DPS FRAMEWORK SCHEDULE 4: LETTER OF APPOINTMENT AND CONTRACT TERMS

Part 1: Letter of Appointment

Ricardo Energy & Environment
Gemini Building
Fermi Avenue
Harwell
OX11 0QR

Dear [redacted]

Letter of Appointment

This letter of Appointment dated Thursday 10th February 2022, is issued in accordance with the provisions of the DPS Agreement (RM6018) between CCS and the Supplier.

Capitalised terms and expressions used in this letter have the same meanings as in the Contract Terms unless the context otherwise requires.

Order Number:	PS21151 - Biomass Resource Availability Calculator Model Update
From:	**The Department for Business, Energy & Industrial Strategy**, 1 Victoria Street, London SW1H 0ET (BEIS) ("Customer")
To:	**Ricardo Energy & Environment,** Gemini Building, Fermi Avenue, Harwell, OX11 0QR ("Supplier")

Effective Date:	Thursday 10th February 2022
Expiry Date:	Monday, 31st October 2022

Services required:	Set out in Section 2, Part B (Specification) of the DPS Agreement and refined by: the Customer's Project Specification attached at Appendix A and the Supplier's Proposal attached at Appendix B of this letter of appointment;
Special terms:	All Intellectual Property Rights in the Supplier Proprietary Materials remain the property of the Supplier. The Supplier grants to the Customer a non-exclusive, non-transferable royalty-free license to use any Supplier Proprietary Materials as are included in the Deliverables, in the Territory, for its own internal purposes related only to the Project. The Customer shall not be entitled to use any Supplier Proprietary Materials for any other purpose or pass this licence to any other contractor.

Key Individuals:	[redacted]
Contract Charges (including any applicable discount(s), but excluding VAT):	£149,542.00 excluding VAT
Insurance Requirements	Additional public liability insurance to cover all risks in the performance of the Contract, with a minimum limit of £5 million for each individual claim Additional employers' liability insurance with a minimum limit of £5 million indemnity Additional professional indemnity insurance adequate to cover all risks in the performance of the Contract with a minimum limit of indemnity of £2 million for each individual claim.
Liability Requirements	**Suppliers limitation of Liability** (Clause 18 of the Contract Terms);
GDPR	As per Contract Terms Schedule 7 (Processing, Personal Data and Data Subjects
Customer billing address for invoicing:	All invoices should be sent to should be sent to [redacted] or Billingham (UKSBS, Queensway House, West Precinct, Billingham, TS23 2NF) and copied to the BEIS representative

FORMATION OF CONTRACT

BY SIGNING AND RETURNING THIS LETTER OF APPOINTMENT (which may be done by electronic means) the Supplier agrees to enter a Contract with the Customer to provide the Services in accordance with the terms of this letter and the Contract Terms.

The Parties hereby acknowledge and agree that they have read this letter and the Contract Terms.

The Parties hereby acknowledge and agree that this Contract shall be formed when the Customer acknowledges (which may be done by electronic means) the receipt of the signed copy of this letter from the Supplier within two (2) Working Days from such receipt

For and on behalf of the Supplier:		**For and on behalf of the Customer:**	
Name and Title:	[redacted]	Name and Title:	[redacted]
Signature:		Signature:	
Date:		Date:	

APPENDIX A

Customer Project Specification

1. Background

The use of biomass will be crucial in meeting the UK's net zero target. In their Sixth Carbon Budget advice, the Climate Change Committee stated that "sustainable bioenergy is essential for reaching net zero1." Supply is likely to be met by a combination of domestic and international sources, however the availability of feedstocks is a matter of considerable uncertainty, resting on a range of assumptions and variables.

Assessing feedstock availability is an issue that can only be addressed through the creation of supply scenarios. Being able to evaluate credible supply scenarios, which are based on the most up to date evidence, is crucial to the development of robust policy making in this space.

BEIS, in conjunction with other Government departments, are currently developing the Biomass Strategy, which will outline in more detail the expected role of biomass in net zero and the policies and measures that will be used to support this. In addition, there is an ongoing policy and analytical need to understand the potential of biomass supply, for example in future Carbon Budget setting.

