Appendix A: Specification for UKRI-1800 Geotechnical Advisor for UKRI-NERC

Table of Contents

1 Introduction

As part of the green industrial revolution, BEIS have indicated that UKRI can play a crucial role in providing independent research and analysis (including National Capability Infrastructure where appropriate) supporting geological solutions over the next decade and in particular support the five clusters as they develop.

In this instance we are seeking to appoint a Geotechnical Advisor with recent international experience in similar programmes that can support UKRI in early-stage development, planning and costing to maximise the efficiency and effectiveness of our investments. This is a high profile appointment that will provide opportunity to support and progress UKRI thinking in this key area of research over the next four years.

The successful organisation will provide all necessary resources to fulfil a range of roles for UKRI acting, for example, as Principal Advisor (Project Board Level, SRO & PD support), Principal Designer (CDM 2015), or Technical Advisor. The organisation may choose to take the lead role with other 'specialist' sub-advisors in order to provide a pre-selected core team for breadth of expertise and consistency of approach.

The opportunity requires a deep understanding and demonstrable experience of a range of infrastructure and scientific approaches both in the UK and abroad to include, inter alia: Geoenergy; Hydrogen Storage, Deep Geological CO_2 Storage and Geothermal Energy.

Services might include for example technical expertise in infrastructure design for gas injection, including dense phase CO_2, fluid production from deep boreholes, deep well design for scientific analysis, capture, transport and storage. Current relevant experience of risk management, cost modelling and cost consultancy, land acquisition, regulatory planning and Environmental Impact Assessments, relevant HSE including drilling safety cases and permissions for both onshore and potentially offshore environments would all be advantageous. Experience would be enhanced with expertise in sustainability, stakeholder/public engagement/public consultations, social interaction, data management and business case development reflecting the UKRI cross-Council remit for the Advisor.

Current projects include:

- UK Geoenergy Observatories (UKGEOS) – Delivery of two underground observatories. The one in Glasgow is almost complete (Mine Water) and will become operational in Spring 2022. The second observatory planned for Cheshire (Thornton Science Park, Aquifer) is due to commence construction in early summer 2022 and complete Autumn 2023.
- Carbon Capture and Storage Testbed – currently in the scoping phase. It is anticipated a Strategic Outline Business case will be prepared and approved by BEIS in November 2022. The governance structure is being put into place and anticipated that the Project Board will be established in early 2022.
- Geothermal energy and underground thermal storage – This project is currently at concept stage.

Key Benefits include:

- UKRI impact offering the opportunity to help define research context in this critical area
- Strategic and technical advice delivered to decision makers

This will be a new appointment for UKRI-NERC and one that is quite separate to any previous opportunities or indeed exisiting opportunities on live projects. NERC already have Technical Advisors in areas such as Marine and Estates. This will be the first time UKRI-NERC has engaged the services of a Geotchnical Advisor for direct use across multiple projects. This is reflective of the projects that are coming through the development pipeline in this area. We are looking for a unique skill set – one that is flexible in both an 'advising' and 'doing' capacity.

2 Aims & Objectives

2.1 Aims

To provide NERC a compliant route to market for the provision of professional services for a wide range of specialisms, utilising both SME and national providers, to deliver a single service for a range of services. These include both traditional and design and build professional scopes, for delivering new infrastructure projects along with general specialisms i.e. technical advice, analysis and review at various project stages as well as general advice and attendance at meetings to provide technical information.

2.2 Objectives

The objective of this opportunity is to implement a framework work agreement (Agreement) to facilitate the procurement of quality, value for money services by UKRI (in particular, the Natural Environment Research Council (NERC) and any participating authorities aligned to UK Research and Innovation (UKRI).

It is very much envisaged that the new Agreement will become the vehicle through which a large proportion of Geotechnical advice is sought and procured by UKRI.

