Department for Business, Energy & Industrial Strategy

Smart Hydrogen Meter Development and Manufacture

(Hy4Heat Work Package 10)

Innovation Partnership

Invitation to Tender

Tender Reference Number: TRN: 1778/01/2019

Deadline for Tender Responses: 29 April 2019 12 noon

Department for Business, Energy & Industrial Strategy

Date: 28th March 2019

The Department for Business, Energy & Industrial Strategy ("BEIS") wishes to appoint contractors to develop certified smart gas meters that can be run on hydrogen, or hydrogen and natural gas (dual gas) under an Innovation Partnership procurement.

Enclosed are the following sections:

- Section 1 (page 5) Instructions and Information on Tendering Procedures
- Section 2 (page 11) Specification of Requirements
- Section 3 (page 38) Further Information on Tender Procedure
- Section 4 (page 41) Functional Specification
- Section 5 (page 49) Declarations to be submitted by the Tenderer;
  - Statement of Non-Collusion
  - Form of Tender
  - Conflict of Interest
  - The General Data Protection Regulation Assurance Questionnaire for Contractors
  - Safe Use of Hydrogen
  - Code of Practice for Research
- Annex A: Pricing Schedule
- Annex B: Code of Practice for Research

Tenderers should apply by registering on the following website www.delta-esourcing.com. This will ensure you receive immediate notification of updates to the ITT process and answers to questions raised by potential bidders which will be published on the Delta portal.

Please read the instructions on the tendering procedures carefully since failure to comply with them may invalidate your tender. Your tender must be received by uploading to the Delta portal by **12 noon (UK time) on Monday 29th April 2019** clearly marked as "TENDER".

I look forward to receiving your response.

Yours sincerely,

Steve Loades

Email: hy4heat@arup.com

Privacy Notice

This notice sets out how we will use your personal data, and your rights. It is made under Articles 13 and/or 14 of the General Data Protection Regulation (GDPR).

YOUR DATA

We will process the following personal data:

Names and contact details of employees involved in preparing and submitting the bid;
Names and contact details of employees proposed to be involved in delivery of the contract;
Names, contact details, age, qualifications and experience of employees whose CVs are submitted as part of the bid.

Purpose

We are processing your personal data for the purposes of the tender exercise described within the remainder of this Invitation to Tender, or in the event of legal challenge to such tender exercise.

Legal basis of processing

The legal basis for processing your personal data is necessary for the performance of a task carried out in the public interest or in the exercise of official authority vested in the data controller, such as the exercise of a function of the Crown, a Minister of the Crown, or a government department; the exercise of a function conferred on a person by an enactment; the exercise of a function of either House of Parliament; or the administration of justice.

Recipients

Your personal data will be shared by us with other Government Departments or public authorities where necessary as part of the tender exercise. We may share your data if we are required to do so by law, for example by court order or to prevent fraud or other crime.

Retention

All tenders will be retained for a period of 6 years from the date of contract expiry, unless the contract is entered into as a deed in which case it will be kept for a period of 12 years from the date of contract expiry.

YOUR RIGHTS

You have the right to request information about how your personal data are processed, and to request a copy of that personal data.

You have the right to request that any inaccuracies in your personal data are rectified without delay.

You have the right to request that any incomplete personal data are completed, including by means of a supplementary statement.

You have the right to request that your personal data is erased if there is no longer a

justification for it to be processed.

You have the right in certain circumstances (for example, where accuracy is contested) to request that the processing of your personal data is restricted.

You have the right to object to the processing of your personal data where it is processed for direct marketing purposes.

You have the right to object to the processing of your personal data.

INTERNATIONAL TRANSFERS

Your personal data will not be processed outside the European Union.

COMPLAINTS

If you consider that your personal data has been misused or mishandled, you may make a complaint to the Information Commissioner, who is an independent regulator. The Information Commissioner can be contacted at:

Information Commissioner's Office
Wycliffe House
Water Lane
Wilmslow
Cheshire
SK9 5AF
0303 123 1113
casework@ico.org.uk

Any complaint to the Information Commissioner is without prejudice to your right to seek redress through the courts.

CONTACT DETAILS

The data controller for your personal data 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.

Section 1

Instructions and Information on Tendering Procedures

Invitation to Tender for Smart Hydrogen Meter Development and Manufacture

Tender Reference Number: 1778/01/2019

Deadline for Tender Responses: 29 April 2019 (12 noon)

Contents

1.1 Indicative Procurement Timetable

The anticipated timetable for this Innovation Partnership tender exercise is as follows. The Department reserves the right to vary this timetable. Any variations will be published on the Delta portal or circulated to all organisations who have registered an interest in notifications.

Tender Timeline	**Date**
Invitation to Tender issued	Thursday 28 March 2019
Deadline for questions relating to the tender	Friday 5 April 2019
Responses to questions published	Friday 12 April 2019
Deadline for receipt of Initial Tenders	**Monday 29th April 2019 12:00 (UK time)**
Invite suppliers for bid clarification/ negotiation	14 – 16 May 2019
Negotiation period ends	Thursday 16 May 2019
Invitation for Final Tenders issued	Tuesday 21 May 2019
Deadline for receipt of Final Tenders	Tuesday 4 June 2019 12:00 (UK time)
Evaluation period (including clarification questions if required)	5 – 12 June 2019
Notification of results to award maximum of 3 contracts	Thursday 13 June 2019
10-day Standstill period	14 – 25 June 2019
Contract award on signature by both parties	26 – 28 June 2019
Contract start date	Monday 1 July 2019

The contract is to be for a period of 21 months unless terminated or extended by the Department in accordance with the terms of the contract.

Subject to future approvals, and successfully certified meters, approximately 2,000 meters in total may be purchased by BEIS from the 3 appointed contractors for the purposes of community trials, these may run for a period up to 24 months.

1.2 Procedure for Submitting Tenders

The maximum page limit for tenders is 30 A4 (excluding declarations, pricing schedule and CVs). The font type should be in Arial, minimum size 12 pt with single line spacing and minimum 2.5cm margins.

Tenderers should apply by registering 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 BIP Solutions Delta Website. No hard copies of your submission are required.

For questions regarding the procurement process please upload these to the Delta portal.

Tenders will be received up to the time and date stated. Please ensure that your tender is delivered no 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, these should be uploaded onto the Delta portal. All questions should be submitted by 17:00 on 5 April 2019; questions submitted after this date may not be answered. Questions deemed as commercially sensitive will not be uploaded and shared in the general Q&A. 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 17:00 on 12 April 2019 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.

1.3 Conflict of Interest

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

All conflicts must be declared via the Declaration form these should also include conflicts for the research elements.

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

Where there may be a potential conflict of interest, it is suggested that the consortia or organisation designs 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 maintain an impartial approach to the project.

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 the Delta portal (in a form which does not reveal the questioner's identity). Please ensure these questions are submitted via BIP DELTA. The Department will respond via BIP DELTA.

2. **Contractors are asked to sign and return Declaration 3 (page 52) 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.

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.

BEIS has appointed Arup+ as the programme management contractor (PMC), who are responsible for delivering work packages 1 and 9 as part of their contract. Arup+ will also be managing the delivery of Work Packages 2 – 8 & 10 and, as part of the conditions for the PMC role, have agreed not to bid for the remaining work packages. These work packages will be delivered by other suppliers.

The Arup+ team is a consortium of the following companies: Arup, Kiwa Gastec, Progressive Energy, Embers and YoEnergy.

1.4 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 Section 2.17 (Evaluation of Tenders).

1.5 Terms and Conditions applying to this Invitation to Tender

The Department's Terms and Conditions of Contract will apply to this contract and are published alongside this ITT.

Intellectual Property

BEIS requires a UK wide, irrevocable, royalty-free, non-exclusive licence, together with the right to grant sub-licences, to use or publish information, data, results, outcomes or conclusions which are created in performing the project, for its internal non-commercial purposes.

Suppliers will be expected to identify and protect intellectual property arising from the project prior to publication. Suppliers will be expected to commercially exploit the arising intellectual property to generate either capital or revenue or both.

Suppliers will retain the arising intellectual property, subject to certain conditions, including if within three years of its creation:

- It has not been commercially exploited by the contractor, the contractor shall if requested by BEIS assign it to the Department
- It has not been commercially exploited by the contractor, or the contractor has established a monopoly position, BEIS may require the contractor to licence it to third parties nominated by the Department

Costs associated with securing intellectual property arising from or associated with this project are not eligible for reimbursement and cannot be included within the contract price.

The detailed arrangements for intellectual property rights and exploitation of IPR are set out under clauses 27 and 28 in the Terms and Conditions for this Contract.

1.6 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 17:00 on 12 April 2019. 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.

1.7 Checklist of Documents to be Returned

- Proposal (maximum 30 pages)
- Annex A: Pricing Schedule
- Declaration 1: Statement of Non-Collusion
- Declaration 2: Form of Tender
- Declaration 3: Conflict of Interest
- Declaration 4: The General Data Protection Regulation Assurance Questionnaire for Contractors
- Declaration 5: Safe Use of Hydrogen
- Declaration 6: Code of Practice for Research

Section 2

Specification of Requirements

Invitation to Tender for Smart Hydrogen Meter Development and Manufacture

Tender Reference Number: 1778/01/2019

Deadline for Tender Responses: 29 April 2019 (12 noon)

Contents

2.1 Introduction and Summary of Requirements

This Invitation to Tender follows the selection of suppliers from the responses to the Selection Questionnaire. It forms the second stage of the Innovation Partnership procurement procedure to appoint contractors to develop certified smart hydrogen gas meters that can accurately measure the supply of hydrogen or hydrogen and natural gas (dual gas) to buildings.

