities and the outcomes achieved. This will include a final summary report detailing technical approach, key achievements and recommendations. BEIS may also publish research and/or evaluation reports for the scheme as a whole. BEIS however recognises the need to maintain confidentiality of commercially
sensitive information. BEIS will consult applicants regarding the nature of information to be published, in order to protect commercially sensitive information.

Knowledge sharing
To improve understanding of the technologies developed during the Programme and share lessons learned there will be an obligation on the successful tenderer to undertake knowledge sharing activities. We will expect the TAC to share useful data and experience through relevant industry forms and with relevant BEIS policy teams.

7. Quality Assurance

The successful tenderer will be required to put in place an internal quality monitoring process which is managed and implemented on a regular basis. Details should be included in the tenderer’s proposal.

The successful tenderer will hold monthly performance meetings with BEIS on levels of performance and quality of service against agreed Key Performance Indicators (KPIs) and progress against milestones

8. Timetable

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Planned Completion Date</th>
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<tbody>
<tr>
<td>Tender Process</td>
<td>August – December 2018</td>
</tr>
<tr>
<td>Suppliers information day</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt; August 2018</td>
</tr>
<tr>
<td>ITT issued</td>
<td>7&lt;sup&gt;th&lt;/sup&gt; September 2018</td>
</tr>
<tr>
<td>Deadline for Expressions of Interest</td>
<td>21st September 2018</td>
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<tr>
<td>Deadline for submission of proposals</td>
<td>12th October 2018</td>
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<tr>
<td>Successful bidder notified and contract awarded</td>
<td>November 2018</td>
</tr>
<tr>
<td>TAC to commence work</td>
<td>December 2018</td>
</tr>
<tr>
<td>Phase 1</td>
<td>January 2019 – September 2019</td>
</tr>
<tr>
<td>Projects provided with test data by TAC contractor</td>
<td>January 2019</td>
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</tbody>
</table>
9. Challenges

There are a number of challenges that the tenderer needs to consider in their submission. We highlight those below that we consider to be the main ones.

1. **Time constraint on the testing programme.** We expect the tenderer to consider and, as necessary, build upon or modify the indicative assessment programme provided in this tender. In developing the programme, it is important to maximise the time that the Innovation Competition Participants have to develop their SMETERs whilst delivering a robust assessment of them. All works must be completed within the overall timetable set out in this tender (i.e. Phase 2 must complete as planned, although there is the potential for the end of Phase 1 to be moved).

2. **Recruitment and retention of homes for the field trial.** It is necessary to recruit occupied homes for any field trial with an appropriate range of characteristics to assess the different SMETERs. It is important to incentivise trial participants to achieve a high retention rate during the course of the trial and to get feedback from householders on issues around product installation and usage. The tenderer should look at ways to make any field trial cost-effective e.g. it may be appropriate to cluster the trial homes in several geographical locations. Depending on the SMETERs’ data needs, it is expected that data protection
requirements and customer permissions will be required to obtain smart meter and other data.

3. **Recruitment and practical arrangements for co-heating tests in ‘occupied’ homes.** We assume the assessment programme will include carrying out co-heating tests within a sub-set of the field trial homes. There is a challenge in that the co-heating test methodology is for the homes to be unoccupied during the period of the test. There is also a challenge that co-heating tests are more difficult to apply for attached properties, particularly for apartment buildings. The latter may limit the scope of the building types that the SMETERs are assessed for, or some supplementary processes may be deemed sufficient to address the difficulties of establishing the reference HTC of attached properties.

4. **Data protection and privacy.** All applicable legislation and regulations must be complied with, notably the Data Protection Act, General Data Protection Regulations, and where applicable the Smart Meter Data Access and Privacy Framework. The TAC is expected to take primary responsibility for these issues in relation to field trial households; Competition Participants will have primary responsibility in relation to developing and piloting their SMETERs.

5. **Objectivity, equity and transparency in working with the Innovation Competition Participants.** A key part of this project is to work collaboratively with the Competition Participants. It is also required to be sufficiently detached to undertake the assessment of each project in an independent manner. Hence, it is important to avoid any suggestion of bias – either as a result of unequitable support to the different Competition Participants or that the assessment of the SMETERs is not sufficiently robust.

