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& Industrial Strategy

CONTRACT FOR THE PROVISION OF UPDATING THE MODELLED BENEFITS FROM RESOURCE EFFICIENCY TO THE DEPARTMENT OF BUSINESS, ENERGY AND INDUSTRIAL STRATERGY (THE CONTRACT OFFER LETTER)

(Purchase Order Number: TBC)

This Contract is dated **28th November 2022** and is made between:-

1. **The Secretary of State for Business, Energy & Industrial Strategy** (the "Authority") of 1 Victoria Street, London SW1H 0ET, acting as part of the Crown;

   and

2. **University of Leeds** (the "Contractor") whose registered office is at Woodhouse, Leeds, LS2 9JT.

INTRODUCTION

(A) On **26th October 2022** the Authority issued an invitation to quote for the provision of **Updating the modelled benefits from Resource Efficiency** - including the specification a copy of which is set out in Schedule 1 (the "Specification").

(B) In response the Contractor submitted a proposal dated **9th November 2022** and entitled **Modelling the effectiveness of resource efficiency strategies to reduce energy demand and Greenhouse Gas Emissions** explaining how it would provide the Services, a copy of which is set out in Schedule 2 (the "Proposal").

(C) The **Specification** and the **Proposal** were amended and updated by the correspondence copies of which are set out in Schedule 3 (the "Correspondence").

The parties agree as follows:-

1. SUPPLY OF SERVICES AND PRICE

In consideration of payment by the Authority to the Contractor of the sums set out in Schedule 5 (exclusive of Value Added Tax) (the "Contract Price") and in accordance with (a) the Specification; (b) the Contractor's Proposal; (c) the Correspondece and (d) the Authority's Standard Terms and Conditions of Contract for Services (the "Standard Terms") (a copy of which is attached at Schedule 4); the Contractor

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shall provide the Services described in the Authority's updated Specification (in Schedule 3) and the Contractor's Proposal to the Authority.

2. COMMENCEMENT AND CONTINUATION

This Contract shall commence on **28th November 2022** and subject to any provisions for earlier termination contained in the Standard Terms shall end on **29th February 2024.**

3. TERMS AND CONDITIONS

3.1 The Standard Terms shall form part of this Contract.

3.2 The Standard Terms shall be amended as follows:

Condition 31 – Cancellation is replaced with the following:

"Condition 31 – Cancellation

(1) The Authority shall be entitled to terminate the Contract, or to terminate the provision of any part of the Services, if:

a. the Authority gives the Contractor not less than 90 days' notice in writing to that effect;
b. any of the mandatory or discretionary exclusion events listed under Regulations 57(1) or 57(2) of the Public Contracts Regulations 2015 (the "PCR") occur; or
c. a declaration on ineffectiveness is made pursuant to the PCR in respect of this Contract or any variation thereof.

(2) If the Authority has given notice under Clause (1) above, the Authority may extend the period of notice at any time before it expires, subject to agreement on the level of Services to be provided by the Contractor during the period of extension.

(3) The Authority reserves the right to cancel the Contract, with no further costs due to the Contractor, after the completion of the first three activities (Pre-modelling preparation and support activities, Modelling impact of RE on energy demand (CREDS 2021), Modelling the RE potential - Phase 1 sectors) as detailed in Schedule 5 – Contract Price to this Contract but before the start of the last two activities (Modelling RE potential - Phase 2 sectors, Presenting final results and documentation) as detailed in Schedule 5 – Contract Price."

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These amendments are for the purposes of this Contract only and do not set a precedent for future contracts between the Contractor and the Authority.

3.3 The Contractor's terms and conditions of business shall not apply to this Contract.

3.4 This Contract is formed of these clauses and the Schedules hereto. Any other attachments are provided for information purposes only and are not intended to be legally binding. In the event of any conflict or inconsistency, the documents prevail in the following order:

a) these clauses;
b) the Standard Terms (as set out in Schedule 4);
c) the updated Specification as set out in the Correspondence (Schedule 3) and Contract Price (as set out in Schedule 5); and
d) finally, the Contractor's Proposal (as set out in Schedule 2)

(save that where the Contractor's Proposals contain a provision requiring a higher standard of service provision the Authority may (at its discretion and for no additional remuneration confirm that such higher standard applies).

4. CONTRACTOR'S OBLIGATIONS

4.1 Where the Contractor is supplying goods to the Authority these shall be delivered to the Authority in full compliance with the Authority's updated Specification (as setout in the Correspondence at Schedule 3) and shall be of satisfactory quality and fit for purpose. Where the Contractor is performing Services for the Authority it shall do so in accordance with the updated Specification (in Schedule 3) and exercise reasonable skill and care.

5. MANAGEMENT AND COMMUNICATIONS

5.1 The Contractor shall perform the Services under the direction of the Authority.

5.2 Any direction by the Authority may be given by **[REDACTED]** (the "Contract Manager") who is an officer in the Authority's **Industrial Decarbonisation and Emissions Trading Directorate, 1 Victoria, London SW1H 0ET** or such other person as is notified by the Authority to the Contractor in writing. All queries (including any notice or communication required to be provided under this Contract) to the Authority from Contractor shall initially be addressed to the Contract Manager.

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5.3 The Contractor appoints **[REDACTED], Woodhouse, Leeds, LS2 9JT** to be the Contractor's first point of contact for this Contract. All queries (including any notice or communication required to be provided under this Contract) to the Contractor from the Authority's Contract Manager shall initially be addressed to the Contractor's first point of contact.

5.4 The Contractor's first point of contact and the Contract Manager shall meet as often as either the Contractor or the Authority may require to review the Contractor's performance of the Contract.

5.5 The Contractor appoints **[REDACTED], Woodhouse, Leeds, LS2 9JT** to be the Contractor's point of contact for all Freedom of Information Act (FOIA) and Environmental Information requests for this Contract. All requests received by the Contractor shall be referred to the Authority's Contract Manager (or his authorised representative) in the first instance in accordace with Condition 11 of the Authority's Standard Terms (as detailed in Schedule 4 to this Contract).

6. INVOICES AND PAYMENT

6.1 Subject to the Contractor providing the Services to the Authority in accordance with this Contract and submitting invoice/s to the Contract Manager in the manner reasonably required by the Contract Manager payment will be made by the Authority to the Contractor in accordance with Condition 17 of the Standard Terms (as detailed in Schedule 4 to this Contract).

7. TRANSPARENCY

7.1 The Authority will publish the Contract and the Schedules hereto on a designated government internet site, using the redacted version of the contract attached. The Authority has made the decision on the specific redactions to be made in light of the exemptions under the Freedom of Information Act 2000 (FOIA) and Condition 40 of the Standard Terms.

However, subject to those redactions, the rest of the Contract and Schedules will be published in full, in accordance with the Government's policy on the publication of contracts, which forms part of the Government's transparency agenda, and the Contract is therefore entered into on the basis of such publication taking place.

The Authority emphasises that its decision to redact information on this occasion does not preclude it publishing such information in the future in the context of other contracts. Neither does it preclude the disclosure of such information in the circumstances

of a request for disclosure under FOIA or the Environmental

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Information Regulations 2004 (EIR) or where such disclosure is required by virtue of any other legal requirement. In such cases, the Authority would need to consider disclosure in the context of the particular circumstances of the request or requirement concerned.

Signed by the parties' duly authorised representatives:-

For the Secretary of State for Business, Energy & Industrial Strategy

Signature: …**[REDACTED]** ……

Print Name: …**[REDACTED]** ……

Job Title: …**Deputy Director, Carbon Pricing and Industrial Decarbonisation Analysis**

Date:…… **6/12/2022**……..