The suppliers' responses to this ITT will be assessed by BEIS and the Arup+ team. As part of this assessment there will be a period of negotiation with each tenderer following which, an invitation for final tenders may be issued. The responses to the final tender will be evaluated by the project team in accordance with the criteria set out later in this document.

The Department intends to appoint up to three contractors to develop prototype smart hydrogen meters in accordance with the requirements. The overall budget for the whole project (excluding the community trials is up to £3,000,000 (excluding VAT) in total. The target budget range for each of the three suppliers will be between £500,000 - £1,000,000 (excluding VAT) per supplier. The contracts will run until the end of March 2021.

Subject to future approvals of potential future community trials, and successfully certified meters, approximately 2,000 meters in total may be purchased by BEIS from the 3 appointed contractors for the purposes of those community trials (with a total value of approximately £800,000 to be awarded across the successful suppliers).

2.2 Background

Heating is essential to our lives – it is the biggest reason we consume energy in our society and is responsible for over a third of our emissions. Meeting our existing Climate Change Act commitment to reduce greenhouse emissions by 80% by 2050 will require decarbonising nearly all heat in buildings and most industrial processes.

There is no clear consensus on the best approach to decarbonising heat at scale. However, there are a number of options with potential to play an important role. One of these is to utilise low carbon gases such as hydrogen. Over 80% of homes and business are currently supplied by gas and the UK has one of the most comprehensive gas networks in the world with 282,000km of gas pipes feeding 22.7 million buildings.

In December 2018 the Department for Business, Energy and Industrial Strategy published Clean Growth: Transforming Heating which provides an overview of the key issues arising from our review of the evidence base on approaches to achieve heat decarbonisation. It sets out where we believe efforts should be focused across industry, academia and the public sector over the next 2-5 years to inform development of a long-term policy framework. The Government is leading a number of innovation and practical demonstration projects to help address some of the key uncertainties.

The Hydrogen Approach

To be able to inform any future assessment of the feasibility of the costs and benefits of undertaking a hydrogen conversion, a full understanding of issues from end-to-end (production to use) of the gas chain will be required.

The hydrogen gas chain can be split into the following stages:

- Production (including plant and CO_2 off-take, CO_2 sequestration and hydrogen storage)
- Transmission network (involving the pipework that transports the gas under pressure of between 7 and 85 bar)
- Distribution network down to the end user's gas meter (involving pipework that transports the gas under a pressure of up to 7 bar)
- End-use (i.e. at and downstream of the meter)

The innovation programme, Hy4Heat, seeks to prove the safety case for the use of hydrogen for heating in GB homes and businesses, downstream of the Emergency Control Valve (ECV).

Hy4Heat programme

The Department for Business, Energy and Industrial Strategy (BEIS) has appointed Arup+, a group of companies led by Ove Arup Ltd, as the Programme Management Contractor (PMC) to manage and successfully deliver Hy4Heat, a programme to demonstrate and prove the safety case for the use of hydrogen for heating in GB homes and businesses.

The Hy4Heat programme's aim is:

- To establish if it is technically possible and safe to replace methane with hydrogen in commercial and residential buildings and gas appliances. This will enable the Government to determine whether to proceed to a community trial

The Hy4Heat programme's overall objective is:

- To provide the technical, performance, usability and safety evidence to de-risk the use of hydrogen for heat in buildings whilst working with others to prepare for a potential future occupied trial

The programme's focus is on researching, developing, testing and demonstrating within the end-use stage of the gas chain. This involves the gas appliance and equipment sectors as well as consumer research.

The programme is aiming to demonstrate:

- That safe, reliable, efficient and affordable end-use appliances and equipment can be developed
- That hydrogen can be safely distributed to the end user appliances in existing buildings' pipework, downstream of the meter

- Initial findings around what the consumer experience of a hydrogen fuelled home will be. This includes demonstration trials of appliances and equipment as well as developing detailed plans and preparations to progress to potential community trials, if the government decides to do so.

The Hy4Heat programme will be completed by the end of March 2021. It now comprises of the following ten Work Packages.

1. Programme management
2. Definition of a hydrogen quality standard
3. Establishing an appliance and equipment testing capability
4. Development of domestic hydrogen appliances
5. Understanding commercial appliances
6. Understanding industrial appliances
7. Assessment of suitability of hydrogen in existing buildings
8. Hydrogen demonstration trials in unoccupied building
9. Preparations for a potential occupied consumer community trial
10. **Development of smart hydrogen meters (this Invitation to Tender (ITT))**

Arup+ as the Programme Management Contractor (PMC), are responsible for delivering Work Packages 1 and 9 as part of their contract. Arup+ will also be managing the delivery of Work Packages 2 – 8 & 10 and, as part of the conditions for the PMC role, have agreed not to bid for the remaining Work Packages. These Work Packages will be delivered by other suppliers.

This ITT directly supports the delivery of Work Package 10, smart hydrogen meter development and manufacture.

2.3 Aims and Objectives

The aim of this work package (WP10) is to develop certified hydrogen gas smart metering equipment (GSME) that can safely and accurately measure the supply of hydrogen gas, or dual (hydrogen and natural) gas to domestic and small commercial buildings.

The objectives of this work package are to:

1. Develop and deliver certified and compliant hydrogen gas smart metering equipment (GSMEs) which can demonstrate the safe, accurate measurement and billing of hydrogen, (or if feasible hydrogen and natural gas) delivery to a building;
2. Provide safe prototype GSMEs for use in WP8 demonstration trials;
3. Demonstrate that additional safety features can be included in the GSME in turn providing evidence to the safety case for hydrogen;
4. Understand, and where feasible address, the challenges and risks associated with progressing the meters to a volume manufacturing stage;
5. Understand the challenges and potential solutions to support a potential future transition to hydrogen. This includes research and development of products that simplify the switch-over process (e.g. should meters be hydrogen only or dual gas).

2.4 Scope of Work

The project will be structured in two main phases:

1. **Prototype development (July 2019 – March 2020)**: Concept design and prototype development for use in demonstration trials
2. **Product certification and refinement (April 2020 to March 2021)**

Minimum requirements are that the GSMEs meet all over arching applicable regulation for smart metering including the following:

- They should be capable of safely and accurately measuring hydrogen gas of ISO 14687 Type A quality
- They should fit inside an existing meter box (BS 8499, or other relevant standard if a reference can be provided) or on a meter bracket
- They should be legally compliant with the appropriate product standards
- They should be legally compliant with the Measuring Instruments Directive (MID) 2014/32/EU, implemented in Great Britain as the Measuring Instruments Regulations 2016,
- They should be accompanied by a document detailing their level of compliance with the ATEX Directive 2014/34/EU, implemented in Great Britain as The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016. This may require the production of an ATEX compliance declaration by the manufacturer.
- They should be compliant with the relevant SMETS2 legislation. Further information can be found at: https://smartenergycodecompany.co.uk/the-smart-energy-code-2/
- They should include excess flow detection and gas disablement functionality
- They should contain a means of interfacing with third party devices to allow operation of additional safety devices (such as gas detection alarms or anomalous flow detectors) to prevent accumulations of hydrogen gas. This would be using the SMETS2 protocols.

Sectoral scope

The smart hydrogen or dual hydrogen and natural gas GSMEs developed under this work package will be for use in domestic and commercial buildings.

Geographic scope

It is expected that operation of the developed GSMEs will be in Great Britain.

2.5 Activities and Timescales

Delivery of the work package is divided into two phases. Details of the activities and timescales for each phase are described below. Further detail is included in the Functional Specification included in Section 4.

Phase 1 - Prototype development (July 2019 to March 2020)

The focus of Phase 1 is to design, develop and deliver prototype GSMEs that operate safely, and which accurately measure the supply of hydrogen gas (or hydrogen and natural gas if developing a dual gas meter) to buildings.

Within the prototype design is the ability of the GSME to identify excessive gas flow (gas flow outside predefined limits) and automatically disable the gas supply (by closure of the gas supply valve) to a building if an uncontrolled gas flow is detected. This is likely to be achieved through the development of functionality already required under SMETS2.

These prototype meters must be delivered in time for inclusion in a demonstration trial (Phase 2 as detailed below), which is due to start in March 2020.