The Agreement will be for the benefit of UKRI and in particular the Natural Environment Research Council (NERC) and any participating authorities aligned to UKRI (please see **Schedule 1**). All tender responses should be reflective of the amalgamation of these Participating Authorities into a wider remit and that this may extend out over a wider geographical area within the period of this Agreement.

Recognising that UKRI-NERC has considerable expertise through its own organisations such as the British Geological Survey (BGS), it is anticipated that through this Agreement we will engage with a supplier who can access/has gained experience on similar activities internationally and has the reputation and experience to enhance UKRI. It is also expected that the Technical Advisor role will have involvement through technical input – advice and design both from project concept through to project completion – i.e. through all project life cycle stages.

3 Background to the Requirement

3.1 History Relevant to the procurement

UKRI seeks to procure the services of a suitably qualified and experienced Geotechnical Advisor for a range of sub-surface investments currently underway, planned and being considered as part of our commitment to support HMG in this developing research field. UKRI is developing a range of projects across it's Councils to support HMG delivery of Net Zero by 2050 that may include similar geotechnical advice.

As part of the green industrial revolution, BEIS have indicated that UKRI can play a crucial role in providing independent research and analysis (including National Capability Infrastructure where appropriate) supporting geological solutions over the next decade and inparticular support the five clusters as they develop.

3.2 Recent developments

Governments investment in the UK Geo-energy Observatories (UKGEOS) by NERC and delivered by the British Geological Survey (BGS) responds to the governments net zero by 2050 target. This work is fully developed and one of the two proposed observatories has already been constructed (Glasgow). The second observatory planned for Cheshire is due to commence activity on site summer 2022.

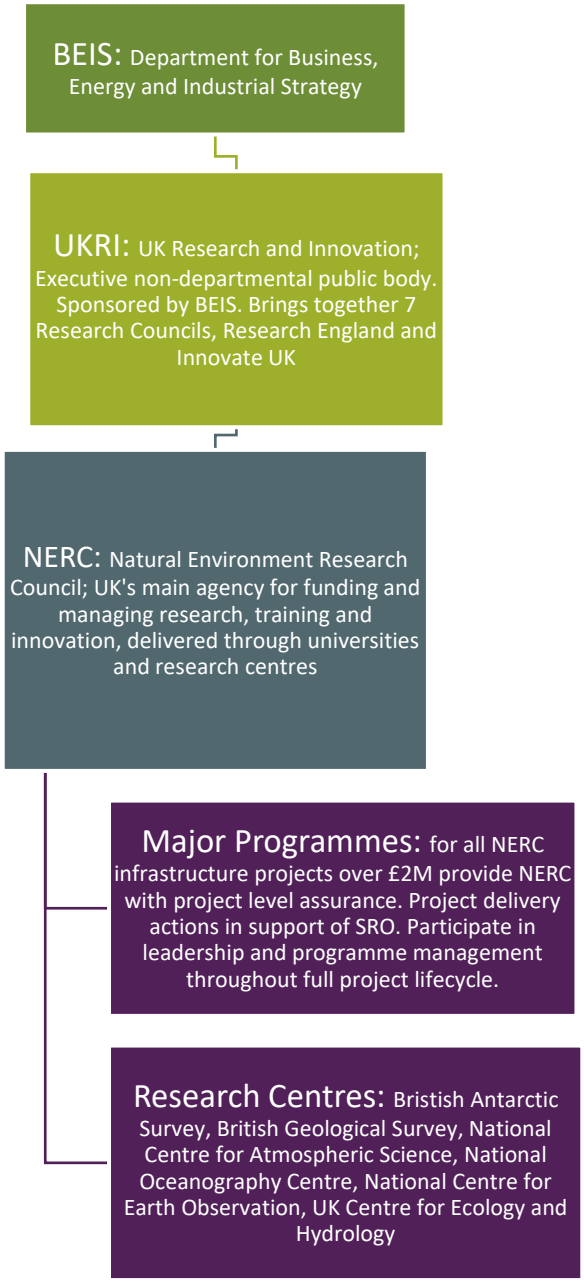
The UKRI Environmental Sustainability Strategy[1] sets out our ambition to be a leader in environmental sustainability for the sector. It sets out what we will do to enhance and recognise where we are making a positive environmental contribution, while minimising environmental harm. By 2040 we aspire to be 'net zero' for our entire research undertaking, which includes reducing and mitigating all carbon emissions from our owned operations.