For the Contractor

Signature: ……**[REDACTED]** …….

Print Name: ……**[REDACTED]** …….

Job Title: ……**Director of Commercialisation**…….

Date: **……2/12/2022……**

The following Schedules form part of this Contract:

Schedule 1	The Authority's Specification
Schedule 2	The Contractor's Proposal
Schedule 3	The Correspondence
Schedule 4	The Authority's Standard Terms & Conditions of Contract for Services
Schedule 5	Contract Price
Schedule 6	Annex 1 - Processing, Personal Data and Data Subjects schedule

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Schedule 1 – Authority's Specification

Note: The Authority's updated Specification can be found at Schedule 3 (the Correspondence) to this Contract.

1. Background

Resource Efficiency (RE) is the optimisation of material use, so the needs of society are met with less material inputs. Resource Efficiency can occur at production, consumption, or end of product life. Examples of resource efficiency measures therefore include making lighter products (e.g. making lighter/smaller cars), using recycled materials in production (e.g. recycled steel, recycled plastic), product sharing (e.g. car clubs, clothing rental) and improving product lifespan (e.g. increased product reuse, improved product repairability).

As Resource Efficiency can reduce demand for raw materials, reduce energy demand and carbon emissions from industrial production, and reduce residual waste, it has a key role to play in many of the Government's environmental and climate strategies.

For example, Resource Efficiency plays a critical role in the Government's plan to decarbonise industry as well as meet their legally binding Net Zero target. This is evident in the Industrial Decarbonisation Pathway[1] (which sets out how industry will decarbonise to achieve Net Zero) where Resource Efficiency is currently projected to deliver 8 MtCO2e of industrial carbon savings per year by 2035. This is 25% of total industrial carbon savings needed in Carbon Budget 5 (2028 – 2032), and 20% in Carbon Budget 6 (2033 – 2037)[2]. Resource Efficiency also has a key role to play in the Government's Resources and Waste Strategy for England[3] and its ambition to maximise the value of resource use and minimise waste and its impact on the environment. This includes commitments to double resource productivity and to achieve zero avoidable waste, both by 2050.

The Government's current modelled potential benefits from Resource Efficiency are based on 2018 modelling[4] conducted by the University of Leeds. This modelling looked at the maximum technical potential (i.e. the maximum possible benefits) from a subset of Resource Efficiency measures. The assumptions about the maximum technical potential were drawn from academic literature.

This research project will update and extend this modelling to produce new estimates for the modelled potential benefits from Resource Efficiency. Specifically, it will:

- **Update the modelled maximum technical potential from Resource Efficiency.** This will estimate the maximum technical potential for all known RE measures.

- **Model the maximum deliverable potential from all Resource Efficiency measures.** This will estimate the maximum potential from all known RE measures when commercial, behavioural, regulatory barriers are considered.

- **Model the maximum deliverable potential for bespoke scenarios.**

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This will estimate the maximum deliverable potential for certain subsections of Resource Efficiency measures.

- **Model the potential from Resource Efficiency that will be achieved in the absence of further Government intervention.** This will estimate the potential from all known resource efficiency measures if no new Resource Efficiency policy is introduced.

To enable these new profiles to be modelled the following information is needed:

1. A comprehensive list of all known RE measures

2. For each measure: the current level of RE, the maximum technical potential, the maximum deliverable potential and the likely potential in the absence of further government intervention.

This information will be collected in the '*Unlocking the benefits of Resource Efficiency: Building the evidence base to support environmental and climate policy'* research project (hereafter referred to as 'BEIS Resource Efficiency research project) that BEIS is commissioning alongside this modelling work.

We expect the University of Leeds conducting this modelling work and the contractors of the BEIS Resource Efficiency research project to engage with each other throughout their contracts to ensure the necessary outputs are delivered.

2. Aims and Objectives of the Project

The BEIS Resource Efficiency research project will cover 11 sectors: steel; cement; vehicles; construction; textiles; chemicals; glass; paper; plastics; electricals; and food. For each sector, there will be a two-stage approach consisting of a literature review followed by qualitative research using facilitated workshops. The research will take place in two phases with both the literature reviews and the facilitated workshops for five sectors (steel, cement, vehicles, construction and textiles) taking place first and reporting results in April 2023, and the literature review and the facilitated workshops for the remaining 6 sectors (paper, plastics, glass, chemicals, electricals and food) taking place after and reporting in December 2023.

In order to model new Resource Efficiency profiles, the outputs of the BEIS Resource Efficiency research project must contain the correct information and be in the correct format to feed into the modelling.

Objective 1: Support the BEIS RE research project to ensure the outputs can be used to create new profiles for the modelled benefits of Resource Efficiency.

The first objective of this project is to support and advise the contracted research provider for the BEIS Resource Efficiency research project to ensure the outputs can be used to create new profiles for the modelled benefits of Resource Efficiency.

This will involve discussions with the contractors about the model, consultation on the structure and approach of the facilitated workshops, attending the workshops, and

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reviewing outputs of both the literature reviews and workshops.

The outputs from the BEIS Resource Efficiency research project that will feed into this modelling work and so fall under the scope of this objective are:

1. Comprehensive list of Resource Efficiency measures

2. For each Resource Efficiency measure:

    a. Consensus estimates for the current level of efficiency
    b. Consensus estimates for the maximum technical level of efficiency (including estimated time profiles)
    c. Consensus estimates for the maximum 'deliverable' level of efficiency (including estimated time profiles)
    d. Consensus estimates for level of efficiency that will be achieved by 2050 in the absence of new Resource Efficiency policy (including estimated time profiles)

Objective 2: Create new profiles for the modelled benefits of resource efficiency over time using the outputs of the BEIS RE research project.

The second objective of this project is to use the outputs from the BEIS Resource Efficiency research project to create new profiles over time for the modelled benefits of resource efficiency. These profiles will be used to inform modelling against Carbon Budgets and Net Zero targets, as well as to inform decisions on resource efficiency policy.

To create these profiles, the UK MRIO model used in the Centre for Research into Energy Demand (CREDs) Solutions 2021 report[5] should be used. For each profile the impact on territorial emissions, consumption emissions and material footprint should be modelled.

The reference scenario for these profiles should take the same approach as in the Centre for Research into Energy Demand (CREDs) Solutions 2021 report[6] and use the most recent version of the relevant data e.g. EEP 2021 rather than EEP 2018.

The profiles that are required are:

1. **Maximum technical potential from all resource efficiency measures**

- This profile should model the maximum technical potential over time from all resource efficiency measures identified in the BEIS resource efficiency research project. This will likely include some measures that have not previously been modelling in either the 2018[7] or 2021[8] modelling.
- This profile should use the consensus estimates on the maximum technical "level of efficiency" for each resource efficiency measure, and the consensus estimates on the current "level of efficiency" for each resource efficiency measure from the BEIS resource efficiency research project.

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2. **Maximum deliverable potential profile from all resource efficiency measures**

- This profile should model the maximum deliverable potential over time from all resource efficiency measures identified in the BEIS resource efficiency research project. This will likely include some measures that have not previously been modelling in either the 2018[9] or 2021[10] modelling.
- This profile should use the consensus estimates on the maximum deliverable level of efficiency for each resource efficiency measure, and the consensus estimates on the current level of efficiency for each resource efficiency measure from the BEIS resource efficiency research project.