There are some key challenges that applicants will need to consider during Phase 1 and make plans for within their applications:

Key challenges

1. **Capacity** – Manufacturers should demonstrate how they intend to meet the challenge of producing a hydrogen gas or dual (hydrogen or natural) gas meter that is capable of measuring gas flows of up to 20m^3/hr for a domestic meter and 400m^3/hr for a commercial meter, whilst fitting within the standard meter box.
2. **Safety** – Manufacturers should provide evidence of how their GSME will operate safely and if practicable how it will satisfy the requirements of the ATEX directive. If ATEX approval is considered inappropriate, justification must be given as to why and how safety will be alternatively ensured. GSME designs should also demonstrate the incorporation of additional safety measures that prevent the uncontrolled release of gas in the building as specified in the functional specification (Section 4).
3. **Accuracy** – Manufacturers should demonstrate how they will meet the challenge of achieving accuracy requirements as specified in the MID for natural gas.
4. **Security** – Manufacturers should demonstrate how the design and operation of their product meets the security requirements of SMETS.
5. **Continuity** – Manufacturers should demonstrate how their design will enable future developments in security, safety, functionality and connectivity to be incorporated without the need to replace the GSME.
6. **Compliance** – Whilst certification is not required in phase 1, manufacturers should demonstrate that their designs and communications protocols will be compliant with the relevant product standards, MID requirements, SMETS2 and ATEX where practicable.

Funding scope: If you have bid as a consortia please that BEIS will not fund development of consortia or team building.

Phase 2 Product Refinement and Certification (April 2020 – March 2021)

Phase 2 will focus on the testing, certification and further refinement of the prototype GSME so it is certified for use in an occupied building. It is expected that manufacturers will obtain the necessary certification for their meter to be used in a potential future community trial.

In parallel to this, it is expected that the unoccupied demonstration trial is used to refine the prototype product, particularly the GSME interface with the Home Area Network (HAN). Where possible and if products are available, it is expected that integration with third party additional safety devices is included in this product refinement stage (manufacture of these third-party devices is outside the requirements of this tender).

Manufacture of GSMEs at scale is outside the requirement of this current tender. Further information is included in the functional specification (Section 4)

There are some key challenges that applicants will need to consider at this stage and make plans for within their applications:

Key challenges

1. **Product Certification** – Manufacturers should show compliance with relevant product standards through the normal certification processes.
2. **MID Compliance** – Manufacturers should demonstrate how the GSME will meet the requirements of the MID and obtain MID certification.
3. **ATEX Compliance** – Manufacturers should demonstrate how their GSME will comply with the ATEX directive where practicable. Or where ATEX approval is considered inappropriate, justification must be given as to why and how safety will be alternatively ensured. This is essential to allow the use in any further community trial.
4. **SMETS2 Compliance** – Manufacturers should demonstrate that their GSME complies with the SMETS2 requirements so it can be used to measure gas flows in any future community trial.
5. **Ease of installation, reading and maintenance** – Manufacturers should demonstrate that their product is no more challenging to install, read and maintain that a natural gas SMETS2 meter.
6. **Reliability** – Manufacturers should demonstrate that their meter functions reliably and consistently within designed limits throughout the demonstration trial.
3. **Performance data gathering** – Manufacturers should demonstrate that the data received from their meters is accurate and of high quality throughout the demonstration trial.
7. **System integration –** Manufacturers should demonstrate that the additional safety measures added to the GSME HAN interface reliably interfaces with the existing communications infrastructure and protocols as specified by SMETS2.

Other activities are likely to also include:

- Knowledge dissemination
- Stakeholder engagement and communications

2.6 Outputs Required

Contract delivery will be measured against predefined milestones. These will be specific for each phase and are detailed below. Contractors should expect to complete Phase 1 milestones by 31 March 2020. On 31 March 2020, there will be short contract break where the Authority will decide whether to proceed to Phase 2 of this requirement. Contractors that fail to deliver Phase 1 milestones will not be progressed to Phase 2. It should be noted that BEIS contracts require that project outputs are shared publicly.

Phase 1 outputs:
Phase 1 should deliver a total of 6 prototype meters per bidder, that have been tested for safety and functionality. The following documentation should accompany each prototype GSME and this should be delivered in accordance with the milestone table below:

- A feasibility and planning report that describes the necessary product development steps and required outputs to achieve the functional specification within the project timescales. As a minimum, feasibility reports should include:
    - A description of the metering technology chosen and an explanation of why this technology is suitable for fulfilling the functional specification.
    - Where dual meters (hydrogen or natural gas) are proposed, this explanation should include a description of how the meter will measure both gases and how it will distinguish between the two.
    - A schedule for the development work, which refers to the milestone schedule for Phases 1 and 2 in the table below. This should include a Gantt chart and detail inhouse development activities and externalities e.g. testing, facility use.
    - A description of how you will deliver the work, including a list of relevant roles.
    - Key risks (technical, safety and end-user related) and dependencies of the project, including mitigation plans.
    - Details of the type of information you propose to publish outside your organisation, the format you expect this to take and the expected timeframe
    - A detailed breakdown of costs for the development work.
- A Bill of Materials (BoM) listing the components and their key performance characteristics (e.g. gas tightness of the meter valve).
- Design drawings showing how the GSME components fit together and how the prototype GSME will interface with any additional safety equipment.
- Communications protocols that describe:
    - The operational states of the GSME

  - How the GSME changes between these states
  - The circumstances under which these changes will take place.
  - How the GSME will interface with any additional safety measures
- Publication of communication protocol to enable manufacturers of 3rd party 'additional safety measures' (e.g. hydrogen gas alarms or alarms from hydrogen appliances) to develop equipment which integrates with the GSME and potentially 'Disables the gas supply' in a dangerous situation.
- A safety and functionality test report which demonstrates that the prototype GSME will (this does not require evidence of full certification at prototype stage, but should demonstrate that these aspects have been considered and internal testing carried out):
  - Accurately measure the supply of hydrogen (or hydrogen and natural gas) to accuracy levels comparable or better, to those stated in the MID for current natural gas products
  - Operate safely with hydrogen (or hydrogen and natural gas) with appropriate consideration of the ATEX directive where practicable.
  - Operate safely when changing between operational states (e.g. disabled, armed, enabled etc.) as specified in SMETS 2.
  - Be capable of interfacing with additional safety measures designed to prevent large scale leaks as defined by the functional specification
- Calibration reports showing that the meter can measure flow of hydrogen or hydrogen and natural gas accurately up to the maximum flow rates of 20m^3/hr for a domestic meter and 400m^3/hr for a commercial meter.

Phase 1 milestone table

No.	Milestone	Evidence / Deliverable Required
1	Feasibility Report	Identification of design parameters for development of a hydrogen product. A description of the product and the necessary conversion steps to demonstrate that the development of a hydrogen GSME is viable.
2	List of components	A bill of materials identifying all the key components and key performance characteristics for each component.
3	Progress Report 1 – Hardware design complete	GSME hardware design review report including prototype GSME design, a final bill of materials showing all the key components and details of any sub-contract suppliers for each component. Where necessary the report should demonstrate that each component has passed functionality, accuracy and safety testing and component level safety certificates should be included. The report should identify any predicted challenges for assembling these components into a functioning and safe product and what further work is planned to overcome these.
4	Progress Report 2 – Operating protocols complete	GSME operating protocols design review report including test results demonstrating how the safety and performance challenges have been met (detail provided in the functional specification), Where performance challenges have yet to be achieved, the report should recommend what further work needs to be done to complete the prototype design.
5	GSME prototype complete	Completion of the GSME design, production and laboratory demonstration of the first unit ready for functional and safety testing. The whole product shall demonstrate adequate qualitative performance as defined by the MID, ATEX, SMETS2 and the relevant product standards. Certificates of compliance are not necessary at this stage.
6	Delivery of 6 No. GSME prototypes	Delivery to the demonstration trial site of 6 GSME prototypes, complete with a full set of manufacturer's instructions and trained support staff qualified to install, operate and maintain the prototype safely and who can show evidence of this qualification. Support staff will be required for the full duration of the unoccupied demonstration trial.

Phase 2 outputs:
Phase 2 should result in the delivery of 6 GSMEs per bidder that are certified for use in a potential community trial in compliance with MID, ATEX (where appropriate) SMETS2 and individual product standards. Final outputs should be delivered in accordance with the milestone table below and should include:

- A final project report detailing the final product design and development of the certified GSME. As a minimum, this report should include:
  - Final designs and layout drawings of the GSME, complete with additional safety measures.
  - Final communications protocols showing how the GSME will operate in conjunction with the additional safety measures
  - Demonstration trial findings with identification of design alterations made, and the impact of these on GSME functionality/performance.
  - Certification test results and certificates to demonstrate compliance with the relevant safety, performance and product standards.
  - Recommendations for further dissemination of knowledge and learning from the project.
- A business plan for scaling up the manufacture of the GSME product and training of installers in preparation for a potential future community trial and subsequent sales. The business plan should consider potential further product developments to facilitate a long term roll out programme for hydrogen transition, as well as cost to the consumer.

Phase 2 milestone table

No.	Milestone	Evidence / Deliverable Required
7a	MID compliance	Evidence of compliance with the MID i.e. a certificate of compliance issued by a notified body
7b	ATEX compliance	Evidence of compliance with the relevant ATEX standard i.e. A certificate of compliance where practicable issued by a notified body and product markings on each GSME.
7c	SMETS2 compliance	Evidence of compliance with SMETS2 i.e. a certificate of compliance with the relevant BSI/EN standards to the product, issued by a notified body
7d	Product standards compliance	Evidence of compliance with relevant product standards i.e. a certificate(s) of compliance issued by a notified body
7e	Delivery of a fully certified GSME	Presentation of six fully boxed GSME including all paperwork and certification for use in an occupied building.