3.3 A description of the business activities in the area relating to the procurement

As previously mentioned, works to-date and planned around geotechnology include UKGEOS, Carbon Capture and storage Research Facilities and Geothermal Energy. By approinting a Geotechnical Advisor it will place UKRI-NERC in a good position to further rdevelop existing projects and plan for any expansion of projects going forward.

[1] UKRI-050920-SustainabilityStrategy.pdf

3.4 Organisational Structure



3.5 Role of BGS

Given the subject area covered within this opportunity it is most likely that the research centre involved will be the British Geological Survey (BGS)[2]. BGS is a world-leading geological survey and global geoscience organisation, focused on public-good science for government and research to understand earth and environmental processes.

3.6 Roles and Responsibilities

Named individuals will be appointed by NERC to operate as the appointed Project Manager for each Project. This individual will also likely be appointed, under NERC delegations as the Service/Contract Manager under the individual Call Off Contract. The Project Manager is responsible for the overall delivery of any Project, and the supplier Project Manager will report to the named individual directly. Day-to-day contact will be through the Programme Sponsors within the Major Programmes team.

Schedule 1 details the other research councils within UKRI ("Paticipating Authorities") that may use this contract. However, each individual call off Contract will need to be approved by Major Programmes- Programme Sponsors.

Please refer to **Schedule 2** for an example of the 'typical' governance structure of the projects relevant to this opportunity

3.7 Service Conditions and Environmental Factors

There are no known issues under this heading currently, however this will be reviewed on a case-by-case basis for each Call Off Contract that occurs.

[2] Welcome to BGS - British Geological Survey

4 Scope

4.1 High-level Scope

The required Geo-technical related services have been broken down into the following (not exhaustive) potential areas of input:

i. Analysis of options for business case development

ii. Analysis of Tenders at various stages throughout the project – scope, outline design, detailed design, implementation

iii. General:

   a) Attendance at project meetings (project board, project team & other, e.g. Steering Committee, Science Advisory Group, etc).
   b) Advice to SRO / Director level UKRI staff both verbal and written across the subject field.

iv. Permitting, planning, regulation and legal advice

v. Technical advice (not limited to) drilling/well technology, CO2 monitoring, supply and injection.

vi. Estimating and cost analysis

vii. Environmental planning

viii. Digital infrastructure

ix. Change and impact of Government policy and regulation from around the world, e.g. North Sea Transition

x. Synergies across geotechnical research areas including inter alia direct air capture, hydrogen, other negative emissions technologies

xi. Experience of operating projects to government standards such as the IPA project routemap[3]

[3] 2641_IPA_Modules_Handbook.18__2_.pdf (publishing.service.gov.uk)

In terms of key skills, a table below is provided to provide some indicative guidance on the types of expertise/skills we would look to draw on:

TABLE 1: KEY SKILLS

Essential	Desirable
Current geotechnical expertise (including international)	Risk Management
Design/Cost Modelling/Review of Costs	Data Management & Digtial Infrastructure (Twining)
Permitting and Regulation	Stakeholder Engagement
Business Case Development	Land acquisition
Environmental Planning	Environmental Impact Assessments
Carbon Sequestration (depleted hydrocarbon fields, saline aquifers) ; Geothermal; Monitoring; Testing	Public engagement
Relevant national and international expertise and knowledge	

Due to the emerging nature and varying development levels of the potential projects it is not possible at this time to define the exact areas of input that will be required, a degree of flexibility is expected. There is likely to be an equal measure of review and production of documents.

4.2 Forms of Contract

We will be using UKRI standard terms and conditions to govern the overarching Agreement (**Appendix C**).