3. **Maximum deliverable potential profile for each resource efficiency measure**

- These profiles should model the maximum deliverable potential over time for each resource efficiency measure identified in the BEIS resource efficiency research project. This will likely include some measures that have not previously been modelling in either the 2018[11] or 2021[12] modelling.
- These profiles should use the consensus estimates on the maximum deliverable level of efficiency for each resource efficiency measure, and the consensus estimates on the current level of efficiency for each resource efficiency measure from the BEIS resource efficiency research project.

4. **Maximum deliverable potential profiles for 5 bespoke scenarios**

- These profiles should model the maximum deliverable benefits over time for 5 bespoke scenarios. These bespoke scenarios will include different subsets of RE measures. For example, a potential bespoke scenario could be the deliverable potential from all RE measures excluding behaviour change measures.
- These profiles should use the consensus estimates on the maximum deliverable “level of efficiency” for each resource efficiency measure, and the consensus estimates on the current “level of efficiency” for each resource efficiency measure from the BEIS resource efficiency research project.

5. **Benefits from resource efficiency in the absence of further government intervention**

- This profile should model the benefits from resource efficiency that will be achieved over time in the absence of further government intervention to encourage resource efficiency improvement. It should include all resource efficiency measures identified in BEIS resource efficiency research project. This will likely include some measures that have not previously been modelling in either the 2018[13] or 2021[14] modelling.
- This profile should use the consensus estimates on the current “level of efficiency” for each resource efficiency measure, and the “level of efficiency” that will be achieved in the absence of additional government intervention from the BEIS resource efficiency research project.

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Objective 3: Documenting the methodology used to create the new profiles for the modelled benefits of resource efficiency

To ensure the modelled profiles created in this work are used and interpreted appropriately, it is essential that the methodology and crucially it's key caveats and limitations, are clearly documented.

This documentation should be accessible to BEIS and Defra employees, including non-analysts.

3. Suggested Activities

To achieve the objectives listed above the following activities will be required:

1. **Meet with BEIS and Defra analysts and contractors for the BEIS resource efficiency research project to provide an introduction to the model.**
   - The first element of this work will be holding a meeting with analysts from BEIS and Defra and the contractors for the BEIS resource efficiency research project.
   - In this meeting the University of Leeds should provide a high-level overview about their UK MRIO model and go into detail about how the model inputs are structured.
   - They should then clearly set out the format needed for the outputs from the BEIS resource efficiency research project to ensure they can be used to update the modelling.

2. **Share model documentation with BEIS and Defra analysts and the contractors for the BEIS resource efficiency research project**
   - After Leeds have met with BEIS and Defra analysts and the contractor for the BEIS resource efficiency research project they should share relevant documentation and guidance on the model.

3. **Respond to queries from BEIS and Defra analysts and the contractors for the BEIS resource efficiency research project**
   - After the relevant model documentation and guidance have been shared, the University of Leeds should respond queries from BEIS and Defra analysts or from the contractor.
   - These queries may occur throughout the 15-month duration of the BEIS resource efficiency research project.
   - The University of Leeds should aim to respond to any queries within 5 working days, though we note it may take longer for queries to be resolved.
   - We expect the majority of these queries will be resolved via email but the University of Leeds should be prepared to meet with BEIS and Defra analysts or the contractors for the BEIS resource efficiency research project.

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4. **Review and feedback on the outputs of the literature reviews from the BEIS resource efficiency research project**

- When the literature reviews from the BEIS resource efficiency research project have concluded, the University of Leeds should review the results and provide feedback.
- This feedback should relate to how well the results align with the inputs needed to create the new RE profiles and highlight any area where the approach should be changed before the facilitated workshops.
- There will be 11 literature reviews in total. The first 5 literature reviews are expected conclude in January 2023. The final 6 literature reviews are expected to conclude in July 2023.

5. **Meet with BEIS and Defra analysts and contractors for the BEIS resource efficiency research project to discuss the structure and approach for the facilitated workshops.**

- Before the facilitated workshops the University of Leeds should meet with BEIS and Defra analysts and contractors for the BEIS resource efficiency research project.
- This meeting should discuss the structure and approach of the facilitated workshops and advise the contractors how best to ensure the outputs of the workshops can be used to update the UK MRIO modelling.

6. **Attend facilitated workshops.**

- The University of Leeds should attend all the facilitated workshops in the BEIS resource efficiency research project.
- At the workshops Leeds should support the contractors and the workshop facilitators to ensure the outputs from the workshops can be used to update the UK MRIO modelling.
- There will be 22 facilitated workshops in total, 2 for each of the 11 sectors covered in the research project. The 10 workshops for the 5 sectors in the first phase of the research are expected to take place in February – March 2023. The 12 workshops for the 6 sectors in the second phase of the research are expected to take place in September – November 2023.

7. **Review and feedback on the outputs from the BEIS resource efficiency research project's facilitated workshops.**

- When the facilitated workshops from the BEIS resource efficiency research project have concluded, the University of Leeds should review the results and provide feedback.
- As the workshops will take place in 2 phases the outputs from these workshops will be delivered in 2 phases. Outputs from the workshops for the 5 sectors in the first phase of the research are expected in April 2023 and outputs from the 6 sectors in the second phase of the research are expected in December 2023.

8. **Use the outputs from the BEIS resource efficiency research project to produce new modelled profiles on the potential benefits from resource efficiency.**

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- The University of Leeds should use the outputs from BEIS resource efficiency research project to produce new modelled profiles on the potential benefits from resource efficiency.
- The detail of the profiles to be modelled can be found in section 2.

- The modelling will take place in two stages. The modelling for the sectors in phase 1 should take place once the outputs for those sectors have been finalised (April – May 2023) and the modelling for the sectors in phase 2 should take place once the outputs for those sectors have been finalised (December 2023 – January 2024).
- Modelling results should be shared when they are available though it is appreciated that the majority of modelled profiles will not be available until both stages of the modelling have been completed.

9. **Present modelling findings to BEIS and Defra.**
   - Once the modelling has completed the University of Leeds should present the findings of their modelling to BEIS and Defra.
   - This presentation should provide a high-level summary of the results as well as highlighting any particularly important or surprising findings.
   - The slides from this presentation should be shared with BEIS and Defra ahead of the meeting.

10. **Produce documentation to accompany the new modelled profiles.**

    - All models and modelling must be quality assured and documented.
    - The university of Leeds should include a Quality Assurance (QA) plan that they will apply to all tasks and modelling. This QA plan should be no longer than 2 sides of A4 paper and should include the delivery of a BEIS QA Log.
    - As part of this, the University of Leeds should also produce documentation which sets out the modelling methodology and clearly states the caveats and limitations of the model and outputs.
    - This link contains an externally accessible version of the BEIS Modelling QA guidance, and the QA log: The QA log should be filled during the project and submitted at project completion as a deliverable to demonstrate the QA undertaken.
    - When models are submitted to BEIS, during the project or at completion, they should be accompanied by confirmation by a senior (partner or equivalent) of the University of Leeds, that the assurance has taken place in accordance with approaches outlined in the QA plan agreed with BEIS. Evidence of testing through development provided in support of the QA Log ratings greatly improves the level of confidence in it.
    - For all projects Contractors must supply quality assurance evidence for any existing models they wish to submit to BEIS. This must be:
      - To a standard that is at least the equivalent of BEIS's internal standard, available at this link.
      - Accepted as suitable by BEIS.