An important tool that is currently used in Government assessment of biomass supply is the UK and Global Bioenergy Resource Model2. This was first developed in 2011, to support the 2012 Bioenergy Strategy and subsequently updated in 2015 and is now in urgent need of updating.

2. Aims and Objectives of the Project

The objective of the project is to update the UK and Global Bioenergy Resource Model such that it meets current analytical and policy requirements.

The specific aims are to:

- Review the model to determine whether methodological developments are necessary, to improve the representation of key sensitivities.
- Update the model, such that it reflects the most up to date evidence base and incorporates improved methodologies.
- Overhaul the representation of domestic feedstock supply, in particular making it more spatially granular.
- Future proof it, such that it is able to incorporate new evidence that will emerge, including through the separate Science Team land programme.

These aims are elaborated upon in detail in the methodology section below.

3. Suggested Methodology

a) BEIS model QA requirements

[1] https://www.theccc.org.uk/publication/sixth-carbon-budget/
[2] https://www.gov.uk/government/publications/uk-and-global-bioenergy-resource-model

All models and modelling must be quality assured and documented.

Contractors should include a Quality Assurance (QA) plan as part of the PROJ1.1 response, that they will apply to all of the research tasks and modelling. This QA plan should be no longer than 2 sides of A4 paper and include the activities to deliver the assessments in the BEIS QA Log.

An externally accessible version of the BEIS Modelling QA guidance, and the QA log template can be found in the footnote below3. 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 contracting organisation, 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.

b) Model updates

We require model updates in the following areas:

1. Spatially granular UK feedstock supply. BEIS requires an improved understanding of the spatial potential of feedstock supply within the UK. This should be at the regional level (north east, north west, central, southwest and southeast of England with a similar breakdown in other nations), or more spatially precise if possible.

2. Review of UK feedstock estimates. The contractor will review recent developments that may credibly impact the volume of domestic supply and then revise the model as appropriate. Examples include, but are not restricted to, the following:
    a. Updated forest harvest projections from Forest Research
    b. New waste policies, including reduced waste to landfill and increased waste separation, and mandatory food waste collection policies
    c. Defra scenarios for future perennial energy crop production, short rotation forestry and woodland creation and management.
    d. Latest evidence on the availability of agricultural residues and wastes
    e. Evidence on marine feedstocks and emerging novel feedstocks

    We welcome other proposals for the inclusion of other relevant developments that the contractor is aware of.

3. Updated assumptions of global bioenergy demand. This is currently based on the IEA World Energy Outlook, 2016, and requires updating. The contractor will review the available options for new global demand data, make recommendations as to which is most appropriate and then implement this with the model. As part of this review, we require an assessment of whether it is feasible to incorporate global demand in sectoral detail within the model (power, heat, transport, etc). If so, this will also be implemented.

[3] https://www.gov.uk/government/collections/quality-assurance-tools-and-guidance-in-decc

4. Updated assumptions for global resource estimates. The contractor will review recent developments that may credibly impact the volume of global resource. Examples include, but are not restricted to, the following:
    a. New global forestry resource estimates have been produced by Forest Research. They, or other robust data, should be included in the update.
    b. Other feedstock types are currently based on user assumptions regarding the amount of abandoned agricultural or pasture land that is used for their production. The availability of such land types derives from an Integrated Assessment Model (IAM), IMAGE, based on runs of three Shared Socioeconomic Pathways (SSP1, 2 and 3). The contractor will:
        i. Determine whether this approach remains appropriate or whether an alternate methodology is now preferable.
        ii. If no alternate approach is viable, then:
            1. assess whether improved modelling is available (e.g. more spatially granular) and whether a wider range of SSPs could be used, to support a greater range of user scenarios.
            2. assess whether to allow greater flexibility of land types available (being mindful of sustainability requirements).
            3. given the considerable inter-model differences in the implementation of SSPs, review whether it would be valuable to be able to use the outputs from a more diverse suite of IAMs.