8	Final Report	A final report containing all the information listed above as a minimum.
9	Business Plan & Final Retention	Business plan to provide information on scaling up the manufacture of GSMEs and training of installers in readiness for a community trial and subsequent sales. The business plan should also consider potential further product developments to facilitate a long term roll out programme for hydrogen transition as well as cost to the consumer. Where a hydrogen only product has been developed detail should be provided as to the expected transition procedure if the UK were to move to hydrogen.

It is expected that any GSME developed under the Hy4Heat programme will be compatible between all supplier systems especially regarding interfaces with ‘additional safety measures’. Therefore, all communication protocols are expected to comply with the specification in SMETS2. Hy4Heat will facilitate dissemination events to allow a collaborative approach to such communication to avoid subtly different protocols. As necessary Hy4Heat will subsequently organise meetings with (for example) BEIS, Ofgem and/or GCHQ to facilitate any re-interpretation of SMETS2 that manufacturers may think are necessary to enable the above. Close communication between all suppliers and Hy4Heat will be essential.

2.7 Ownership and Publication

BEIS is committed to openness and transparency. All outputs listed within Sections 2 and 4 (with the exception of project updates and reports) should be accessible, non-disclosive and suitable for publication and further use.

The exceptions to this are where:

1) the intellectual property rights to an output (or part of an output) are owned by someone other than the contractor. Tenderers should state in their tender if this is the case and indicate whether the third party copyrighted materials can be redacted;

2) data is commercial in confidence; and

3) a non-anonymised dataset is required for the project.

If these exceptions apply to any part of the outputs, tenderers should indicate this in their proposal alongside any approaches to resolving these.

If any Arising Intellectual Property (IP) from all models and software paid for by BEIS has not been commercially exploited by the contractor within a period of three years BEIS may require the contractor to licence this IP to third parties nominated by the BEIS - see BEIS terms and conditions of contract issued with this ITT.

- Where the contractor is using or building on top of existing IP, such as modules that interface with the model, or proprietary datasets, this must be explicitly stated in the tender response.

- Where open source code or models are to be used within this model, please make clear under which licence this open source software is released.

- The Open Government Licence should be used wherever possible:

http://www.nationalarchives.gov.uk/doc/open-government-licence/version/2/

Non-Disclosure

All outputs must be provided to BEIS in a format that is non-disclosive (i.e. no individuals or individual organisations are identifiable from the data or analysis, directly or indirectly), unless the specification states otherwise or the individual / organisation has given their permission. The contractor is responsible for ensuring that the data is supplied in this form alongside a report on the checks made. A minimum standard for checking includes cell counts within sub-groups for all outputs and analysis. The contractor will be asked to agree their approach to checking for disclosure with BEIS during the course of the contract, before the checks are carried out. Where data or analysis is found to be disclosive during checking, the contractor will be required to suggest an approach or approaches to aggregate the analysis and to agree this with BEIS.

Storage and Transfer

The contractor will need to ensure that all appropriate regulations are adhered to regarding safe storage and transfer, compliant with BEIS requirements for the data processing and storage of restricted data.

2.8 Quality Assurance

This project must comply with the BEIS Code of Practice for Research (Annex B) and bidders must set out their approach to quality assurance in their response to this ITT.

Tenderers should include a quality assurance plan that they will apply to all of the Work Packages.

To demonstrate relevant experience in producing high quality reporting, the tenderer must:

- Specify who will be responsible for quality assurance. This must be undertaken before information is issued to Hy4Heat for review and onward circulation to BEIS. More information can be found in the working arrangements in section 5 below.
- Specify the specific responsibilities of the contractor's project manager / director.

Sign-off for the quality assurance must be done by someone of sufficient seniority within the contractor organisation to be able take responsibility for the work done. Acceptance of the work by BEIS will take this into consideration. BEIS reserves the right to refuse to sign off outputs which do not meet the required standard specified in this invitation to tender.

The successful bidder will be responsible for any work they or subsequent Work Package contractors supply and should therefore provide assurance that all work in the contract is undertaken in accordance with the Code of Practice.

BEIS reserves the right to request an audit of projects against the BEIS Code of Practice for Research and the commitments made in the tender documents and subsequent contract. Your response could be automatically rejected if the project will not be performed under quality assurance measures that fully meet the Code's requirements.

Other useful sources of guidance and advice that will help bids and the resulting work be of the highest quality include:

- The Government Social Research Code, in particular those that relate to GSR Products: http://www.civilservice.gov.uk/networks/gsr/gsr-code
- The Green Book: appraisal and evaluation in central government. https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-governent

- Quality in Qualitative Evaluation: A Framework for assessing research evidence provides a Framework for appraising the quality of qualitative evaluations.

- Rapid Evidence Assessment (REA):. http://www.civilservice.gov.uk/networks/gsr/resources-and-guidance/rapid-evidence-assessment/what-is. This toolkit will help researchers to identify whether a Rapid Evidence Assessment is best for their needs, and help with the process of planning and carrying out a review

Where relevant, all bids should refer to these pieces of guidance and advice and how they will be used.

The Contractor will be expected to produce high quality reports that meet the following criteria:

General:

- They answer the research questions clearly, in plain English
- They are clearly structured so that information presented in each section of each report is clear
- Connections between sections are clear
- Executive summaries are no more than two sides and set out the findings clearly and their relevance to BEIS policies
- All sections have clear introductions and conclusions (including findings being written concisely upfront)

Use of good quality English:

- They are thoroughly peer reviewed for writing quality
- No jargon is used and all terms are defined and referenced clearly
- All acronyms are written out in full the first time that they are mentioned in each section of each report
- No grammar and phrasing errors are present
- No typos / typographical errors are present
- They contain concise and non-wordy sentences and paragraphs
- They are concise reports that are not too long and do not have vast annexes

Visualisations:

- All visualisations are labelled
- All axes are labelled, including with appropriate units
- Clear and appropriate use of visualisations (large enough size, data can be read clearly without reference to the raw data, and there are not too many visualisations presented at once)
- All visualisations are clearly explained and discussed
- A range of different types of visualisations are used to provide more interesting and innovative ways of presenting the results

Data quality:

- Any limitations in the research approach need to be clearly stated and justified
- Further research should be stated to build upon the limitations that cannot be addressed in the research
- Where the findings are stronger and more robust and where they are not needs to be stated clearly
- They must use appropriate and consistent units
- All numerical units should include the range of uncertainty / error margin

2.9 Delivery Timetable

As part of the submission, the tenderer is expected to submit a delivery plan including, as a minimum:

- An organisation chart and list of key people within the successful tenderer's delivery team with an outline description of how they will be managed in order to ensure that delivery will be completed on time
- A detailed schedule of works showing when the scope will be delivered
- The methodology that will be used to produce the deliverables and to ensure the quality of the deliverable
- An outline description of the risks to delivery and your proposed mitigation measures

Aligned with the deliverables presented in Section 2 and Section 4 and the Milestone Payments in 2.16, an indicative, outline time schedule is presented below:

Reporting points/deliverables	Proposed date
Contract commences	1 July 2019
Phase 1 – Concept design and prototype development	
Project Inception Meeting	w/c 15 July 2019
Interim Project Meeting / Presentation	September / October 2019
Submission of Feasibility Report	September / October 2019
Submission of Draft Phase 1 Progress Reports (Milestones 3 & 4)	On or before 14 February 2020
Submission of Final Phase 1 Progress Reports (Milestones 3 & 4)	On or before 13 March 2020
BEIS sign-off of Phase 1	31 March 2020
Phase 2 – Product refinement and certification	
Phase 2 Inception Meeting	w/c 6 April 2020
Interim Phase 2 Meeting / Presentation	July / August 2020
Submission of Draft Phase 2 Reports (Milestones 8 & 9)	On or before 5 February 2021
Submission of Final Phase 2 Reports (Milestones 8 & 9)	On or before 5 March 2021
BEIS sign-off of Phase 2	31 March 2021

The contract duration will be 21 months.

2.10 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 will be taken into consideration within the evaluation of applicants' proposals.

We expect contractors to adhere to the following GSR Principles:

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

2.11 Working Arrangements

The successful contractors will be expected to identify one named point of contact through whom all enquiries can be filtered. An Arup+ project manager, working on behalf of BEIS, will be assigned to the project and will be the central point of contact.

2.12 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.

The only processing that the Contractor is authorised to do is listed in Annex 1 by BEIS, "the Authority" and may not be determined by the Contractor.

Annex 1: Processing, Personal Data and Data Subjects

(1) The contact details of the Authority's Data Protection Officer are:

BEIS Data Protection Officer
Department for Business, Energy and Industrial Strategy
1 Victoria Street
London
SW1H 0ET

Email: dataprotection@beis.gov.uk

(2) The contact details of the Contractor's Data Protection Officer (or if not applicable, details of the person responsible for data protection in the organisation) are: [To be completed by the Contractor]

(3) The Contractor shall comply with any further written instructions with respect to processing by the Authority.

(4) Any such further instructions shall be incorporated into this Annex 1.