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4. Deliverables

There are 2 main deliverables for this project:

1. **Modelled profiles of the benefits of resource efficiency**
   - These profiles should be produced using the UK MRIO model used in the Centre for Research into Energy Demand (CREDs) Solutions 2021 report[15] and should include all the measures identified in the *BEIS RE research project* research project. This will likely include some measures that have not previously been modelled in either the 2018[16] or 2021[17] modelling.
   - For each profile the territorial emissions savings, consumption emissions savings and material footprint impact should be provided, alongside information about the reference scenarios.
   - The modelled profiles that should be delivered are:
     - Maximum technical potential from resource efficiency over time (all measures).
     - Maximum 'deliverable' potential from resource efficiency over time (each measure).
     - 5 bespoke scenarios for the maximum deliverable potential from resource efficiency over time. BEIS will provide the detail of these scenarios (the measures that should be included and the timescales that should be used) before the modelling work begins.
     - Current likely potential from resource efficiency over time in the absence of new government policy (all measures).
   - These profiles should be delivered as excel spreadsheets.

2. **Documentation to accompany the modelled profiles of the benefits of resource efficiency**
   - The University of Leeds should deliver detailed documentation and evidence of QA to accompany the modelled profiles. This should include an outline of the methodology (include detail about the model used) and its key caveats and limitations as well as a BEIS Modelling QA log. This documentation should be accessible to BEIS and Defra employees, including non-analysts.

5. Timescales

Suggested timescales – Note due to the dependence of this work on actions/outputs from the BEIS RE research project the timings here are illustrative and will change if there are changes to the BEIS

	Expected timing
Meet with BEIS and Defra analysts and research contractors (Estimated 1 person days)	December 2022
Share model documentation with BEIS and Defra analysts and research contractors (Estimated 1 person days)	December 2022
Respond to queries from BEIS and Defra analysts	Ongoing – throughout

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RE research project timelines.	**and the research contractors (Estimated 14 person days)**	contract duration
	Review and feedback on the outputs of the literature reviews from the research project (Estimated 9 person days)	February 2023 and August 2023
	Meet with BEIS and Defra analysts and research contractors to discuss the structure for the facilitated workshops. (Estimated 3 person days)	February 2023 and August 2023
	Attend facilitated workshops. (Estimated 16 person days)	March 2023 and September 2023
	Review and feedback on outputs from the facilitated workshops. (Estimated 9 person days)	April 2023 and October 2023
	Use the outputs from the research project to produce new modelled profiles on the potential benefits from resource efficiency. (Estimated 40 person days)	April 2023 – May 2023, November – December 2023
	Present modelling finding to BEIS/Defra (Estimated 3 person day)	January 2024
	Produce documentation to accompany the new modelled profiles. (Estimated 3 person day)	December 2023 – January 2024
	Total 99 person days	

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Schedule 2 – Contractor's Proposal

UNIVERSITY OF LEEDS

Proposal to the Department for Business, Energy and Industrial Strategy (BEIS) from the University of Leeds

Proposal title: Modelling the effectiveness of resource efficiency strategies to reduce energy demand and Greenhouse Gas Emissions

Professor **[REDACTED]**

November 9th, 2022

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About the University of Leeds

The research team led by **[REDACTED]** at the University of Leeds is the UK's leading team on modelling resource efficiency and its potential contribution to climate change mitigation. The research team has developed a multi-regional input output (MRIO) model that tracks materials, energy and emissions through global supply chains. The MRIO model now provides the official statistics for the UK and Scottish Government to measure the emissions embodied in imports, needed to calculate the UK's consumption GHG emissions. The model was also used to calculate the potential for resource efficiency to reduce emissions by the Climate Change Committee and has been used to formulate policy responses for Defra and other Government departments including the Treasury and the Cabinet Office. Four members of the team will be contributing to this project. These include:

[REDACTED]- Chair in Energy and Climate Policy at the Sustainability Research Institute, University of Leeds with research interests in energy demand and scenario modelling, sustainable consumption and production, and industrial energy and resource efficiency strategies. Advisor to the UK Government including sitting on the committee responsible for the development of standards for low carbon products and resource efficiency strategies and targets, carbon budgets and scenario analysis. Working closely for the Climate Change Committee regularly providing evidence and analysis for progress reports to parliament. A regular presenter to Select Committees for the UK and Scottish Government as well as working closely with industrial stakeholders. He was awarded an OBE in 2022 in recognition of the contribution his research has made to shape UK policy in the areas of climate change and resource efficiency. **[REDACTED]** was Director of Centre for Industrial Energy, Materials and Products, a £3 million initiative funded by the UKRI. Previously, co-director of the UK Energy Research Centre and currently co-director of the Centre for Research into Energy Demand Solutions (CREDS). An accomplished public speaker regularly appearing on TV and Radio and currently present a call in show on BBC Radio Leeds related to climate change. International reputation, having published in renowned international journals and a lead author for the Intergovernmental Panel on Climate Change.

[REDACTED]- Senior Research Fellow in the Sustainability Research Institute at the University of Leeds with ten years' experience in the modelling of industrial energy use and improvement potential within a whole systems context. A recent focus has been on the potential for resource efficiency when applied at scale in the UK, using multi-regional input-output analysis to assess the whole supply chain impacts of resource efficiency strategies. Impact outside of academia has been an important part of **[REDACTED]** work and he was worked with and been cited by (among others) BEIS, Defra, WRAP, the Climate Change Committee, the

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Parliamentary Office of Science and Technology, the High Value Manufacturing Catapult, Innovate UK, the Government Office of Science and various consultancies.

[REDACTED]- Research Assistant in Energy Demand at the Sustainability Research Institute, University of Leeds. During my 2 years as a Research Assistant, I have developed a broad range of research skills including carrying out literature reviews for academic reports and papers, undertaking qualitative and quantitative scenario modelling, collecting and analysing qualitative data from deliberative workshops, report and academic paper writing, and presenting research findings to stakeholders and at webinars. I have collaborated with WRAP to deliver a research project modelling the impact on greenhouse gas emissions on a wide range of resource efficiency strategies. My role included undertaking literature reviews to assess the technical potential of different resource efficiency strategies, and inputting assumptions our UKMRIO model. I also have experience delivering two research projects for Defra, including the modelling of a range of resource efficiency policies, and carrying out stakeholder workshops to develop and model a series of baseline scenarios for UK material consumption. Most recently, I am undertaking a secondment with Defra to further explore policy options to deliver resource efficiency.

[REDACTED]- Research assistant in energy demand at the Sustainability Research Institute, University of Leeds. **[REDACTED]** has experience working with a wide variety of stakeholders, including government. Currently working with the Government Office for Science, assessing the broader socioeconomic, health and non-climate impacts of their net zero scenarios. In addition, he has provided written evidence to select committees on the importance of energy demand reduction in meeting climate targets as well as coordinated with the Committee on Climate Change and EU-based think tanks on recent research projects.

Modelling approach

Our MRIO model allocates emissions to the sector in which they are physically produced (‘emissions by source') to the final product they become embodied in (Owen et al, 2017). These final products are consumed both in the UK and abroad by households and governments, or represent large capital spend. Goods and services are classified by 106 sectors (also referred to as product groups) according to the UK Standard Industrial Classification system and we aggregate the global economy into a fifteen region model of the UK and the Rest of the World (RoW) reflecting how the UK trades in goods and services. By retaining a fifteen-region structure we are able to capture emissions that were exported and then reimported to the UK across international supply chains. Embodied emissions are calculated using the standard Leontief demand-pull model. GHGs emitted directly by UK sectors are reallocated to final consumers (including exports) by following products through multiple trade and

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transformation steps. This provides a time series of UK consumption based emissions from 1990 to 2019.