Any Contract under the Agreement may take such form as UKRI and the Supplier may agree. However, it is anticipated that:

i. higher-value or higher-complexity Contracts may take the form of a further award letter with associated terms, in the form of the template set out in **Schedule 6 of Appendix C**; and
ii. lower-value or lower-complexity Contracts may be agreed by the issuance of a purchase order by UKRI and the acceptance of that purchase order by the Supplier.

4.3 Period of Agreement

The Agreement duration shall be for a period of 4 years.

Whilst the Agreement itself shall not exceed 4 years, Contracts awarded under the Agreement will be of a duration agreed by the Parties which may go beyond the term of the Agreement. However, UKRI reserves the right to terminate any Contract in-line with the Agreement.

4.4 Potential Demand

Demand will vary dependent on a number of factors. Unfortunately it's not possible to predict the exact requirement at this time. A work prgramme will be developed with the successful oranisation for the rest of 2022/23 and thereafter at least annually, recognising that within year work packages will be agreed as need arises. However, due to this, it is anticipated there will need to be a degree of flexibility and work will need to be prioritised accordingly.

As stated in NERC's Delivery Plan 2019 "The UK leads the world research quality in environmental science. The question-driven research that NERC funds creates breakthroughs in understanding both the environment and human interactions with it, in the past, present and future." The role of the Geotechnical Advisor is pivotal to this question-driven research and similarly the role of the Geotechnical Advisor needs to be agile, to respond to developments and help NERC to react and exand its knowledge accordingly. It is expected that demand for this Agreement will increase throughout the lifetime of the Agreement.

4.5 Constraints

The only known constraint for this Agreement will be the approval of budget for each individual project call off Contract.

5 Requirement

5.1 Overview

The exact nature of the services to be provided will be further defined at call off stage.

Potential areas of input required/existing knowledge gaps:

i. Understanding real-life operational impacts on long-term storage efficiency to improve storage security and reduce risks and costs

ii. Improving knowledge of subsurface geological processes at scale

iii. Cost-effective monitoring, conformance technologies and development of related equipment and services

iv. Monitoring technology, environmental research, sustainability and strategic management of different UK low-carbon energy uses

v. Evaluation processes

vi. Social attitudes to local hosting of major 'Net Zero' infrastructure as well as citizen science opportunities beyond CO2 storage

vii. Business Case Development

viii. Planning & Permitry

ix. Policy Development

x. Principal Designer (as defined in the Contruction, Design and Management (CDM) Regulations 2015)

An example of the type of work that may be required is provided in **Schedule 3**.

5.2 General Requirements

The Supplier will appoint a named individual, who will be the Contract Manager and will be authorised to receive instructions and be the point of contact throughout the course of any Contracts' derived under this Agreement and will, on behalf of the supplier, attend all meetings regarding matters relevant to the derived contract under this Agreement. They will also approve and sign all reports submitted by the Supplier.

At the time a call off Contract is initiated the Supplier will be provided with a detailed written specification. Following this a start-up meeting will take place to ensure requirements are clearly understood and to allow for clarifications/amendments to be made. The Supplier will provide an initial report setting out their detailed understanding of the brief, proposed approach to the task, deliverables, resource plan and fee proposal. The Supplier must also agree the level of expertise and experience of the personnel to be engaged.

It is anticipated that regular progress meetings will take place to provide updates on progress of all 'live' call off Contracts.

The Supplier and their sub-contractors (where relevant) will put into place processes and systems which will deal efficiently and effectively with any requests for advice, queries, budgetary estimates and firm quotations.

5.3 Sub-Contracting

The Supplier will be fully responsible for the services undertaken by sub-contractors whom the Supplier may appoint, and the Supplier will have the same responsibility for the delivery of the services undertaken by sub-contractors as if the services had been undertaken directly by the Supplier. The Supplier will be responsible for entering into any agreements with sub-contractors as considered necessary and any fees or expenses claimable by those sub-contractors and any costs incurred by the Supplier in employing those sub-contractors and in accepting the additional responsibilities thereby will be deemed to be included in the Suppliers proposal(s), unless otherwise stated.