6. **Technical difficulty.** There are many complexities, e.g. accurately measuring effective environmental conditions (number and location of sensors to establish ‘average’ conditions in the home, or zones within it, etc.), undertaking good quality co-heating tests, establishing electrical safety prior to co-heating tests, detecting and addressing faults in measurement equipment, handling data quality issues (gaps and outliers), etc.

**10. Ethics**

All applicants will need to identify and propose arrangements for initial scrutiny and on-going monitoring of ethical issues. The appropriate handling of ethical issues is part of the tender assessment exercise and proposals will be evaluated on this as part of the ‘addressing challenges and risks’ criterion.
We expect contractors to adhere to the following GSR Principles:\(^\text{13}\):
1. Sound application and conduct of social research methods and appropriate dissemination and utilisation of findings
2. Participation based on valid consent
3. Enabling participation
4. Avoidance of personal harm
5. Non-disclosure of identity and personal information

11. Working Arrangements

The successful contractor will be expected to identify one named point of contract through whom all enquiries can be filtered. A BEIS project manager will be assigned to the project and will be the central point of contact.

12. Data Protection

The Contractor will be compliant with the Data Protection Legislation, as defined in the terms and conditions applying to this Invitation to Tender. A guide to The General Data Protection Regulation published by the Information Commissioner’s Office can be found here.

![GDPR Privacy Notice Template.docx](https://www.gov.uk/government/publications/ethical-assurance-guidance-for-social-research-in-government)

The nature of the service will require the Contractor to collect personal data directly from data subjects. The Contractor will utilise the agreed BEIS privacy notice (adapted from the embedded template and agreed with BEIS prior to contract agreement) in its communications to data subjects.

BEIS will be relying on consent as the relevant legal basis of processing. The Contractor will ensure that all communications allow for the data subject to provide clear, affirmative, informed, freely given and unambiguous consent, which is ‘opt-in.’ The Contractor should have mechanisms to ensure that consent is recorded and shown through an audit trail.

13. Cyber Security

In line with HM Government’s Cyber Essentials Scheme, the Contractor will hold valid Cyber Essentials certification by the time of contract award.

If the Contractor already holds ISO27001 accreditation, no further Cyber Essentials certification will be necessary provided that the certification body carrying out this

verification is approved to issue a Cyber Essentials certificate by one of the accreditation bodies.

Third party independent certification of compliance may be requested by the Authority as evidence of compliance.

14. Skills and experience

BEIS would like you to demonstrate that you have the experience and capabilities to undertake the project. Your tender response should include a summary of each proposed team members experience and capabilities.

Contractors should propose named members of the project team, and include the tasks and responsibilities of each team member. This should be clearly linked to the work programme, indicating the grade/seniority of staff and number of days allocated to specific tasks.

Contractors should identify the individual(s) who will be responsible for managing the project.

15. Consortium Bids

In the case of a consortium tender, only one submission covering all of the partners is required but consortia are advised to make clear the proposed role that each partner will play in performing the contract as per the requirements of the technical specification. We expect the bidder to indicate who in the consortium will be the lead contact for this project, and the organisation and governance associated with the consortia.

Contractors must provide details as to how they will manage any sub-contractors and what percentage of the tendered activity (in terms of monetary value) will be sub-contracted.

If a consortium is not proposing to form a corporate entity, full details of alternative proposed arrangements should be provided in the Annex. However, please note the Department reserves the right to require a successful consortium to form a single legal entity in accordance with Regulation 28 of the Public Contracts Regulations 2006.

The Department recognises that arrangements in relation to consortia may (within limits) be subject to future change. Potential Providers should therefore respond in the light of the arrangements as currently envisaged. Potential Providers are reminded that any future proposed change in relation to consortia must be notified to the Department so that it can make a further assessment by applying the selection criteria to the new information provided.
16. Budget

The budget for this project is up to £900,000 excluding VAT.

Contractors should provide a full and detailed breakdown of costs (including options where appropriate). This should include staff (and day rate) allocated to specific tasks.