Description	Details
Subject matter of the processing	The processing of names and business contact details of staff of both the Authority and the Contractor will be necessary to deliver the services exchanged during the course of the Contract, and to undertake contract and performance management. The Contract itself will include the names and business contact details of staff of both the Authority and the Contractor involved in managing the Contract.
Duration of the processing	Processing will take place from *1st July 2019* for the duration of the Contract. The contract will be for *21* months ending on *31st March 2021*.
Nature and purposes of the processing	The nature of processing will include the storage and use of names and business contact details of staff of both the Authority and the Contractor as necessary to deliver the services and to undertake contract and performance management. The Contract itself will include the names and business contact details of staff of both the Authority and the Contractor involved in managing the Contract.
Type of Personal Data	Names, business telephone numbers and email addresses, office location and position of staff of both the Authority and the Contractor as necessary to deliver the services and to undertake contract and performance management. The Contract itself will include the names and business contact details of staff of both the Authority and the Contractor involved in managing the Contract.
Categories of Data Subject	Staff of the Authority and the Contractor (including volunteers, agents and temporary workers), including where those employees are named within the Contract itself or involved within contract management.
Plan for return and destruction of the data once the processing is complete UNLESS requirement under European Union or European member state law to preserve that type of data	The Contractor will provide the Authority with a complete and uncorrupted version of the Personal Data in electronic form (or such other format as reasonably required by the Authority) and erase from any computers, storage devices and storage media that are to be retained by the Contractor after the expiry of the Contract . The Contractor will certify to the Authority that it has completed such deletion. Where Personal Data is contained within the Contract documentation, this will be retained in line with the Department's privacy notice found within the Invitation to Tender.

2.13 Cyber Security

In the event that contracts lead to community trials, Cyber Security requirements may be required. The exact option required will be advised at the time the contract is awarded.

In summary, cyber security requirements are required:

- where personal data will be processed by the supplier and cyber security requirements have been determined necessary by the BEIS security team.
- where non-personal data at the OFFICIAL level of the Government Protective Marking scheme will be processed by the supplier.
- where the procurement will involve ICT systems or services which are designed to store or process personal data or non-personal OFFICIAL data.
- where Contractors are NOT already being contracted under the following schemes:
  - G-Cloud
  - Digital Services Framework
  - Public Sector Network
  - ID Assurance Framework
  - Assisted Digital
- If the procurement will not follow the requirements outlined in the Supplier Assurance Framework and during this process fully cover Cyber Essentials requirements.
- The BEIS Security Team might suggest other security requirements such as a technical information risk assessment, CHECK or CREST certified ITHC or Penetration Test, encryption or use of end user devices. Please see Annex D in the Procurement Policy Note to be found here.
- The BEIS Security Team might suggest that evaluation questions are included on security if the procurement is high risk.

Optional clause 3: In line with HM Government's Cyber Essentials Scheme, the Contractor will hold valid [choose either Cyber Essentials certification/Cyber Essentials Plus] by the time of contract award. Evidence of the certification must be provided to the Authority in order for the contract to be awarded.

Evidence of renewal of certification must then be provided to the Authority on each anniversary of the first applicable certificate obtained by the Contractor for the duration of the Contract. In the event the Contractor fails to comply, the Authority reserves the right to terminate the Contract for material breach in line with the Standard Terms and Conditions of Contract.

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.

OR

Optional clause 4: the Contractor will hold [other security requirement] by the time of contract award. Third party independent certification of compliance may be requested by the Authority as evidence of compliance.

2.14 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 member's experience and capabilities.

Tenderers 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.

Tenderers should identify the individual(s) who will be responsible for managing the project and those who will carry out QA.

The appropriateness of the skills and expertise of the team should match the proposed tasks being undertaken. For instance, this may include a team with expertise in the fields of mechanical or chemical engineering with specific knowledge of natural gas and hydrogen applications, as well as expertise in conducting research and report writing.

The following skills are considered particularly important for this work:

- Experience and capability of working with and developing meters with different types of gas e.g. hydrogen, LPG etc.
- Experience of developing primary meters to appropriate product and accuracy standards
- Experience and capability of developing smart metering products that are compliant with SMETS.
- Managing research and development projects

2.15 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.

2.16 Budget

The overall budget for this project is up to £3,000,000 (excluding VAT) The target budget range for each of the three suppliers will be between £500,000 - £1,000,000 (excluding VAT).

Tenderers should provide fixed prices for the deliverables described in this ITT. Payments will be linked to delivery of key milestones. A full and detailed breakdown of costs should be provided in Annex A Pricing Schedule. This should include staff (and day rate) allocated to specific tasks.

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

In submitting full tenders, tenderers confirm in writing that the price offered will be held for a minimum of 13 weeks 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.

Phase	Milestone No.	Milestone	Payment %
1	1	Feasibility Report	5
	2	List of components	5
	3	Design Report 1 – Hardware design complete	10
	4	Design Report 2 – Operating protocols complete	10
	5	GSME prototype complete	10
	6	Delivery of 6 No. GSME prototypes	15
2	7a	MID compliance	5
	7b	ATEX compliance	5
	7c	SMETS2 compliance	5
	7d	Product standards compliance	5
	7e	Delivery of a fully certified GSME	10
	8	Final Report	10
	9	Business Plan & Final Retention	5

If the contractor fails to deliver the milstone deliverables to the timeline and quality set for Phase 1 and Phase 2, BEIS will request the Contractor to review and reschedule the services and a revised date for the milestone(s) delivery will be agreed.

If the Contractor subsequently fails to deliver the re-scheduled services by the revised date, a 28-day notice period will begin by which the service requirements for the milestone must be satisfactorily provided.

If, at the end of the 28-day notice period the requirements for the milestone(s) have not been delivered satisfactorily, BEIS reserves the right to terminate the contract.

2.17 Evaluation of Tenders

Tenderers are invited to submit full tenders of no more than 30 A4 pages, (in Arial 12pt), excluding declarations and a maximum of five CVs. Following the negotiation period, tenderers will be afforded the opportunity to submit final tenders and these will be evaluated by at least three BEIS/Arup+ staff. The cost criterion will be marked by BEIS staff only.

BEIS will select up to three bidders that score highest against the criteria and weightings listed below:

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

Evaluation Criteria

Criterion		Description	Weighting
1	**Skills and expertise**	**Demonstration of relevant skills, project team and facilities for the delivery of this specific requirement**	**15%**
		1a - Details of project team including organisational structure. If your bid is a consortium, this should clearly state the consortium lead and details of each consortium member and their role	(5%)
		1b - Evidence of appropriate facilities (either existing or planned) that are required to undertake the project	(5%)
		1c - Evidence that the team has relevant skills and expertise to undertake this specific project including capability of working with hydrogen gas if possible	(5%)
2	**Technical Approach**	**Proposal of hydrogen smart meter and development approach**	**40%**
		2a - Provide a clear description of the proposed GSME. This should include the type of metering technology chosen and an explanation of why this technology is suitable for fulfilling the functional specification. Where dual gas meters (hydrogen or natural gas) are proposed, this explanation should include a description of how the meter will measure both gases and how it will distinguish between the two.	(10%)
		2b - Detailed description of the development work required to achieve the challenges detailed in ITT and any others which may be considered relevant. Reference should be made to existing products where appropriate and the steps required to move	(10%)

		from the current status to the prototype product.	
		2c - Outline the proposed logic steps required in the HAN interface to meet the safety requirements of the proposed GSME. This should include indication as to how the user can re-set the GSME following a false positive event. *(Note: details of full functionality are not required at this stage, but an indication of how functionality will be achieved should be included).*	(10%)
		2d - Include evidence that you understand the challenges associated with hydrogen use and measurement, in comparison to natural gas. Include reference to challenges outlined in Section 2.5	(10%)
3	**Management of delivery**	**Demonstration of management techniques to support the successful delivery of work**	**20%**
		3a - Detailed description of work and associated timelines to complete phase 1 and phase 2 to the timescales required (including milestone delivery dates)	(5%)
		3b - Description of management plans to demonstrate how the project will be delivered alongside existing commitments. Include detail of your quality assurance procedures	(5%)
		3c - Key risks relating to the delivery and dependencies of the project, including mitigation plans. Risks should include technical, user-related and safety aspects	(10%)
4	**Price**	**Price: To be marked proportionately to the lowest tender [Please see example below]**	**25%**
TOTAL			**100%**

Scoring Methodology

Tenders will be scored against each of the criteria 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.

The total score will be calculated by applying the weighting set against each criterion, outlined above; the maximum number of marks possible will be 100. Tenderers are required to achieve a **minimum pass mark of 60%.**

Score	Description
1	Not Satisfactory: Proposal contains significant shortcomings and does not meet the required standard
2	Partially Satisfactory: Proposal partially meets the required standard, with one or more moderate weaknesses or gaps
3	Satisfactory: Proposal mostly meets the required standard, with one or more minor weaknesses or gaps.
4	Good: Proposal meets the required standard, with moderate levels of assurance
5	Excellent: Proposal fully meets the required standard with high levels of assurance

Scoring for Pricing Evaluation

Price will be marked using proportionate pricing with a maximum of 25 marks. Please see the example below.

The lowest priced bid will receive the full 25 marks, all other bids will then be marked as set out below.