5. Review of feedstock categories and end use. Biomass supply is influenced by end use because not all feedstocks can be equally used in all types of conversion technology and end use.
    a. The contractor will assess the feasibility of modelling the availability of biomass from a specific end use perspective. A comprehensive model development in this respect might include competition between end use sectors and changing demand over time.
    b. We recognise that this may be challenging to implement and so a minimum required step will be to revise current feedstock categories to improve their transparency.
    c. In particular, the current feedstock list contains a mix which have no particular processing pathway/end use assigned, whereas others are listed separately as to whether they are likely to be processed into biogas, bioethanol and biodiesel.
    d. The contractor will produce potential energy conversion routes and end uses for each feedstock type, separately from the availability figures. The full list of end uses will be determined at project inception, but will be expanded upon the current iteration, for example with the inclusion of hydrogen.

6. Updated approach to sustainability criteria. The availability of supply is constrained by the application of sustainability criteria. The contractor will develop a sub-model to address the sustainability consequences of expected future decarbonisation of transport systems, heat and electricity supply. The contractor will also review whether it is feasible to include a broader set of sustainability parameters, like natural capital, ecosystem services and biodiversity.

7. Revised feedstock price modelling. The impact of feedstock price on supply is currently modelled relatively crudely, with just three independent price points to act as a constraint. The contractor will assess whether more sophisticated approaches are possible and then implement these if so.

8. Review of other modelling approaches. SUPERGEN Bioenergy recently published a paper[4] describing the range of other feedstock availability models that currently exist in a UK context. The contractors will review such models and consider whether there are aspects of them that could be usefully adapted to the BEIS model.

9. Future proof the model. The evidence landscape in this area evolves rapidly and it would be beneficial for BEIS to have the flexibility to be able to incorporate new information on an ongoing basis, rather than having to commission periodic updates. The contractor will review the feasibility of this, with some illustrative examples, and, if possible, design and structure the model to enable this (with suitable accompanying guidance).

Bidders are also encouraged to suggest model improvements that are not listed above. The successful contractor will undertake literature reviews, engage thoroughly with the relevant stakeholder community, including Government departments and the Devolved Administrations, and liaise closely with the HMG steering group. When data, new assumptions and new modelling approaches are gathered and developed, they will be applied to the model with appropriate and rigorous mathematical and statistical approaches and conforming to BEIS QA requirements.

When major methodological advances and assumptions are developed, they will require sign off by the steering group. We will require the contractor to provide appropriate supporting material to enable their assessment, as well as a rigorous discussion of their robustness and feasibility.

The funding for this project will be split 30%/70% across the 21/22 and 22/23 financial years. The updated model will help to play an important role in supporting the Biomass Strategy, which will be released in 2022. In order to do this, the Strategy requires evidence collection to be complete by March 2022. We recognise that the model will not be finalised by this date and therefore a development prioritisation exercise will be required. This will be determined at project inception; however, we request that prospective contractors make a preliminary consideration of how they might prioritise in their bids. Items 2, 4, 5 and 7 are key aspects of model development (though we recognise that they are interlinked with others). Individual tasks could also potentially be sub-prioritised, for example by feedstock type (SRC, SRF, miscanthus, waste, food waste and forest residues are all important) or by end use (BECCS, hydrogen, industry and biomethane are particularly important).

4. Deliverables

The following deliverables are required

- A revised feedstock supply model, compliant with BEIS model QA guidelines, including a BEIS QA Log, a detailed assumptions log, a detailed model description.

[4] https://www.supergen-bioenergy.net/news/new-supergen-bioenergy-hub-scoping-report-assesses-the-sustainability-and-availability-of-uk-biomass-resource/

- A clear and accessible updated user guide.
- A report explaining the model approach and main structural assumptions and that explains the reasons for differences with the 2017 version.
- A workshop for analytical and policy teams across Government, on completion of the model update, to provide an update on developments and training in use of the model.

APPENDIX B

Supplier Proposal