In addition, we have developed a methodology to project forward a reference scenario considering the emissions intensity (of each sector in each region) and the level of final demand up to 2050. For the reference scenario the “production recipe” i.e. how industries purchase outputs from each other to ultimately supply final demand, was held constant. The effect of resource efficiency strategies can then be assessed by applying such strategies onto the reference scenario. A resource efficiency strategy could impact how a product of industry was used by other industries (altering the technical coefficients matrix, A) and/ or how a product was

purchased by final demand (altering the final demand vector, Y). The MRIO model can be used to calculate the impact of the changes resulting from these strategies, with such impacts traced through the whole supply chain. This methodology is based on that utilised by Cooper et al. (2017) and Scott et al. (2019). The resource efficiency strategies assessed focus on UK actions. Due to the nature of international trade, actions taken by UK industries and consumers can impact industrial production and its associated impacts in other nations – the full impacts of which are captured by consumption emissions accounting.

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Aims and objectives

The University of Leeds is willing to meet the key objectives for the project outlined in the specification. Therefore, the University of Leeds will:

- Support BEIS to model the energy demand and Greenhouse Gas emissions benefits of a range of resource efficiency strategies to 11 sectors. This will involve the University of Leeds working closely with contractors who are evaluating the evidence for each sector in relation to resource efficiency strategies.
- Create scenarios that outline the effectiveness of individual and a package of resource efficiency measures for 11 sectors using the MRIO model and approach described above. The results will show the contribution that resource efficiency strategies can make to achieve the UK Government's carbon budgets. The reference scenario will be consistent with the approach developed by **[REDACTED]**. The analysis will consider pathways that identify the maximum technical potential, maximum deliverable potential for all measures and individual measures, and potential reductions for 5 bespoke scenarios. The analysis will also include a scenario exploring the benefits from resource efficiency in the absence of further government intervention.

Work packages

The University of Leeds are satisfied that the specification listed above can be delivered in full. In summary, we will:

- WP1 – Meet with BEIS, Defra and contractors – University of Leeds will introduce the model, the scenario template that will need to be completed for each measure by the contractors. The outputs of each measure will also be agreed with BEIS and Defra.
- WP 2 – Provide detailed model specification to BEIS and Defra and the contractors. University of Leeds will provide any clarification required on the specification of the MRIO model.
- WP3 – Respond to queries from BEIS, Defra and the contractors. University of Leeds will offer timely guidance to ensure that the scenario templates are completed correctly responding within 5 working days.
- WP4 – Review and feedback on the evidence collected through the literature reviews. University of Leeds will evaluate the quality of the evidence collected for each sector and provide feedback on potential improvements.
- WP 5 – Provide input into the structure of the sector workshops by meeting with BEIS, Defra and the contractors.
- WP 6 – Attend the facilitated workshops. At least one member of the research team will attend each workshop.
- WP 7 - Review and feedback the outputs of the facilitated workshops.

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- WP 8 – Using our MRIO model, assess the energy demand and GHG emission reductions of all the resource efficiency measures.
- WP 9 – Present the findings to BEIS, Defra and other interested parties.
- WP10 – Provide a short report outlining the approach and giving the results.

Other issues

All of the analysis can be delivered by timescales suggested in the specification. To keep to this timeline, it is essential that the evidence and scenario templates are provided in a timely manner by the contractors. We anticipate the work to take 99 days in total.

References

[REDACTED]

		Cost (£)
1	Pre-modelling preparation and supporting activities - Phase 1 sectors	**[REDACTED]**
2	Updating the modelled benefits from resource efficiency - phase 1 sectors	**[REDACTED]**
3	Pre-modelling preparation and supporting activities - Phase 2 sectors	**[REDACTED]**
4	Updating the modelled benefits from resource efficiency - phase 2 sectors	**[REDACTED]**
	Total	**[REDACTED]**

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Schedule 3 – The Correspondence

[REDACTED]

Research and Evaluation Specification & Weightings

Note: Please submit this completed document to Central BEIS Procurement team (EMAIL ADDRESS TO ADD), at least **5 working days** before the preferred date of commission.

Project Title:	*Updating the modelled benefits from resource efficiency*
Framework Lot or Contracts Finder	N/A
Project Manager (email address):	**[REDACTED]**
Evaluation Panel: are suitably qualified and competent to carry out this role. All evaluators will be required to sign a No Conflict of Interest Statement which we will send out prior to the date your tender closes. We would recommend you make your evaluation panel aware of the time commitment involved in the role.	
Evaluation Panel (email addresses):	N/A
Project Start Date:	November 2022
Project End Date:	March 2024
Budget: Maximum	**[REDACTED]**
RAF Number:	RAF058/2223

Section	Update / Clarification
Section 2 - Aims and Objectives of the project	BEIS have removed Objective 1 *(Support the BEIS RE research project to ensure the outputs can be used to create new profiles for the modelled benefits from resource efficiency)* as BEIS assume this work will be covered in the main RE research project contract which has been Offered to Leeds in consortium with **[REDACTED]**. Can Leeds confirm that this is correct? I can confirm that outputs originally outlined in objective 1 will now be covered as part of the consortium with **[REDACTED]**.
Section 2 – Aims and Objectives of the project	BEIS have updated the Objective *(Create new profiles for the modelled benefits of resource efficiency over time using the outputs of the BEIS RE research project)* to request modelled profiles of the impact of RE on energy demand (split by fuel type) are provided alongside the territorial emissions, consumption emissions and material footprint profiles that BEIS requested in the first draft of the specification.

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	Can Leeds confirm they can produce modelled profiles for energy demand split by fuel type as part of this project (noting we have updated the number of days allocated to the modelled work to reflect this addition)? Can Leeds also confirm they will provide material footprint profiles – this is a key project output and was included in BEIS's first draft of the specification but was not referenced in Leeds's response. We can provide the total final energy demand reduction associated with each resource efficiency strategy and the associated scenarios. We are confident that we can also split the final energy demand into the different fuel types. However, as previously mentioned, this will require further research that is being undertaken as part of other research funding commitments and therefore there is a small possibility that this will not be possible once we have fully researched the method. However, we are reasonably confident that this will be possible. In addition, we are able to provide material footprint savings for each of the resource efficiency strategies. This can be broken down into the following categories - biomass, metal ores, non-metallic minerals, fossil fuels. We can also provide the material footprint as a total. The impacts of RE on energy demand and material footprint can be provided against the base year. To be able to provide the impacts in comparison to a scenario based on the energy and emissions projection model (EEP), as has been discussed for the emissions impacts, would require additional information from BEIS as these impacts are not covered in the EEP with a similar level of detail to emissions.
Section 3 – Suggested activities (WP3)	BEIS have updated the requirements here to respond to BEIS and Defra queries only (and not queries from contractors) as we assume that Leeds will work closely with Eunomia as consortium partners for the main RE research project and this work will be covered under the main RE research contract. Can Leeds confirm that this is correct? I can confirm that outputs originally outlined in objective 3 will now be covered as part of the consortium with **[REDACTED]**
Section 3 – Suggested activities (WP4)	BEIS have removed WP4 (*Review and feedback on the outputs of the literature reviews*) from the suggested activities as we assume this activity will be covered by the main RE research contract. Can Leeds confirm that this is correct? I can confirm that outputs originally outlined in objective 4 will now be covered as part of the consortium with **[REDACTED]**.
Section 3 – Suggested activities (WP5)	BEIS have removed WP5 (*to discuss the structure and approach for the facilitated workshops*) from the suggested activities as we assume this activity will be covered by the main RE research contract. Can Leeds confirm that this is correct?