Proportionate Pricing scoring example

If 25% = 25 marks

Supplier	Price	Marks
1 (lowest bid)	£400,000	25
2	£450,000	400/450 * 25 = 22.2
3	£550,000	400/550 * 25 = 18.2

Structure of Tenders

Tenderers are strongly advised to structure their tender submissions to cover each of the criteria above. **Complete the pricing schedule attached at Annex A**, specifying the daily rates (ex-VAT) you will charge for each level of your staff.

Negotiation Period

Following the return of tender submissions in response to this ITT, Innovation Partnership allows for discussions and negotiations to take place between BEIS and the tenderers and this period is shown in the Indicative Timeline in Section 1. If, following negotiations, further clarifications or amendments are deemed necessary to

the requirements set out in this ITT document, these will be issued by BEIS to provide all tenderers with the opportunity to submit final proposals. These final submissions will be evaluated in accordance with the criteria set out above.

Bid Clarification

After reviewing and evaluating the written proposals from the Best and Final Tenders, BEIS reserves the right to ask further clarification questions if required. There will not be any further negotiations.

Feedback

Feedback will be given to unsuccessful bidders via letters or emails. This will be followed by a 10-day standstill period as detailed in the Indicative Procurement Timetable (Section 1.1).

Section 3

Further Information on Tender Procedure

Invitation to Tender for Smart Hydrogen Meter Development and Manufacture

Tender Reference Number: 1778/01/2019

Deadline for Tender Responses: 29 April 2019 (12 noon)

Contents:

3.1 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, of 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.

3.2 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.

Section 5 contains "The General Data Protection Regulation Assurance Questionnaire for Contractors" (Declaration 4) to evidence the extent of readiness. The Authority may ask the Contractor to provide evidence to support the position stated in the questionnaire. The Authority may require the successful Contractor to increase their preparedness where the Authority is not satisfied that the Contractor will be in a

position to meet its obligations under the terms and conditions. If the Contractor fails to satisfy the Authority that it will be in a position to meet its obligations under the terms and conditions in the event that the Contractor is successful, the Authority reserves the right to exclude the bidder from this procurement.

3.3 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. Section 5 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.

Section 4

Functional Specification

Invitation to Tender for Smart Hydrogen Meter Development and Manufacture

Tender Reference Number: 1778/01/2019

Deadline for Tender Responses: 29 April 2019 (12 noon)

Contents:

4.1 Gas Delivery

The primary aim of this work is the development of a gas meter that can accurately measure the supply of hydrogen to a property. Where feasible, the same meter would also be capable of measuring the supply of natural gas within the gas quality specification listed in the Gas Safety (Management) Regulations (GS(M)R). At this stage, within the Hy4Heat programme, blended gas is not a priority. However, a meter which has the capability of measuring blends would be considered if made available.

Consideration must be made to the volume of gas that will need to be delivered to a user. By unit volume, hydrogen contains less energy than natural gas, therefore approximately 3x more hydrogen must be delivered to provide the equivalent energy. This has implications on the size of traditional mechanical displacement meters and considerations must be made to the meter box requirements within a domestic environment as detailed in BS 8499. It is suggested that alternative meter types may be more suitable.

At this stage, we are provisionally looking for meters to satisfy domestic and commercial environments. Therefore, meters with appropriate maximum flowrates, suggested to be between approximately 20m3 and 400m3 per hour, are sought.

4.2 Purity

In accordance with ISO 14687, a hydrogen gas specification of Grade A, Type 1 should be assumed. This comprises >98%v/v hydrogen and is designated for use in internal combustion engines for transportation and residential/commercial appliances, excluding PEM fuel cell stationary appliances (Figure 1, Section 4.11).

If dual gas meters are proposed, the meter must be capable of accurately measuring hydrogen as above, but also natural gas within the specification detailed in the GS(M)R.

Meters capable of accurately measuring the supply of blended gases are not within the remit of the Hy4Heat programme, however will be considered if an appropriate product can be offered. In all cases the meter must be able to measure hydrogen as per ISO 14687.

4.3 Supply Pressure

The hydrogen supply pressure to the property Emergency Control Valve (ECV) will be comparable to the current supply of natural gas in the low-pressure network, at 0.075 to 0.025 bar. Gas pressure within a property is expected to be nominally 21mbarg i.e. similar to natural gas.

4.4 Certification

Meters designed, developed and delivered under the Hy4Heat programme must meet

all legal requirements for use as a billing meter within the UK. This means they must be stamped and must satisfy the accuracy requirements (as currently required for natural gas) as detailed in the Measuring Instruments Directive (MID) 2014/32/EU, implemented in Great Britain as the Measuring Instruments Regulations 2016.

Components within the meter such as a gas valve, should satisfy the requirements of the ATEX Directive 2014/34/EU, implemented in Great Britain as The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016. If you consider ATEX certification is not reasonably practicable, justification as to why must be provided in your submission.

It is expected that meters developed in this work package bear reference to the appropriate product standard as would be used in the development of the same type of natural gas product; examples include BS EN 14236, PD CEN/TR 16061:2010 and BS EN 16314:2013. With the understanding that equivalent standards for hydrogen do not yet exist.

4.5 SMETS2

Energy suppliers have a licence obligation to offer domestic and smaller non domestic consumers smart meters by 2020. Smart Metering Equipment Technical Specifications (SMETS) provide guidance as to what the requirements are.

Considering the timescales involved in the Hy4Heat programme it is expected that SMETS2 will be relevant to meters developed under this work package. All meters developed under WP10 must be compliant with the relevant SMETS2 requirements. Further information on the current SMETS2 can be found at https://smartenergycodecompany.co.uk/the-smart-energy-code-2/.

4.6 Safety

All flammable gases present a risk to buildings and people if a gas release is ignited. Ongoing experimental work suggests that ignitions within spaces at low gas concentrations are comparable between natural gas and hydrogen. However, when high concentrations of hydrogen occur, the faster flame speed, wider flammability range and lower ignition energy of hydrogen can result in an increased risk.

The key means of prevention is to remove the risk of gas accumulations occurring. One of the challenges to overcome in this work package is to include preventative measures within the design of the hydrogen meters to prevent flammable concentrations of gas occurring within the building in the event of an escape.

Gas Smart Metering Equipment (GSME) developed under this work package are required to include a number of essential safety features which result in the automatic activation of an onboard (within the GSME) gas valve. The development and implementation of these will follow a phased approach as detailed below.

It is not the intention that the functional requirements detailed here conflict with SMETS2 and other legislation, therefore if the bidder thinks there is a conflict, this

should be identified and, an alternative solution with justification should be provided. It is understood, that Revision 4.1 of SMETS2 does not require a gas valve to be incorporated in the GSME for a large natural gas meter. However, for any GSME developed under the Hy4Heat programme an onboard (within the GSME) gas valve is an essential requirement. Further details are provided below.

4.7 Approach

The following essential requirements should be provided within the GSME. In all cases manufacturers should consider the safety implications of wireless connectivity. Any device (including third-party devices) that interfaces with the GSME must not affect the safety and security of the gas supply. It must also have no impact on the measuring accuracy and other essential requirements of the product standard, MID, ATEX and SMETS.

It is expected that any meter developed under the Hy4Heat programme is compatible with all supplier systems. Therefore, all communication protocols used for the requirements below are expected to comply with the specification in SMETS.

In all instance's manufacturers should carefully consider power requirements of their products as fail-safe operation may be closure of the gas supply valve.

4.8 Phase 1 – Prototype Development

4.8.1 Functionality

Phase 1 requires the design, development, production and supply of one or more safe and functioning hydrogen gas meters to prototype stage.

The meter must be capable of accurately measuring (in accordance with MID requirements) appropriate gas volumes as may be required in a domestic and commercial environment (suggested maximum flowrates to be between approximately $20m^3$ and $400m^3$).

It must also be of appropriate size to fit within existing meter boxes or on meter brackets as specified in BS 8499.

4.8.2 Safety

The developed GSME is required to include safety features which enables it to interrupt the gas supply to a building in the event of an unsafe situation being identified. Points a and b below are essential requirements of the GSME developed in this work. It is understood that this functionality is beyond that currently included in natural gas GSMEs. However, it offers a key method of ensuring safe supply of gas within a property.

a) Excessive gas flow

An essential requirement of the GSMEs developed under the Hy4Heat programme is the ability to identify excessive gas flow and disable the gas supply to the building if such a flow is detected.

Sudden excessive gas flow can indicate an accidental gas release in the property. Unchecked, this can lead to the accumulation of gas to flammable concentrations.

The gas meter should incorporate an automated mechanism for shutting off the gas supply if the instantaneous gas flow rate exceeds a pre-set threshold.

This threshold, although pre-set, must be changeable by an authorised person, such as an engineer visiting the property and the supplier. This may be via the SMETS2 communication protocol, e.g. the Home Area Network (HAN) interface.

In the event of a supply disablement, an alert should be generated showing the nature of the event. In accordance with SMETS2, this should be displayed on the user interface and sent via the HAN interface to the supplier.

The user must be able to restore the gas supply via a manual action (e.g. re-set button). However, if activated more than 3 times in a 24-hour period then an authorised person will be required to restore the gas supply, after checking the gas system.