Where sub-contracting arrangements may exist, the Suppliers will arrange for all invoices to be co-ordinated through the Supplier, with the Participating Authority receiving one consolidated monthly invoice, unless otherwise stated.

5.4 Cost Plans and Provision of Information

The Supplier will develop cost plans for each project or service, and these will be developed and maintained from initiation and will be reviewed and refined throughout the lifecycle of a project.

The level of detail provided for each cost plan will be commensurate to the progress and development of the project or service, noting that at every stage, the level of detail incorporated in the Cost Plan must be sufficient to support the development of Investment Assessments.

It is anticipated for each call off Contract the following information will be provided:

i. A summary of tasks undertaken, performance, costs and anticipated work programme annually to the SRO.

ii. Calculation of value added contribution for each work package.

iii. Completion of a 3 year summary of performance to the SRO as input to options for UKRI after the 4 year framework ceases.

iv. A lessons learnt and vfm analysis on completion of each task.

5.5 Pricing

All rates provided in the Pricing Schedule will be firm and fixed for the first two years of the Agreement (24 months). Following this period, the Supplier may submit a request to change the rates, subject to alignment with CPI to be agreed by the Parties.

The pricing of each individual project will be determined at call off stage based on:

i. Rate Card – the rates will be applied to all work carried out under the Agreement.

ii. Sub-Contractors Mark Up – the percentage mark up on all subcontracted work will be applied to all work carried out under the Agreement.

Prices should include all costs including travel and subsistence assuming UK only work areas. Other indicative costs for tasks can also be provided to assist UKRI in understanding the proposed pricing schedule.

5.6 Data

In accordance with GDPR, NERC reserve the right to liaise with suppliers and customers as and when appropriate to ensure legitimate enforcement of the Regulation. Suppliers are required to adhere to the General Data Protection Regulations (GDPR) and any subsequent future updates to these regulations when delivering projects under this Agreement.

5.7 Social Value and Sustainability

Suppliers are expected to align to the principles, obligations and aspirations set out in the Social Value Act (2012)[4] when delivering projects under this Agreement, with regards to their behaviour and culture in respect of Corporate Social Responsibility.

Social Value targets and more detailed expectations will be embedded within the project specific exercises, which will occur through the result of a call off Contract.

Based on the Social Value Model[5], UKRI have outlined the Key Themes relevant to the Agreement and subsequent call off Contracts, in Table 2 below:

[4] Public Services (Social Value) Act 2012 (legislation.gov.uk)
[5] Procurement Policy Note 06/20 – taking account of social value in the award of central government contracts - GOV.UK (www.gov.uk)

TABLE 2: SOCIAL VALUE KEY THEMES

Theme	Policy Outcome	Delivery Objectives	Reporting Metrics
Tackling economic inequality	Increase supply chain resilience and capacity	Create a diverse supply chain to deliver the contract including new businesses and entrepreneurs, start-ups, SMEs, VCSEs and mutuals	The number of contract opportunities awarded under the contract. The value of contract opportunities awarded under the contract in £. Total spend under the contract, as a percentage of the overall contract.
Fighting climate change	Effective stewardship of the environment	Deliver additional environmental benefits in the performance of the contract including working towards net zero greenhouse gas emissions.	Number of people-hours spent protecting and improving the environment under the contract, by UK region. Number of green spaces created under the contract, by UK region. Reduction in emissions of greenhouse gases arising from the performance of the contract, measured in metric tonnes carbon dioxide equivalents (MTCDE). Reduction in water use arising from the performance of the contract, measured in litres. Reduction in waste to landfill arising from the performance of the contract, measured in metric tonne
		Influence staff, suppliers, customers and communities through the delivery of the contract to support environmental protection and improvement.	

