

DPS FRAMEWORK SCHEDULE 4: LETTER OF APPOINTMENT AND CONTRACT TERMS

Part 1: Letter of Appointment

Dear [REDACTED]

Letter of Appointment

This letter of Appointment dated Thursday 11th November 2021, 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:	PS21171 – Global Projections of Energy Sector Emissions – RAF041/2122
From:	Department for Business, Energy & Industrial Strategy (BEIS) of 1 Victoria Street Westminster, London SW1H 0ET ("Customer")
To:	Enerdata SAS, 47 Avenue Alsace-Lorraine, Grenoble, France, 38000 ("Supplier")

Effective Date:	Thursday 11 th November 2021
Expiry Date:	Thursday 31 st March 2022 Notice period of cancellation is 30 days

Services required:	Set out in Section 2, Part B (Specification) of the DPS Agreement and refined by: · the Customer's Project Specification attached at Annex A. the Supplier's Proposal attached at Annex B and Key Deliverables and Agreed Payment Terms at Annex C
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Key Individuals:	[REDACTED] [REDACTED] [REDACTED]
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Contract Charges (including any applicable discount(s), but excluding VAT):	The customer shall pay the supplier the sum of £147,248.04 excluding VAT for delivery of these services in alignment with Annex C – Key Deliverables and Payment Terms. For the avoidance of doubt, the contract charges shall be inclusive of all third-party costs.
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 £1 million for each individual claim.
Liability Requirements	Suppliers limitation of Liability (Clause 18.2 of the Contract Terms);
Customer billing address for invoicing:	All invoices should be sent to should be sent to: [REDACTED]
GDPR	As per Contract Terms Schedule 7 (Processing, Personal Data and Data Subjects)

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: [REDACTED]

Signature: [REDACTED]

Date: 15/11/2021

Date: 17/11/2021

ANNEX A

Customer Project Specification

1. Background

The Department for Business, Energy and Industrial Strategy (BEIS) was created in July 2016, to bring together responsibilities for business, industrial strategy, science, innovation, energy, and climate change. To find out more about our work visit the BEIS website at <https://www.gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy>

One of BEIS's priorities is to tackle climate change at home and abroad and reach net zero UK carbon emissions by 2050.

The Global Carbon Finance Model (GLOCAF) is BEIS's in-house model of hypothetical international carbon markets and global decarbonisation scenarios at 5-yearly time horizons up to 2050. It is used to provide a robust evidence base to inform UK international climate change policy and strategy, modelling the most cost-effective distribution of abatement across sectors and regions given different abatement targets at global, regional or sectoral levels.

From an international perspective, outputs from the GLOCAF model inform the UK's understanding of global decarbonisation scenarios and implementation of international climate commitments.

Domestically, GLOCAF outputs are used as part of the evidence base that informs the emissions targets included in domestic legislation, as set out in the carbon budgets orders and in the net zero 2050 target.

GLOCAF currently allows modelling of up to 26 countries/regions (including emissions from international aviation and maritime transport as separate 'regions'). Together, these countries/regions provide global coverage. For example, the Americas are currently split into six countries/regions: Canada, USA, Mexico, Rest of Central America, Brazil, and Rest of South America. GLOCAF can currently model up to 27 sectors.

The aim of this project is to provide an updated dataset of emissions from Energy and industry Sectors; carbon dioxide and non-carbon dioxide emissions, e.g. methane; and abatement costs across a regional and sectoral disaggregation used as inputs to the GLOCAF model. The necessary breakdowns are outlined below in the objectives of the project.

Policy Context to The Requirement

This year is our biggest year for international climate engagement to date, as the UK will hold the Presidency of the 26th Conference of Parties (COP26) to the United Framework Convention on Climate Change. Modelling increasing climate mitigation ambition will be an ongoing priority in the UK's role as COP Presidents.

2. Aims and Objectives of the Project

Up-to-date estimates on emissions and abatement potentials within Energy and industry sectors will be used in support of policy programmes and initiatives within BEIS. The data will support modelling of climate scenarios consistent with the Paris Agreement temperature objective (e.g. well below 2 degrees above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 degrees above pre-industrial levels) reflecting the latest developments and projections in markets, technology and household behaviour, as well as country commitments to tackle climate change.

Historic data and projections of emissions from energy sectors, including process emissions and the costs of reducing them are required, at global coverage:

1. Projections of a Business as Usual [BaU] / Current Policies emissions scenario are required.
2. The costs of reducing emissions need to be modelled in the form of marginal abatement cost curves [MACCs] for at least the period 2020-2050.