This requirement is an extension to the functionality already specified within SMETS2 in the identification of uncontrolled gas flow on enablement of supply. It is suggested the GSME should measure the gas flow at regular time intervals (bidders should specify appropriate time intervals to achieve the required functionality) and if the flow is found to exceed a pre-set threshold an alert is generated which disables the supply.

b) HAN functionality

SMETS2 details the requirements of the HAN interface of the GSME. The GSME provided at the end of this phase must have the capability to interface with additional (3rd Party) safety devices which may potentially be added to the HAN. Specific details of these 3rd party devices are not yet available but may include devices such as hydrogen gas alarms within a building or gas appliance, which if activated would send a signal to interrupt the gas supply to the building.

4.9 Phase 2 – Certification and Refinement

Phase 2 includes the certification and refinement of the prototype hydrogen meter delivered at the end of Phase 1.

4.9.1 Certification

The prototype GSME shall be certified against:

- All relevant product standards
- Measuring Instruments Directive (MID) 2014/32/EU, implemented in Great Britain as the Measuring Instruments Regulations 2016.

- ATEX Directive 2014/34/EU, implemented in Great Britain as The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016. If you consider ATEX certification is not reasonably practicable, justification as to why must be provided in your submission

4.9.2 Product refinement

It is expected that manufacturers will use the unoccupied demonstration trial (WP8) to further refine their product. This includes identification of any failure in functionality of gas measurement, and/or the HAN interface. Any failures should be identified, investigated and resolved.

In addition, if third party devices become available, it is expected that manufacturers would trial the integration of these products with the GSME. Manufacturers should detail the cost for trialling of 1, 2 or 3 additional devices (as supplied by others). The supply of this third-party equipment is outside the requirements of this current tender.

To allow third parties to manufacture appropriate devices, it is expected that the communication protocol used within the GSME products developed under this contract will be published. The protocol must be compatible across all devices; therefore, it is expected that the SMETS2 communication protocol is used as the basis for development.

It is expected that by the end of Phase 2 the GSME contains a reliable, secure and fully functional HAN interface that will allow the addition of a variety of third-party devices which operate a gas shut-off and alert procedure in the event of an unsafe situation being identified.

4.10 Summary Information

It is expected that meters developed under WP10 will need to satisfy the following minimum requirements:

- They should be capable of safely and accurately measuring hydrogen gas of ISO 14687 Type A quality
- They should fit inside an existing meter box (BS 8499, or other relevant standard if a reference can be provided) or on a meter bracket
- They should be legally compliant with the appropriate product standards
- They should be legally compliant with the Measuring Instruments Directive (MID) 2014/32/EU, implemented in Great Britain as the Measuring Instruments Regulations 2016,
- They should be accompanied by a document detailing their level of compliance with the ATEX Directive 2014/34/EU, implemented in Great Britain as The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016. This may require the production of an ATEX compliance declaration by the manufacturer.

- They should be compliant with the relevant SMETS2 legislation. Further information can be found at: https://smartenergycodecompany.co.uk/the-smart-energy-code-2/
- They should include excess flow detection and gas disablement functionality
- They should contain a means of interfacing with third party devices to allow operation of additional safety devices (such as gas alarms or anomalous flow detectors) to prevent accumulations of hydrogen gas.

It is considered highly desirable that meters developed under WP10 should be capable of measuring the supply of both hydrogen and natural gas. The volume measurement of blended gases will be considered if a suitable solution can be provided.

4.11 ISO 14687 extract – Gas quality

Dimensions in micromoles per mole unless otherwise stated

Constituents (assay)	Type I			Type II	Type III
	Grade A	Grade B	Grade C	Grade C	
Hydrogen fuel index [g] (minimum mole fraction, %)	98,0	99,90	99,995	99,995	99,995
Para-hydrogen (minimum mole fraction, %)	NS	NS	NS	95,0	95,0
Impurities (maximum content)					
Total gases			50	50	
Water (cm^3/m^3)	NC [a]	NC	b	b	
Total hydrocarbon	100	NC	b	b	
Oxygen	a	100	c	c	
Argon	a		c	c	
Nitrogen	a	400	b	b	
Helium			39	39	
CO_2			d	d	
CO	1		d	d	
Mercury		0,004			
Sulfur	2,0	10			
Permanent particulates	f	e	e	e	
Density					e

NOTE 1 NS: Not specified

NOTE 2 NC: Not to be condensed

[a] Combined water, oxygen, nitrogen and argon: maximum mole fraction of 1,9 %.

[b] Combined nitrogen, water and hydrocarbon: max. 9 µmol/mol.

[c] Combined oxygen and argon: max. 1 µmol/mol.

[d] Total CO_2 and CO: max. 1 µmol/mol.

[e] To be agreed between supplier and customer.

[f] The hydrogen shall not contain dust, sand, dirt, gums, oils, or other substances in an amount sufficient to damage the fuelling station equipment or the vehicle (engine) being fuelled.

[g] The hydrogen fuel index is determined by subtracting the "total non-hydrogen gases" in this Table, expressed in mole percent, from 100 mole percent.

Figure 1: ISO 14687 Gas Quality

Section 5

Declarations to be submitted by the Tenderer

Invitation to Tender for Smart Hydrogen Meter Development and Manufacture

Tender Reference Number: 1778/01/2019

Deadline for Tender Responses: 29 April 2019 (12 noon)

Contents

Declaration 1: Statement of Non-collusion

To: The Department for Business, Energy & Industrial Strategy

1. We recognise that the essence of competitive tendering is that the Department will receive a bona fide competitive tender from all persons tendering. We therefore certify that this is a bona fide tender and that we have not fixed or adjusted the amount of the tender or our rates and prices included therein by or in accordance with any agreement or arrangement with any other person.

2. We also certify that we have not done and undertake not to do at any time before the hour and date specified for the return of this tender any of the following acts:

(a) communicate to any person other than the Department the amount or approximate amount of our proposed tender, except where the disclosure, in confidence, of the approximate amount is necessary to obtain any insurance premium quotation required for the preparation of the tender;

(b) enter into any agreement or arrangement with any other person that he shall refrain for submitting a tender or as to the amount included in the tender;

(c) offer or pay or give or agree to pay or give any sum of money, inducement or valuable consideration directly or indirectly to any person doing or having done or causing or having caused to be done, in relation to any other actual or proposed tender for the contract any act, omission or thing of the kind described above.

3. In this certificate, the word “person” shall include any person, body or association, corporate or unincorporated; and “any agreement or arrangement” includes any such information, formal or informal, whether legally binding or not.

……..….
Signature (duly authorised on behalf of the tenderer)

…….
Print name

…….
On behalf of (organisation name)

…….
Date

Declaration 2: Form of Tender

To: The Department for Business, Energy & Industrial Strategy

1. Having considered the invitation to tender and all accompanying documents (including without limitation, the terms and conditions of contract and the Specification) we confirm that we are fully satisfied as to our experience and ability to deliver the goods/services in all respects in accordance with the requirements of this invitation to tender.

2. We hereby tender and undertake to provide and complete all the services required to be performed in accordance with the terms and conditions of contract and the Specification for the amount set out in the Pricing Schedule.

3. We agree that any insertion by us of any conditions qualifying this tender or any unauthorised alteration to any of the terms and conditions of contract made by us may result in the rejection of this tender.

4. We agree that this tender shall remain open to be accepted by the Department for 8 weeks from the date below.

5. We understand that if we are a subsidiary (within the meaning of section 1159 of (and schedule 6 to) the Companies Act 2006) if requested by the Department we may be required to secure a Deed of Guarantee in favour of the Department from our holding company or ultimate holding company, as determined by the Department in their discretion.

6. We understand that the Department is not bound to accept the lowest or any tender it may receive.

7. We certify that this is a bona fide tender.

…….....
Signature (duly authorised on behalf of the tenderer)

……
Print name

…….
On behalf of (organisation name)

…….
Date

Declaration 3: Conflict of Interest

I have nothing to declare with respect to any current or potential interest or conflict in relation to this research (or any potential providers who may be subcontracted to deliver this work, their advisers or other related parties). By conflict of interest, I mean, anything which could be reasonably perceived to affect the impartiality of this research, or to indicate a professional or personal interest in the outcomes from this research.

Signed …….

Name …….

Position …….

OR

I wish to declare the following with respect to personal or professional interests related to relevant organisations*;

- X
- X

Where a potential conflict of interest has been declared for an individual or organisation within a consortium, please clearly outline the role which this individual or organisation will play in the proposed project and how any conflict of interest has or will be mitigated.

- X
- X

Signed …….

Name …….

Position …….

Please complete this form and return this with your ITT documentation - Nil returns **are** required.

***** These may include (but are not restricted to);

- A professional or personal interest in the outcome of this research
- For evaluation projects, a close working, governance, or commercial involvement in the project under evaluation
- Current or past employment with relevant organisations

- Payment (cash or other) received or likely to be received from relevant organisations for goods or services provided (Including consulting or advisory fees)
- Gifts or entertainment received from relevant organisations
- Shareholdings (excluding those within unit trusts, pension funds etc) in relevant organisations
- Close personal relationship or friendships with individuals employed by or otherwise closely associated with relevant organisations

All of the above apply both to the individual signing this form and their close family / friends / partners etc.