In delivery of individual Contracts, the Supplier will be expected to be mindful and focus on the:

i. Economic importance of stable economic growth, which may mean working within the capacity of the natural environment, adopting measures from fair and rewarding employment through to competitiveness and trade (e.g. fair business and employment practices, local economic multiplier effects).

ii. Social importance identifying the needs of individuals and considering their well-being covering a wide range of issues from employment, education and training for staff, and opportunities for apprenticeships and work experience, through to social inclusion and eradicating poverty (e.g. community engagement, opportunities to reduce unemployment).

iii. Suppliers are requested to comply with all relevant Health and Safety and Environmental legislation and must be flexible enough to comply with any reasonable additional requirements as indicated at call off stage.

5.8 Performance Monitoring

Performance will be reviewed on a project-by-project basis and agreed between the Supplier and Participation Authority at the start of each call-off contract, normally at the start-up meeting.

Frequency and detail will be aligned to the size and complexity of each individual piece of work and could include the following:

i. % activities meeting delivery timescales

ii. % reporting to agreed timeframes

iii. % senior staff time committed to the agreement compared to proposal

iv. Completion of SRO summary reports quarterly

v. Contribution based on value added (e.g.reduction of final anticipated costs, risk margin) by project / activity

vi. Satisfaction index measured by annual survey of activity by project

5.9 Continuous Improvement and Innovation

As this is a continually evolving area of development, new projects will emerge throughout the agreement period. It is expected that the Supplier will work with us to promote and suggest innovation areas with an emphasis on continuous improvement and efficiency. We will openly encourage dialogue on this topic and will actively seek suggestions from the supplier at each call-off Contract.

Schedule 1 – UKRI Research Councils

In addition to NERC, UK Research and Innovation brings together six other Research Councils, Innovate UK and Research England not all of which have a managed estate. A brief overview of each is provided below.

Arts and Humanities Research Council (AHRC)

AHRC funds world-class, independent researchers in a wide range of subjects. Their research provides social and cultural benefits and contributes to the economic success of the UK but also to the culture and welfare of societies around the globe.

Arts and Humanities Research Council

Biotechnology and Biological Sciences Research Council (BBSRC)

BBSRC invests in world-class bioscience research and training. Their research is helping society to meet major challenges, including food security, green energy and healthier, longer lives and underpinning important UK economic sectors, such as farming, food, industrial biotechnology and pharmaceuticals.

Biotechnology and Biological Sciences Research Council

Economic and Social Research Council (ESRC)

ESRC is the UK's largest funder of research on the social and economic questions facing us today. Their research shapes public policy and contributes to making the economy more competitive, as well as giving people a better understanding of 21st century society.

Economic and Social Research Council

Engineering and Physical Sciences Research Council (EPSRC)

EPSRC invests in world-leading research and postgraduate training across the engineering and physical sciences. Their research builds the knowledge and skills base needed to address scientific and technological challenges and provides a platform for future UK prosperity by contributing to a healthy, connected, resilient, productive nation.

Engineering and Physical Sciences Research Council

Innovate UK

Innovate UK works with people, companies and partner organisations to find and drive the science and technology innovations that will grow the UK economy. They drive growth by working with companies to de-risk, enable and support innovation.

Innovate UK

Medical Research Council (MRC)

MRC is at the forefront of scientific discovery to improve human health. Their scientists tackle some of the greatest health problems facing humanity in the 21st century, from the rising tide of chronic diseases associated with ageing to the threats posed by rapidly mutating micro-organisms.

Medical Research Council

Natural Environment Research Council (NERC)

NERC is the driving force of investment in environmental science. Their leading research, skills and infrastructure help solve major issues and bring benefits to the UK, such as affordable clean energy, air pollution, and resilience of our infrastructure.

Natural Environment Research Council

Research England

Research England is a new council within UK Research and Innovation. Taking forward the England-only responsibilities of HEFCE in relation to research and knowledge exchange, Research England will create and sustain the conditions for a healthy and dynamic research and knowledge exchange system in English universities.