The BaU provides a counterfactual from which MACCs can be subtracted to model future emissions projections given different action scenarios. It is necessary that the MACCs reflect a range of action pathways. Traditionally the MACCs have simulated 3 approaches to climate action: progressive climate action policy adoption, or rather a linear adoption of increased climate ambition policies; early action reflecting largescale, near term investment in climate ambition policies and technology, modelling greater abatement costs in the short-term, but low abatement costs overall; and delayed action where action is deferred and the curve of abatement follows an exponential growth shape reaching high marginal costs. We invite bidders to suggest further sensitivities within the procurement that may increase the scope of scenarios modelled.

At a minimum, coverage including historical emissions for the years 1990 – 2050 should be provided at 5-yearly intervals. Reduced accuracy for outputs relating to later years (e.g. greater uncertainty associated with longer future horizons) or path dependencies across time periods (e.g. future abatement options being precluded by historical abatement decisions) should be clearly described.

The project must be completed by the end of March 2022.

Emissions data

(i) Historical emissions data

The dataset needs to include emissions data from 1990 to 2019 (or as recent as possible).

(ii) BaU projections

The dataset needs to include BaU projections to at least 2050, at a minimum of 5-yearly intervals. An extension of BaU emissions projections beyond this would be desirable, with discussion of the uncertainty concomitant with extrapolations beyond 2050. The BaU is expected to be a projection of emissions from current policy emissions, but we invite a BaU sensitivity that would include net zero commitments that have been made, but not legislated.

Abatement data

(iii) Marginal Abatement Cost Curves

The dataset needs to include MAC curves at a minimum of 5-yearly intervals: 2025, 2030, 2035, 2040, 2045 and 2050. Although the scope of the project is up to 2050, an extension of MAC curves beyond this would be desirable but not essential.

a. Abatement data should be in:

- i. CO₂ for carbon dioxide emissions
- ii. CH₄ and CO₂-equivalent [CO₂e] for Methane emissions in AR4 and AR5 warming potentials
- iii. N₂O and CO₂e for nitrous oxide emissions in AR4 and AR5 warming potentials
- iv. The global warming potential conversion factors [GWP] for non-CO₂ emissions should be stated explicitly.

b. MAC curve outputs need to be broken down into increments to be agreed between BEIS and the contractor.

c. As a rough guide MACCs should cover a range from \$0/tCO₂e to \$1000/tCO₂e, or up to what can reasonably be considered a maximum relevant carbon price. Justification needs to be given for the choice of maximum carbon price. We anticipate expensive abatement options will enable BEIS to model high emissions abatement scenarios – the most marginal emissions.

d. Maximum carbon prices will be agreed between BEIS and the contractor. Maximum carbon prices can differ between sectors.

e. All assumptions about available technologies underlying each MAC curve should be clearly stated and explained in the accompanying report, giving details on technology costs and the rationale for their estimation.

e. The distribution of abatement across abatement options employed at each point on the MAC curve should be clearly specified

f. Abatement options are expected to include but need not be limited to:

- I. Behaviour change and mobility change
- II. Fossil fuel switch
- III. Energy efficiency
- IV. Biomass with underlying biomass assumptions clearly defined, within sustainability limits to be agreed with BEIS
- V. Biomass Energy with Carbon Capture and Storage [BECCS] with underlying biomass assumptions clearly defined, within sustainability limits to be agreed with BEIS
- VI. Hydrogen with distinctions made between grey, blue and green hydrogen.
- VII. Ammonia
- VIII. Electrification of end-use energy sectors
- IX. Renewables, with breakdowns across the different renewable sectors e.g. Wind, Solar PV
- X. Nuclear

g. A range of MAC curves are required to illustrate abatement pathways indicative of different approaches to mitigating climate change. There needs to be a meaningful difference in abatement approach between the different modelled MACC pathways. At a minimum they must approximate, with justification given as to how this is achieved:

- i. An early action abatement strategy maximising cumulative reductions
- ii. A progressive policy abatement strategy,
- iii. A delayed action abatement strategy.