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	I can confirm that outputs originally outlined in objective 5 will now be covered as part of the consortium with **[REDACTED]**
Section 3 – Suggested activities (WP6)	BEIS have removed WP6 (*Attend facilitated workshops*) from the suggested activities as we assume this activity will be covered by the main RE research contract. Can Leeds confirm that this is correct? If so, would it be possible for more representative from Leeds to attend the workshops if BEIS included this in the modelling contract? I can confirm that our attendance at the workshops will now be covered as part of the consortium with **[REDACTED]**.
Section 3 – Suggested activities (WP7)	BEIS have removed WP7 (*Review and feedback on the outputs from the BEIS resource efficiency research project's facilitated workshops*) from the suggested activities as we assume this activity will be covered by the main RE research contract. Can Leeds confirm that this is correct? I can confirm that this output will now be covered as part of the consortium with **[REDACTED]**.
Section 3 – Suggested activities (Energy modelling)	BEIS have added the following activity: *Model the impact of resource efficiency on energy demand split by fuel type using resource efficiency measures identified in the CREDS 2021 report*. BEIS have assigned days to this task (see below). Can Leeds confirm they are happy with this addition? As outlined above, we can provide the total energy demand reduction associated with all the resource efficiency interventions and are confident that we can breakdown this down into fuel types. However, the breakdown to fuel types may come at a later state of the project as this is not an ability that currently exists in the modelling framework. As outlined above this would be in reference to the base year, rather than a scenario based on the EEP, in the absence of extra information on the energy demands of the EEP being provided by BEIS.
Section 3 – Suggested activities (WP8)	BEIS have updated this section to cover the creation of the modelled profiles for the impact of RE potential on territorial emissions, consumption emissions, material footprint and energy demand split by fuel type. We are happy with this change.
Section 5 – Timescales	BEIS have removed the days allocated to WP4, WP5, WP6 and WP as we believe this work is now covered in the main RE research contract.

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and resourcing	BEIS have also halved the days for WP3 to reflect the fact that communication between Leeds and the main RE contractors will be covered in the main research contract. BEIS has assigned 5 people days for the added activity '*model the impact of resource efficiency on energy demand split by fuel type using resource efficiency measures identified in the CREDS 2021 report'*. BEIS have also increased the days assigned to the modelling work by 15 days as BEIS have added a request for modelled profiles of the impact of RE on energy demand split by fuel type. Can Leeds confirm they are happy with the updated day allocation and will update their project costs accordingly? We can confirm that we will provide this information.

1. Background

How does this research/evaluation fit within our priorities?

This section provides the contractors with the information that they need to understand BEIS policies:

- *Aims and objectives of specific schemes, programmes or funding that we are researching/evaluating*
- *Size of the scheme/programme in terms of number of participants and amount of expenditure*
- *Other relevant background information*

Evaluation projects (categories 3 and 4) - explain the background to the programme, a brief description of the programme including any key sources that the agency can reference and why we are evaluating at this stage (e.g. trial stage, one year on…).

What will be the impact of this research – how will this report be used to inform a specific policy, improve programme performance or inform strategic direction.

Resource efficiency is the optimisation of material use, so the needs of society are met with less material inputs. Resource efficiency can occur at production, consumption, or end of product life. Examples of resource efficiency measures therefore include making lighter products (e.g. making lighter/smaller cars), using recycled materials in production (e.g. recycled steel, recycled plastic), product sharing (e.g. car clubs, clothing rental) and improving product lifespan (e.g. increased product reuse, improved product repairability).

As resource efficiency can reduce demand for raw materials, reduce energy demand and carbon emissions from industrial production, and reduce residual waste, it has a key role to play in many of the government's environmental and climate strategies.

For example, resource efficiency plays a critical role in the government's plan to decarbonise industry as well as meet their legally binding Net Zero target. This is evident in the Industrial Decarbonisation Pathway[1] (which sets out how industry will

[1] BEIS (2021), Industrial Decarbonisation Strategy

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decarbonise to achieve Net Zero) where resource efficiency is currently projected to deliver 8 MtCO2e of industrial carbon savings per year by 2035. This is 25% of total industrial carbon savings needed in Carbon Budget 5 (2028 – 2032), and 20% in Carbon Budget 6 (2033 – 2037)[2]. Resource efficiency also has a key role to play in the government's Resources and Waste Strategy for England[3] and it's ambition to maximise the value of resource use and minimise waste and its impact on the environment. This includes commitments to double resource productivity and to achieve zero avoidable waste, both by 2050.

The current modelled potential benefits from resource efficiency are based on 2018 modelling[4] conducted by the University of Leeds. This modelling looked at the maximum technical potential (i.e. the maximum possible benefits) from a subset of resource efficiency measures. The assumptions about the maximum technical potential were drawn from the academic literature.

This research project will update and extend this modelling to produce new estimates for the modelled potential benefits from resource efficiency. Specifically, it will:

- **Update the modelled maximum technical potential from resource efficiency.** This will estimate the maximum technical potential for all known RE measures.

- **Model the maximum deliverable potential from all resource efficiency measures.** This will estimate the maximum potential from all known RE measures when commercial, behavioural, regulatory barriers are considered.

- **Model the maximum deliverable potential for bespoke scenarios.** This will estimate the maximum deliverable potential for certain subsections of resource efficiency measures.

- **Model the potential from resource efficiency that will be achieved in the absence of further government intervention.** This will estimate the potential from all known resource efficiency measures if no new resource efficiency policy is introduced.

To enable these new profiles to be modelled the following information is needed:

1.) A comprehensive list of all known RE measures

2.) For each measure: the current level of RE, the maximum technical potential, the maximum deliverable potential and the likely potential in the absence of further government intervention.

This information will be collected in the '*Unlocking the benefits of resource efficiency: Building the evidence base to support environmental and climate policy'* research project (hereafter referred to as 'BEIS resource efficiency research project) that BEIS is commissioning alongside this modelling work.

[2] Climate Change Committee (2020), Sixth Carbon Budget.
[3] Defra (2018), Resources and waste strategy for England
[4] **[REDACTED]**

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This work has been offered to a consortium of **[REDACTED],** the University of Leeds and **[REDACTED]**. BEIS expect that as consortium partners, **[REDACTED],** and Leeds will engage with each other throughout the project to ensure the necessary outputs are delivered.

2. Aims and Objectives of the Project

This is one of the most important sections of the specification.

Please set out the overall aims of the project – explain why the research/evaluation is needed, and what questions/issues it will help BEIS to address.

Please list out the specific objectives of the project. This is a list of questions that the research/evaluation needs to answer.

It is important to specify the group, or groups, of people that we want to research/programme etc. we will be evaluating. In addition, if relevant, be specific about the geographic areas that should be covered.

The BEIS resource efficiency research project will cover 11 sectors steel; cement; vehicles; construction; textiles; chemicals; glass; paper; plastics; electricals; and food. For each sector there will be a two-stage approach consisting of a literature review followed by qualitative research using facilitated workshops. The research will take place in two phases with both the literature reviews and the facilitated workshops for five sectors (steel, cement, vehicles, construction and textiles) taking place first and reporting results in April 2023, and the literature review and the facilitated workshops for the remaining 6 sectors (paper, plastics, glass, chemicals, electricals and food) taking place after and reporting in December 2023.

In order to model new resource efficiency profiles, the outputs of the BEIS resource efficiency research project must contain the correct information and be in the correct format to feed into the modelling.

Objective 1: Create new profiles for the modelled benefits of resource efficiency over time using the outputs of the BEIS RE research project.

The first objective of this project is to use the outputs from the BEIS resource efficiency research project to create new profiles over time for the modelled benefits of resource efficiency. These profiles will be used to inform modelling against Carbon Budgets and Net Zero targets, as well as to inform decisions on resource efficiency policy.