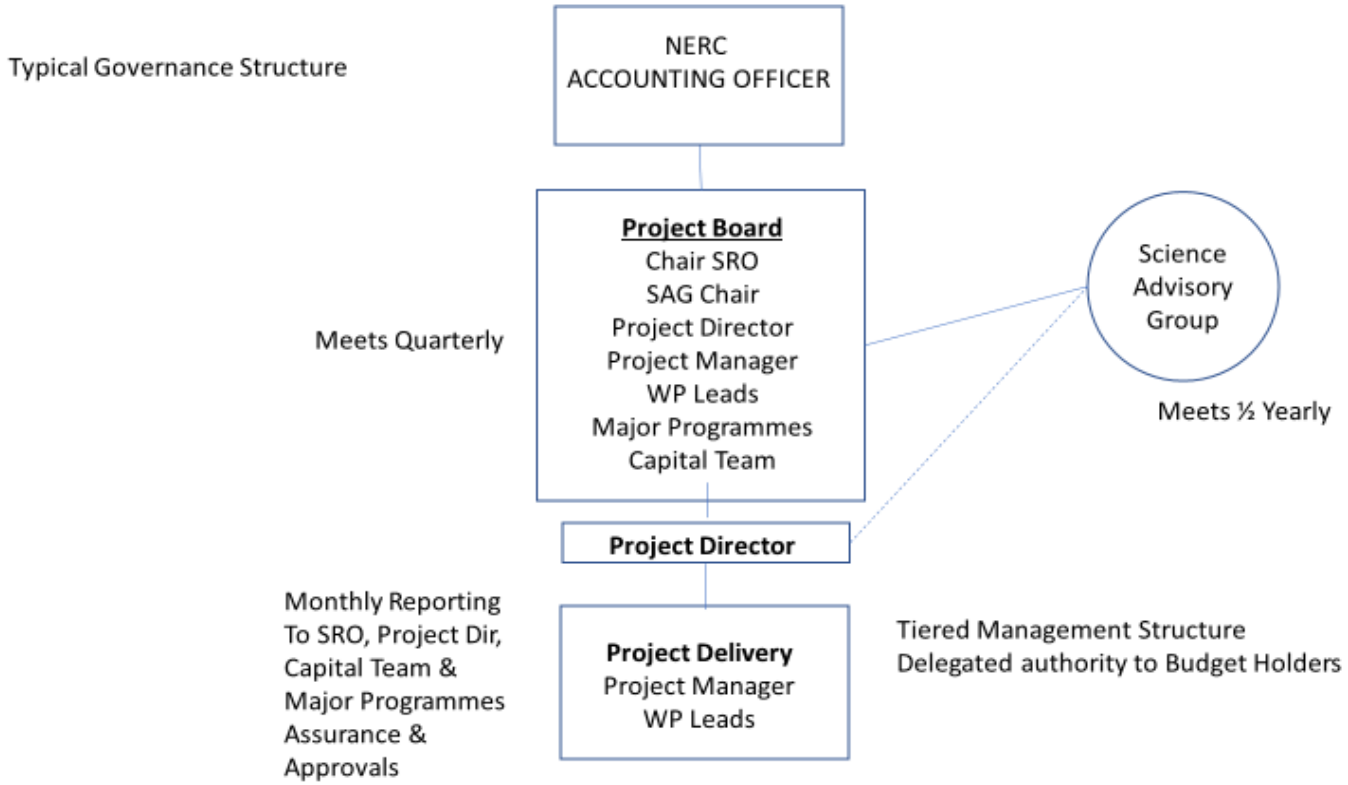
Research England

Science and Technology Facilities Council (STFC)

STFC is a world-leading multi-disciplinary science organisation. Their research seeks to understand the Universe from the largest astronomical scales to the tiniest constituents of matter, yet creates impact on a very tangible, human scale.