Cost will be a criterion against which bids which will be assessed.

Payments will be linked to delivery of key milestones. The indicative milestones and phasing of payments will be agreed prior to entering into contract. This can be adjusted and agreed with the contractor based on the Competition Participants response/details of their bid. Please advise in your tender response how this breakdown reflects your usual payment processes.

In submitting full tenders, contractors confirm in writing that the price offered will be held for a minimum of 60 calendar days from the date of submission. Any payment conditions applicable to the prime contractor must also be replicated with sub-contractors.

The Department aims to pay all correctly submitted invoices as soon as possible with a target of 10 days from the date of receipt and within 30 days at the latest in line with standard terms and conditions of contract.

17. Evaluation of Tenders

Contractors are invited to submit full tenders of no more than 30 pages, excluding declarations and CVs. Attached CVs must be no longer than 2 pages. Any supporting evidence must be attached to the application form. Tenders will be evaluated by at least three assessors and moderated by BEIS.

BEIS will select the bidder that scores highest against the criteria and weighting listed below:

• **Conflict of interest**: pass/fail. See page 7 of the ITT for further information

**EVALUATION CRITERIA AND SCORING METHODOLOGY**

Eligible proposals will be assessed using the following criteria. Answers to the questions set out in the application form must be clear and provide sufficient evidence of how the applicant will meet the required criteria.

A total of 5 points is available against each sub-criterion (a, b, c, etc.), and the weighting to be applied to each sub-criterion is given in brackets:

1. **Technical approach** (Total score 35)
a. The methodology proposed for testing of SMETERs to determine their accuracy (trueness and precision) is robust and the methodology proposed for a gateway assessment at the end of Phase 1 will help to confirm if SMETERs are on track to meet programme objectives and should continue into Phase 2 (weighting x 3);

b. Robust methodology proposed to assess user acceptability of SMETERs related to the impacts of deployment feedback from households on the impacts of SMETER deployments (weighting x 1);

c. The Competition Participants development needs will be supported to help improve the development and deployment of SMETERs (weighting x 2).

d. The testing methodology proposed helps achieve the Programme Objectives as set out in Section 3 by addressing the challenges as set out in Section 4 (weighting x 1);

2. Project Plan (Total score 15)

a. Clear demonstration of the applicant’s ability to meet the deadlines for the various activities and milestones identified. As part of this, the applicant should provide a description of work packages and associated timelines (include a Gantt chart); list of milestones and deliverables with associated dates and invoice values (weighting x 1);

b. Provision of a Resource management plan to meet TAC and programme objectives (weighting x 1).

The applicant should provide: a team structure including roles and responsibilities for this Contract and the management procedures that would to apply to this Contract; this should include managing quality, management of any sub-contractors, and communications between the TAC and BEIS, the Competition Participants, and other stakeholders, and also communication within the TAC’s team itself

c. Key risks and dependencies of the project are identified and sufficient mitigation plans are proposed. A risk plan should be included as part of the proposal (weighting x 1).

3. Skills and Expertise (Total score 30)

a. The team has relevant skills and expertise relating to in situ thermal performance measurement of homes to deliver a robust testing programme and help meet the programme objectives (weighting x 2);

b. Understanding of smart meter technologies, data-tools development, use of data to inform data tools (either smart meter data, or other data) (weighing x 1);

c. The team has the relevant skills and expertise required to deliver the field trial, particularly in relation to data privacy, health and safety, and information security (weighting x 2);

d. Access to skills and experience conducting research and evaluation in policy contexts (weighting x 1)

4. Cost (Total score 20)

a. Total cost will be used to assess value for money. The method for scoring cost is described below. A full cost breakdown should be provided using the table provided in the application form (weighting x 4).
Scoring for Pricing Evaluation

Cost will be marked proportionately to the lowest bid. The lowest bid will receive maximum marks for the price elements and then all other bids will be marked proportionately to that bid. Where contractors indicate options, they should clearly indicate their preferred approach, which the cost and other criteria will be scored against.

Applicants should clearly state where cost savings are being provided compared to exclusive development contracts.