To create these profiles, the UK MRIO model used in the Centre for Research into Energy Demand Solutions (CREDS) 2021 report[5] should be used. For each profile the impact on territorial emissions, consumption emissions, material footprint and energy demand split by fuel type should be modelled.

The impact of resource efficiency measures on energy demand has not previously

[5] **[REDACTED]**

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been modelled so a first attempt to model this for resource efficiency measures identified in the Centre for Research into Energy Demand Solutions (CREDS) 2021 report[6] should be carried out initially. This will enable the refining of methodology and enable BEIS to review the outputs in advance of using updated inputs from the BEIS RE research project.

The reference scenario for these profiles should take the same approach as in the Centre for Research into Energy Demand Solutions (CREDS) 2021 report[7] and use the most recent version of the relevant data e.g. EEP 2021 rather than EEP 2018.

The profiles that are required are:

1.) Maximum technical potential from all resource efficiency measures

- This profile should model the maximum technical potential over time from all resource efficiency measures identified in the BEIS resource efficiency research project. This will likely include some measures that have not previously been modelling in either the 2018[8] or 2021[9] modelling.
- This profile should use the consensus estimates on the maximum technical "level of efficiency" for each resource efficiency measure, and the consensus estimates on the current "level of efficiency" for each resource efficiency measure from the BEIS resource efficiency research project.

2.) Maximum deliverable potential profile from all resource efficiency measures

- This profile should model the maximum deliverable potential over time from all resource efficiency measures identified in the BEIS resource efficiency research project. This will likely include some measures that have not previously been modelling in either the 2018[10] or 2021[11] modelling.
- This profile should use the consensus estimates on the maximum deliverable level of efficiency for each resource efficiency measure, and the consensus estimates on the current level of efficiency for each resource efficiency measure from the BEIS resource efficiency research project.

3.) Maximum deliverable potential profile for each resource efficiency measure

- These profiles should model the maximum deliverable potential over time for each resource efficiency measure identified in the BEIS resource efficiency research project. This will likely include some measures that have not previously been modelling in either the 2018[12] or 2021[13] modelling.

[6] **[REDACTED]**
[7] **[REDACTED]**
[8] **[REDACTED]**
[9] **[REDACTED]**
[10] **[REDACTED]**
[11] **[REDACTED]**
[12] **[REDACTED]**

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- These profiles should use the consensus estimates on the maximum deliverable level of efficiency for each resource efficiency measure, and the consensus estimates on the current level of efficiency for each resource efficiency measure from the BEIS resource efficiency research project.

4.) Maximum deliverable potential profiles for 5 bespoke scenarios

- These profiles should model the maximum deliverable benefits over time for 5 bespoke scenarios. These bespoke scenarios will include different subsets of RE measures. For example, a potential bespoke scenario could be the deliverable potential from all RE measures excluding behaviour change measures.
- These profiles should use the consensus estimates on the maximum deliverable "level of efficiency" for each resource efficiency measure, and the consensus estimates on the current "level of efficiency" for each resource efficiency measure from the BEIS resource efficiency research project.

5.) Benefits from resource efficiency in the absence of further government intervention

- This profile should model the benefits from resource efficiency that will be achieved over time in the absence of further government intervention to encourage resource efficiency improvement. It should include all resource efficiency measures identified in BEIS resource efficiency research project. This will likely include some measures that have not previously been modelling in either the 2018[14] or 2021[15] modelling.
- This profile should use the consensus estimates on the current "level of efficiency" for each resource efficiency measure, and the "level of efficiency" that will be achieved in the absence of additional government intervention from the BEIS resource efficiency research project.

Objective 2: Documenting the methodology used to create the new profiles for the modelled benefits of resource efficiency

To ensure the modelled profiles created in this work are used and interpreted appropriately, it is essential that the methodology and crucially it's key caveats and limitations, are clearly documented.

This documentation should be accessible to BEIS and Defra employees, including non-analysts.

3. Suggested Activities

To assist contractors to gauge the indicative scale of the project we need to offer suggested sample requirements. In order to assess price, we must have a standard set of information to be able to assess 'like for like'. ***Please compete the table***

[13] **[REDACTED]**
[14] **[REDACTED]**
[15] **[REDACTED],**

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below, these details will then be added to the price schedule:

To achieve the objectives listed above the following activities will be required:

1.) **Meet with BEIS and Defra analysts (and consortium partners) to provide an introduction to the UK MIRO model.**

- The first element of this work will be holding a meeting with analysts from BEIS and Defra and consortium partners.
- In this meeting the University of Leeds should provide a high-level overview about their UK MRIO model and go into detail about how the model inputs are structured.
- They should then clearly set out the format needed for the outputs from the BEIS resource efficiency research project to ensure they can be used to update the modelling.

2.) **Share model documentation with BEIS and Defra analysts (and consortium partners)**

- After Leeds have met with BEIS and Defra analysts they should share relevant documentation and guidance on the model.

3.) **Model the impact of resource efficiency on energy demand split by fuel type using resource efficiency measures identified in the Centre for Research into Energy Demand Solutions (CREDS) 2021 report.**

- Model the impact of resource efficiency on energy demand split by fuel type using resource efficiency measures and assumptions from the CREDS 2021 report.
- Review the methodology and outputs with BEIS.

4.) **Respond to queries from BEIS and Defra analysts**

- After the relevant model documentation and guidance have been shared, the University of Leeds should respond to any queries from BEIS and Defra.
- These queries may occur throughout the 15-month duration of the BEIS resource efficiency research project.
- The University of Leeds should aim to respond to any queries within 5 working days, though BEIS note it may take longer for queries to be resolved.
- BEIS expect the majority of these queries will be resolved via email but the University of Leeds should be prepared to meet with BEIS and Defra analysts.

5.) **Use the outputs from the BEIS resource efficiency research project to**

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produce new modelled profiles on the potential benefits from resource efficiency.

- The University of Leeds should use the outputs from BEIS resource efficiency research project to produce new modelled profiles on the potential benefits from resource efficiency.
- The detail of the profiles to be modelled can be found in section 2.
- For each profile the impact on territorial emissions, consumption emissions, material footprint and energy demand split by fuel type should be modelled.
- The modelling will take place in two stages. The modelling for the sectors in phase 1 should take place once the outputs for those sectors have been finalised (April – May 2023) and the modelling for the sectors in phase 2 should take place once the outputs for those sectors have been finalised (December 2023 – January 2024).
- The 5 bespoke scenarios for the maximum deliverable potential from resource efficiency over time should also be modelled in phase 2. BEIS will provide the detail of these scenarios (the measures that should be included and the timescales that should be used) before the phase 2 modelling work begins.
- Modelling results should be shared when they are available though it is appreciated that the majority of modelled profiles will not be available until both stages of the modelling have been completed.

6.) Present modelling findings to BEIS and Defra.

- Once the modelling has completed the University of Leeds should present the findings of their modelling to BEIS and Defra.
- This presentation should provide a high-level summary of the results as well as highlighting any particularly important or surprising findings.
- The slides from this presentation should be shared with BEIS and Defra ahead of the meeting.

7.) Produce documentation to accompany the new modelled profiles.