If your situation changes during the project in terms of interests or conflicts, you must notify the Department straight away.

A DECLARATION OF INTEREST WILL NOT NECESSARILY MEAN THE INDIVIDUAL OR ORGANISATION CANNOT WORK ON THE PROJECT; BUT IT IS VITAL THAT ANY INTEREST OR CONFLICT IS DECLARED SO IT CAN BE CONSIDERED OPENLY.

Declaration 4: The General Data Protection Regulation Assurance Questionnaire for Contractors

Declaration 5: Safe Use of Hydrogen

By responding to this ITT the tenderer must provide assurance that its staff are competent to work with hydrogen in the declaration below and evidence must be provided to support the declaration.

I declare that the staff that will be working on this project (who are already qualified and extensively experienced in the use of natural gas) have given appropriate consideration to the safety considerations of hydrogen and will put in place procedures to ensure these are followed to provide a safe working environment to complete the tendered work.

Signed …….....

Name …….....

Position …….

Date …….....

Declaration 6: Code of Practice[1]

I confirm that I am aware of the requirements of the Department's Code of Practice[2] for Research and, in the proposed project, I will use my best efforts to ensure that the procedures used conform to those requirements under the following headings[3]:

- Responsibilities
- Competence
- Project planning
- Quality Control
- Handling of samples and materials
- Facilities and equipment
- Documentation of procedures and methods
- Research/work records

I understand that the Department has the right to inspect our procedures and practices against the requirements of the Code of Practice, and that I may be asked to provide documentary evidence of our working practices or provide access and assistance to auditors appointed by the Department.

(There is some flexibility in the application of the Code of Practice to specific research projects. Contractors are encouraged to discuss with the Department any aspects that cause them concern, in order to reach agreement on the interpretation of each requirement.)

[1] Please note that this declaration applies to individuals, single organisations and consortia.
[2] The Code of Practice is attached to this ITT as Annex B
[3] Please delete as appropriate

Annex A: Pricing Schedule – Work Package 10

Tenderers should provide a full and detailed breakdown of costs by filling out and returning the pricing table below. This should include staff (and day rate) allocated to specific tasks.

Prices for community trials are not required to be provided at this stage of the procurement.

Tenderers should provide fixed prices for each key task or phase of work (which reflect the milestones, plus details of how staff will be allocated to tasks complete with individual day rates). Resources and day rates should be proposed for other tasks which may reasonably be required in the tenderer's opinion. A format for tenderer responses is given in the table below. Tenderers may expand the number of descriptions as necessary to provide a more detailed breakdown of tasks and staff.
BEIS will retain 10% of the total budget for final payment upon completion and sign-off to the project board's satisfaction of the final programme report.

Task Description	**Staff Role**	**Staff Day Rates (£) (ex VAT)**	**No. of Days Required**	**Total Fee (£)**
Phase 1				
Feasibility report				
Identification of components				
GSME hardware design complete - first design review report				
GSME operating protocols complete and tested - second design review report				
Completion of GSME prototype and production of first unit				
Production of 8 GSMEs				
Phase 1 non-staff project Expenses – please itemise all expenses and setup costs.				
Phase 2				
Evidence of compliance with MID				
Evidence of compliance with ATEX standard				
Evidence of compliance with SMETS2				

Evidence of compliance with product standards				
Delivery of fully certified GSME				
Final submission report				
Business plan and final retention for training, guarantee issues and business cases				
Phase 2 non-staff project Expenses – please itemise all expenses and setup costs.				
Total Fixed Fee*				
VAT				
Grand Total				

Please provide Daily rates for 8 hr day

Name	Grade	Rate

*Total Fixed Fee will be the commercial criterion against which bids which will be assessed.

Annex B: Code of Practice for Research

CODE OF PRACTICE FOR RESEARCH

Issued by the Department for Business, Energy and Industrial Strategy

The Department has developed this Code of Practice from the Joint Code of Practice issued by BBSRC; the Department for Environment, Food and Rural Affairs (Defra); the Food Standards Agency; and the Natural Environment Research Council (NERC) which lays out a framework for the proper conduct of research. It sets out the key aspects of the research process and the importance of making judgements on the appropriate precautions needed in every research activity.
The Code applies to all research funded by The Department. It is intended to apply to all types of research, but the overriding principle is fitness of purpose and that all research must be conducted diligently by competent researchers and therefore the individual provisions must be interpreted with that in mind.

PRINCIPLES BEHIND THE CODE OF PRACTICE

Contractors and consortia funded by the Department are expected to be committed to the quality of the research process in addition to quality of the evidence outputs
The Code of Practice has been created in order to assist contractors to conduct research of the highest quality and to encourage good conduct in research and help prevent misconduct.
Set out over 8 responsibilities the code of practice provides general principles and standards for good practice in research.
Most contractors will already have in place many of the measures set out in the Code and its adoption should not require great effort.

COMPLIANCE WITH THE CODE OF PRACTICE

All organisations contracting to the Department (including those sub-contracting as part of a consortium) will be expected to commit to upholding these responsibilities and will be expected to indicate acceptance of the Code when submitting proposals to the Department.

Contractors are encouraged to discuss with the Department any clauses in the Code that they consider inappropriate or unnecessary in the context of the proposed research project. The Code, and records of the discussions if held, will become part of the Terms and Conditions under which the research is funded.

Additionally, The Department may conduct (or request from the Contractor as appropriat
e) a formal risk assessment on the project to identify where additional controls may be needed.

MONITORING OF COMPLIANCE WITH THE CODE OF PRACTICE

Monitoring of compliance with the Code is necessary to ensure:

- Policies and managed processes exist to support compliance with the Code
- That these are being applied in practice.

In the short term, the Department can require contractors to conduct planned internal audits although the Department reserves the right to obtain evidence that a funded project is carried out to the required standard. The Department may also conduct an audit of a Contractor's research system if deemed necessary.

In the longer term it is expected that most research organisations will assure the quality of their research processes by means of a formal system that is audited by an impartial and competent third party against an appropriate internationally recognised standard that is fit for purpose.

A recommended checklist for researchers can be found on the UK Research Integrity Office (UKRIO) website at http://www.ukrio.org/what-we-do/code-of-practice-for-research

SPECIFIC REQUIREMENTS IN THE CODE OF PRACTICE

1. Responsibilities

All organisations contracting to the Department (including those sub-contracting as part of a consortium will be responsible for the overall quality of research they conducted. Managers, group leaders and supervisors have a responsibility to ensure a climate of good practice in the research teams, including a commitment to the development of scientific and technical skills.

The Principal Investigator or Project Leader is responsible for all the work conducted in the project including that of any subcontractors. All staff and students must have defined responsibilities in relation to the project and be aware of these responsibilities.

2. Competence

All personnel associated with the project must be competent to perform the technical, scientific and support tasks required of them. Personnel undergoing training must be supervised at a level such that the quality of the results is not compromised by the inexperience of the researcher.

3. Project planning

An appropriate level of risk assessment must be conducted to demonstrate awareness of the key factors that will influence the success of the project and the ability to meet its objectives. There must be a written project plan showing that these factors (including research design, statistical methods and others) have been addressed. Projects must be ethical and project plans must be agreed in collaboration with the Department, taking account of the requirements of ethical committees[4] or the terms of project licences, if relevant.

Significant amendments to the plan or milestones must be recorded and approved by

[4] Please note ethical approval does not remove the responsibility of the individual for ethical behaviour.

the Department if applicable.

4. Quality Control

The organisation must have planned processes in place to assure the quality of the research undertaken by its staff Projects must be subjected to formal reviews of an appropriate frequency. Final and interim outputs must always be accompanied by a statement of what quality control has been undertaken.

The authorisation of outputs and publications shall be as agreed by the Department, and subject to senior approval in the Department, where appropriate. Errors identified after publication must be notified to the Department and agreed corrective action initiated.

5. Handling of samples and materials

All samples and other experimental materials must be labelled (clearly, accurately, uniquely and durably), and retained for a period to be agreed by the Department. The storage and handling of the samples, materials and data must be as specified in the project plan (or proposal) and must be appropriate to their nature. If the storage conditions are critical, they must be monitored and recorded.

6. Documentation of procedures and methods

All the procedures and methods used in a research project must be documented, at least in the personal records of the researcher. This includes analytical and statistical procedures and the generation of a clear audit trial linking secondary processed information to primary data.

There must be a procedure for validation of research methods as fit for purpose, and modifications must be trackable through each stage of development of the method.

7. Research/work records

All records must be of sufficient quality to present a complete picture of the work performed, enabling it to be repeated if necessary.

The project leader is accountable for the validity of the wok and responsible for ensuring that regular reviews of the records of each researcher are conducted[5]

The location of all project records, including critical data, must be recorded. They must be retained in a form that ensures their integrity and security, and prevents unauthorised modification, for a period to be agreed by the Department.

A recommended checklist for researchers can be found on the UK Research Integrity Office (UKRIO) website at http://www.ukrio.org/what-we-do/code-of-practice-for-research

[5] Please note that this also applies to projects being undertaken by consortia.