Price will be scored as set out below:

- There will be a maximum of 20 marks
- The lowest priced bid will receive the full 20 marks, all other bids will then be marked as a proportion of these marks as set out in the example below.

If 20% = 20 marks

<table>
<thead>
<tr>
<th>Supplier</th>
<th>Price</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (lowest bid)</td>
<td>£500,000</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>£600,000</td>
<td>500/600 * 20 = 16.7</td>
</tr>
<tr>
<td>3</td>
<td>£750,000</td>
<td>500/750 * 20 = 13.3</td>
</tr>
</tbody>
</table>

Criteria Scoring Method

Tenders will be scored against each of Criteria 1 to 3 above, according to the extent to which they meet the requirements of the tender. The meaning of each score is outlined in the table below. Should any contractor score 1 in any of the sub-criteria, they will be excluded from the tender competition.

The total score will be calculated by applying the weighting set against each sub-criteria, outlined above; the maximum number of marks possible will be 100 (including Criterion 2).

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not Satisfactory: Proposal contains significant shortcomings and does not meet the required standard</td>
</tr>
<tr>
<td>2</td>
<td>Partially Satisfactory: Proposal partially meets the required standard, with one or more moderate weaknesses or gaps</td>
</tr>
<tr>
<td>3</td>
<td>Satisfactory: Proposal mostly meets the required standard, with one or more minor weaknesses or gaps.</td>
</tr>
<tr>
<td>4</td>
<td>Good: Proposal meets the required standard, with moderate levels of assurance</td>
</tr>
<tr>
<td>5</td>
<td>Excellent: Proposal fully meets the required standard with high levels of assurance</td>
</tr>
</tbody>
</table>
6 Structure of Tenders
Contractors are strongly advised to structure their tender submissions to cover each of the criteria above. Complete the price schedule provided in the application form, specifying the daily rates (ex-VAT) you will charge for each level of your staff.

Bid Clarification
After reviewing and evaluating the written proposals, BEIS may decide to hold bid clarifications with suppliers.

Feedback
Feedback will be given in the unsuccessful letters or emails.
<table>
<thead>
<tr>
<th>Ref.</th>
<th>Performance Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPI 1</td>
<td>Number of Energy Innovation projects supported- completed</td>
</tr>
<tr>
<td>KPI 2</td>
<td>Number of projects that have successfully met objectives</td>
</tr>
<tr>
<td>KPI 3</td>
<td>Number (and size) of Organisations supported to deliver project (Lead Partner and Other Organisations as named on grant offer/ contract)</td>
</tr>
<tr>
<td>KPI 4</td>
<td>Number of Business Relationships and Collaborations supported (Formal and Informal, Overall and New)</td>
</tr>
<tr>
<td>KPI 5</td>
<td>Advancement of Low Carbon Solutions- Technology Readiness Levels</td>
</tr>
<tr>
<td>KPI 6i</td>
<td>Initial Financial Leverage from private sector to deliver project</td>
</tr>
<tr>
<td>KPI 6ii</td>
<td>Follow-on Funding to take project further forward</td>
</tr>
<tr>
<td>KPI 7i</td>
<td>A. Reduced Unit Cost of energy- LCOE</td>
</tr>
<tr>
<td></td>
<td>B. Potential Reduced Unit Cost up to 2032</td>
</tr>
<tr>
<td>KPI 7ii</td>
<td>A. Increased Energy Efficiency/ Reduced Energy Demand</td>
</tr>
<tr>
<td></td>
<td>B. Potential Increased Energy Efficiency up to 2032</td>
</tr>
<tr>
<td>KPI 7iii</td>
<td>Increased energy system flexibility</td>
</tr>
<tr>
<td>KPI 8</td>
<td>Number of products (and services) sold in UK and Internationally</td>
</tr>
<tr>
<td>KPI 9</td>
<td>Potential reduction in CO2 emissions savings of project up to 2032</td>
</tr>
</tbody>
</table>
Section 3
Further Information on Tender Procedure

Invitation to Tender for
Tender Reference Number:
Deadline for Tender Responses:

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A. Definitions

Please note that references to the "Department" throughout these documents mean The Secretary of State for Business, Energy and Industrial Strategy acting through his/her representatives in the Department for Business Energy & Industrial Strategy.