Science and Technology Facilities Council

Schedule 2 - Typical Governance Structure of the Projects



Schedule 3 - An illustrative Pxample Project: The CO2 Storage Testbed

Overview:

Currently completing an 18-month scoping study for an ambitious new infrastructure (potentially on to offshore) consisting of a deep borehole (>800m) and associated monitoring wells, arrays etc for academic and industrial research that will also enhance regulation, address public perception and improve industrial efficiency.

The British Geological Survey (BGS) is the delivery team for scoping study and is expected to continue in preliminary phase utilising five workgroup teams within a governance structure reporting to a Senior Responsible Owner (SRO) and a number of advisory committees.

Objective is to outline investment options for a CO2 storage laboratory.

Supported by a steering committee comprising representatives of academia, industry and BEIS CCS Policy.

A broad science case has been developed following discussions with a range of stakeholders, forming the basis for future site selection and design

A long list of possible infrastructure options has been developed to provide capabilities to answer elements of the science case.

Next step: two year preliminary phase to develop and submit a Business Case to HM Treasury

Specific Topic Areas relevant to this opportunity include:

1. Industrial-scale CO 2 storage projects – beyond demonstration:

    i. Insights and learnings from operational projects
    ii. Future large-scale CCUS projects, regional and global roadmaps

2. Storage hub concept – upscaling from 1 MTpa to 10 MTpa and beyond:

    i. Value-chains and business cases for CCUS
    ii. How to deliver large-scale projects – standardised engineering, partnerships, funding and/or incentives from Government?
    iii. Competition for resources and pore space, and how to manage, e.g. offshore CO 2 site and wind farm co-location, hydrogen and gas storage versus CO2.

3. Saline Aquifer Storage:

    i. Injection strategies and pressure management
    ii. Conversion of static capacities to dynamic realities
    iii. Migration-assisted storage – can the theory be translated to a viable business model?

4. Depleting and Depleted Hydrocarbon Field Storage:

    i. The Joule-Thomson dilemma – engineering challenges and risks
    ii. Geo-mechanical hysteresis – impact on reservoir resilience, safe injection rate limits and final storage masses
    iii. Intermittent injection and its impact on storage system integrity and stability
    iv. Legacy well integrity
    v. CO2 -EOR as a pathway to permanent CO2 storage

5. Storage Monitoring:

    i. Demonstrated examples and new technologies
    ii. Affordable and fit for purpose MMV strategies – tailored solutions for maximum. effectiveness and value
    iii. Monitoring challenges and risks, e.g. co-located CO2 storage sites with other industries, post-closure reservoir pressure monitoring

6. Storage Safety:

    i. Demonstrated examples of safety and environmental impact management
    ii. Leakage-risk quantification, prevention, and remediation
    iii. Long-term safety and post hand-over liability

7. Strategic priorities and future evolution of the CCUS industry:

    i. Change and impact of Government policy and regulation from around the globe, e.g. EUSET plan and CCUS Roadmap, the North Sea Transition, outcomes of COP26 targets
    ii. Public perception and successful strategies for engaging with society
    iii. What do NDCs and Net Zero targets mean for CO2 storage industry?
    iv. Synergies between CO2 storage and different technologies, e.g. hydrogen, geothermal,CO2 mineralisation, direct air capture and other negative emissions technologies

Illustrative Task:

The required activities are as follows:

1. Review and comment on Science Case, Critical Success Factors, Objectives and provide confidential report to SRO – assume 2 months review period covering all aspects of the proposal.

2. Attendance at the following meetings and provision of technical advice:

Task	Frequency
Project Board Attendance	4 No. per year
Steering Committee Attendance	4 No. per year
Science Advisory Group Attendance	2 No. per year
SRO / Chief Scientist / PD Meetings	6 No. per year
Project / Workgroup Attendance	Adhoc, expertise day rate
Perfom role of Principal Designer	18 month commencing September 22
Produce Planning & Permiting Strategy	3 month advisory report to SRO

3. Review Preliminary Costings including well design, injection, monitoring regime, digital infrastructure, pipelines, site development including public access visitor centre

4. Review Benefit Analysis & Outcome Process Management as a confidential report to SRO