- All models and modelling must be quality assured and documented.
- The University of Leeds should include a Quality Assurance (QA) plan that they will apply to all tasks and modelling. This QA plan should be no longer than 2 sides of A4 paper and should include the delivery of a BEIS QA Log.
- As part of this, the University of Leeds should also produce documentation which sets out the modelling methodology and clearly states the caveats and limitations of the model and outputs.
- This link contains an externally accessible version of the BEIS Modelling QA guidance, and the QA log: The QA log should be filled during the project and submitted at project completion as a deliverable to demonstrate the QA undertaken.
- When models are submitted to BEIS, during the project or at completion, they should be accompanied by confirmation by a senior (partner or equivalent) of the University of Leeds, that the assurance has taken place in accordance with approaches outlined in the QA plan agreed with BEIS. Evidence of testing through development provided in support of the QA Log ratings greatly improves the level of confidence in it.
- For all projects Contractors must supply quality assurance evidence for any existing models they wish to submit to BEIS. This must be:

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- To a standard that is at least the equivalent of BEIS's internal standard, available at this link.
- Accepted as suitable by BEIS.

4. Deliverables

Are there any particular groups of people that we want to analyse by?

List out the deliverables that we want the contractor to provide throughout the research/evaluation. These may include:

- *Questionnaire*
- *Dataset of survey results*
- *Regular updates on emerging findings and project progress*
- *Interim report of findings*
- *Presentation*
- *Quality assured final report*
- *PowerPoint slides summarising the key findings*

There are 3 major deliverables for this project:

1.) Modelled profile of the impact of RE on energy demand split by fuel type

- This profile should be produced using the UK MRIO model used in the Centre for Research into Energy Demand Solutions (CREDS) 2021 report and the measures and assumptions used in the 2021 modelling.

2.) Modelled profiles of the benefits of resource efficiency

- These profiles should be produced using the UK MRIO model used in the Centre for Research into Energy Demand Solutions (CREDS) 2021 report[16] and should include all the measures identified in the *BEIS RE research project* research project. This will likely include some measures that have not previously been modelled in either the 2018[17] or 2021[18] modelling.
- For each profile the territorial emissions savings, consumption emissions savings, material footprint and energy demand split by fuel type should be provided, alongside information about the reference scenarios.
- The modelled profiles that should be delivered are:
  - Maximum technical potential from resource efficiency over time (all measures).
  - Maximum 'deliverable' potential from resource efficiency over time

[16] **[REDACTED]**
[17] **[REDACTED]**
[18] **[REDACTED]**

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(each measure).

- 5 bespoke scenarios for the maximum deliverable potential from resource efficiency over time. BEIS will provide the detail of these scenarios (the measures that should be included and the timescales that should be used) before the modelling work begins.
- Current likely potential from resource efficiency over time in the absence of new government policy (all measures).

- These profiles should be delivered as excel spreadsheets.

3.) Documentation to accompany the modelled profiles of the benefits of resource efficiency

- The University of Leeds should deliver detailed documentation and evidence of QA to accompany the modelled profiles. This should include an outline the methodology (include detail about the model used) and its key caveats and limitations as well as a BEIS Modelling QA log. This documentation should be accessible to BEIS and Defra employees, including non-analysts.

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5. Timescales and resourcing

Please complete the below table. This information will be used to commission your project.

Suggested timescales – Note due to the dependence of this work on actions/outputs from the BEIS RE research project the timings here are illustrative and will change if there are changes to the BEIS RE research project timelines.

	Expected timing
WP 1 - Meet with BEIS and Defra analysts (and consortium partners) to run through the model **(Estimated 1 person days)**	November 2022
WP2 - Share model documentation with BEIS and Defra analysts and consortium partner **(Estimated 1 person days)**	November 2022
WP3 - Respond to queries from BEIS and Defra analysts **(Estimated 7 person days)**	Ongoing – throughout contract duration
Model the impact of RE on energy demand split by fuel type using RE measures identified in the CREDS 2021 report. **(Estimated 5 person days)**	January 2023
WP4 - Use the outputs from the research project to produce new modelled profiles on the potential benefits from resource efficiency. **(Estimated 55 person days)**	April 2023 – May 2023, November – December 2023
WP5 - Present modelling finding to BEIS/Defra **(Estimated 3 person days)**	January 2024
WP6 - Produce documentation to accompany the new modelled profiles. **(Estimated 3 person day)**	December 2023 – January 2024
Total 75 person days	

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[REDACTED]

	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7	Total	Daily rates	Total Costs
[REDACTED]	2	0	2	2	5	2	2	15	**[REDACTED]**	**[REDACTED]**
[REDACTED]	2	2	4	2	14	2	4	30	**[REDACTED]**	**[REDACTED]**
[REDACTED]	2	2	6	2	14	2	2	30	**[REDACTED]**	**[REDACTED]**
Total	6	4	12	6	33	6	8	75		**[REDACTED]**
									Travel and subsistence	**[REDACTED]**
									Total costs	49,836

Task 1	Meet with BEIS and Defra analysts (and consortium partners) to provide an introduction to the UK MIRO model
Task 2	Share model documentation with BEIS and Defra analysts (and consortium partners)
Task 3	Model the impact of resource efficiency on energy demand split by fuel type using resource efficiency measures identified in the Centre for Research into Energy Demand Solutions (CREDS) 2021 report
Task 4	Respond to queries from BEIS and Defra analysts
Task 5	Use the outputs from the BEIS resource efficiency research project to produce new modelled profiles on the potential benefits from resource efficiency
Task 6	Present modelling findings to BEIS and Defra.
Task 7	Produce documentation to accompany the new modelled profiles

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Schedule 4 – Standard Terms and Conditions

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Schedule 5 – Contract Price

1. Calculation of the Contract Price

The Contract Price shall be calculated on the basis of the rates and prices set out in this Schedule. The Contract Price shall represent the sole remuneration due to the Contractor under this Contract.

2. Contract Price for Fixed Price (i.e. not subject to variation)

Services that must be completed in accordance with this Contract for payment to arise	Amount of Contract Price Due (£) Ex VAT	Requirement on Contractor to Invoice
Pre-modelling preparation and support activities	**[REDACTED]**	Invoice to be submitted upon successful completion of all preparation and support activities to enable the modelling work to begin (Task 1 - Provide intro to MRIO model, Task 2 - Share model documentation).
Modelling impact of RE on energy demand (CREDS 2021)	**[REDACTED]**	Invoice to be submitted upon successful completion of modelling to estimate the impact of RE on energy demand using the CREDS 2021 measures (Task 3).
Modelling RE potential - Phase 1 sectors	**[REDACTED]**	Invoice to be submitted upon successful completion of all modelling outputs for phase 1 sectors (produce new modelled profiles on the potential benefits from resource efficiency). Throughout this modelling contractors will respond to queries from BEIS and Defra analysts (50% of Task 4 - Respond to queries, 50% of Task 5 - produce updated modelled potential form RE).
Modelling RE potential - Phase 2 sectors	**[REDACTED]**	Invoice to be submitted upon successful completion of all modelling outputs for phase 2 sectors (produce new modelled profiles on the potential benefits from resource efficiency). Throughout this modelling contractors will respond to queries from BEIS and Defra analysts (50% of Task 4 - Respond to queries, 50% of Task 5 - produce updated modelled potential form RE).

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Presenting final results and documentaion	**[REDACTED]**	Invoice to be submitted upon successful completion and sharing of all documentation and presentation of final results to BEIS/Defra (Task 6 - Present modelled findings, Task 7 - Produce documentation).
Travel and subsistence	**[REDACTED]**	Invoice to be submitted at project end for travel and subsistence costs accumulated throughout the project.
TOTAL	**£49,863 (Ex VAT)**	

Department for
Business, Energy
& Industrial Strategy

Schedule 6

Annex 1
Processing, Personal Data and Data Subjects schedule