The Freedom of Information Act 2000 ("FOIA") and the Environmental Information Regulations 2004 ("EIR") apply to the Department. You should be aware of the Department’s obligations and responsibilities under FOIA or EIR to disclose, on written request, recorded information held by the Department. Information provided in connection with this procurement exercise, or with any contract that may be awarded as a result of this exercise, may therefore have to be disclosed by the Department in response to such a request, unless the Department decides that one of the statutory exemptions under the FOIA or the exceptions in the EIR applies. If you wish to designate information supplied as part of this response as confidential, or if you believe that its disclosure would be prejudicial to any person’s commercial interests, you must provide clear and specific detail as to the precise information involved and explain (in broad terms) what harm may result from disclosure if a request is received, and the time period applicable to that sensitivity. Such designation alone may not prevent disclosure if in the Department’s reasonable opinion publication is required by applicable legislation or Government policy or where disclosure is required by the Information Commissioner or the First-tier Tribunal (Information Rights).

Additionally, the Government’s transparency agenda requires that tender documents (including ITTs such as this) are published on a designated, publicly searchable web site. The same applies to other tender documents issued by the Department (including the original advertisement and the pre-qualification questionnaire (if used)), and any contract entered into by the Department with its preferred supplier once the procurement is complete. By submitting a tender you agree that your participation in this procurement may be made public. The answers you give in this response will not be published on the transparency web site (but may fall to be disclosed under FOIA or EIR (see above)). Where tender documents issued by the Department or contracts with its suppliers fall to be disclosed the Department will redact them as it thinks necessary, having regard (inter alia) to the exemptions/exceptions in the FOIA or EIR.

B. Data security

The successful tenderer must comply with all relevant Data Protection Legislation, as defined in the terms and conditions applying to this Invitation to Tender. Any information collected, processed and transferred on behalf of the Department, and in particular personal information, must be held and transferred securely. Contractors must provide assurances of compliance with the Data Protection Legislation and set out in their proposals details of the practices and systems they have in place for handling data securely including transmission between the field and head office and then to the Department. Contractors will have responsibility for ensuring that they and any subcontractor or subprocessor who processes or handles information on behalf of the Department is conducted securely. Contractors must
have sought written authorisation from BEIS before engaging the services of a subcontractor or sub-processor. The sorts of issues which must be addressed satisfactorily and described in contractors’ submissions include:

- procedures for storing both physical and system data;
- data back-up procedures;
- procedures for the destruction of physical and system data;
- how data is protected;
- data encryption software used;
- use of laptops and electronic removable media;
- details of person/s responsible for data security;
- policies for unauthorised staff access or misuse of confidential/personal data;
- policies for staff awareness and training under the Data Protection Legislation;
- physical security of premises.
- How research respondents will be made aware of all potential uses of their data.

The application form contains “The General Data Protection Regulation Assurance Questionnaire for Contractors” (Declaration 6) to evidence the extent of readiness. The Authority reserves the right to seek evidence of any stated position as required, and to require the successful Contractor to increase their preparedness where necessary.

C. Non-Collusion

No tender will be considered for acceptance if the contractor has indulged or attempted to indulge in any corrupt practice or canvassed the tender with an officer of the Department. The application form contains a "Statement of non-collusion" (declaration 1); any breach of the undertakings covered under items 1 - 3 inclusive will invalidate your tender. If a contractor has indulged or attempted to indulge in such practices and the tender is accepted, then grounds shall exist for the termination of the contract and the claiming damages from the successful contractors. You must not:

- Tell anyone else what your tender price is or will be, before the time limit for delivery of tenders.
- Try to obtain any information about anyone else’s tender or proposed tender before the time limit for delivery of tenders.
- Make any arrangements with another organisation about whether or not they should tender, or about their or your tender price.

Offering an inducement of any kind in relation to obtaining this or any other contract with the Department will disqualify your tender from being considered and may constitute a criminal offence.