All emissions data and MACCs should be disaggregated by Country/region, sector and emissions type:

1. Individual countries/regions which are essential are:
 - a. all G20 Countries, including the EU.
 - b. The following countries are highly desirable: All Member States and EEA-EFTA countries covered by the EU ETS shown separately and Ukraine. Additional individual countries and disaggregation is desirable but not essential.
 - c. Emissions from other geographical regions are also needed so that all countries and regions sum to give global coverage. Other regions presently used in the GLOCAF model are Middle East, Northern Africa, Oceania, Rest of Central America, Rest of Europe (i.e. non-EU), Rest of Former Soviet Union, Rest of South America, Rest of South Asia, Rest of South East Asia, and Rest of Sub Saharan Africa. Similar – or the same – regions are required. It would be an advantage if additional breakdowns within these regions could also be provided, specifically Democratic Republic of Congo and Malaysia.
2. Energy sectors which are essential are:
 - a. Power
 - b. Industry
 - c. Agriculture (emissions from energy demand e.g. machinery or heating, as opposed to land use)
 - d. Transport
 - I. Road
 - II. Rail
 - III. And other transport
 - e. Domestic aviation
 - f. International Aviation and International Maritime
 - g. Processing emissions
 - I. Methane Energy and Industry
 - II. Methane waste emissions
 - III. Nitrous oxide Energy and Industry emissions
 - IV. Nitrous oxide waste emissions
 - V. Hydro-flouro carbons
 - VI. Other F-gases
 - h. Chemical emissions
 - i. Non-metallic materials
 - j. Steel
 - k. Other industry not covered in previous categories
 - l. Other transformation not covered in previous categories.
3. Negative emissions technologies are highly desirable for example direct air carbon capture.
4. Emissions which are essential are:
 - a. Carbon Dioxide [CO₂] emissions from Energy sectors for each region
 - b. Non-CO₂ emissions from Energy and Industry and Waste sectors for
 - i. Methane [CH₄]
 - ii. Nitrous Oxide [N₂O]
 - c. Units of emissions should be in megatonnes

- i.CO2 for carbon dioxide emissions
- ii.CH4 and CO₂e for Methane emissions
- i.N2O and CO₂e for nitrous oxide emissions
- d. The GWP for non-CO₂ emissions where converted to CO₂e should be stated explicitly. It is a requirement that non-CO₂ emissions CO₂e equivalent are expressed in GWP100 from IPCC AR4.

A breakdown of MACCs by key energy outputs, i.e. different abatement options e.g. renewables vs. energy efficiency vs. Nuclear vs. fuel switch, at key price points compared across the different action scenarios, would be highly desirable.

Additional coverage would be desirable but not essential e.g. mining of critical minerals would be highly desirable

Agriculture, Forestry and other Land Uses [AFOLU] emissions and abatement data is procured separately. Biomass assumptions made as part of this energy sector commission will need to be in line with those of the AFOLU dataset. A maximum sustainable limit will be agreed with BEIS.

3. Suggested Methodology

We anticipate the contractor will derive projections using an energy model drawing on key variables such as energy demand and fuel prices and macro-economic parameters of GDP and population data.

Emissions data must be aligned to an internationally recognised and accepted source for historical and projected emissions.

In the past the International Energy Agency's World Energy Outlook (IEA WEO) Current Policies scenario has been used. Contractors may suggest an alternative to calibrating to the IEA WEO, with a justified rationale.

The model used to produce the projections should be calibrated so that BAU emissions are as close as possible to the projected emissions from the internationally recognised source at both global and regional levels. Other key variables such as GDP, population, fuel prices and energy demand should also be calibrated to the chosen internationally recognised source as closely as possible. The contractor needs to indicate how close their projections will be to the internationally recognised source's totals for:

- GDP and population
- main categories (e.g. Total CO₂, Total primary energy demand, etc)
- sub categories (e.g. Coal within Total CO₂, Coal within Total primary energy demand, etc)

The degree of robustness and reliability of outputs and any differences across countries and sectors must be clearly explained. For instance, any data limitations or policy uncertainty for particular sectors and/or countries which make particular outputs more or less accurate or reliable than others should be clearly described.

All assumptions about available technologies and assumptions as to competition between abatement options underlying each MAC curve should be clearly stated and explained in the accompanying report. It is highly desirable to have endogenous technology costs, or at least have these vary between the different MACC action scenarios.

All model and data assumptions must be agreed with BEIS and a log provided for quick reference. A full list of variable and abatement option definitions must be shared with BEIS.

A log of quality assurance measures carried out in review of the data deliverables must be shared with BEIS, including references to supporting evidence of the assurance update, such as verification and sensitivity tests done.

Further to this we invite tenders to make the case for significant enhancements and sensitivities within their bids, especially those which will prolong the lifetime of this dataset. These are expected to be projections of BaU or MACCs at the regional and sectoral breakdown in-line with specified scenarios, for example, but not limited to:

- i. demand management – energy efficiency vs. Behavioural change
- ii. Net zero pathways e.g. a BaU that reflects current Net Zero commitments that have been made but not legislated.
- iii. Temperature targets
- iv. Scenarios geared towards particular technology deployment options or allowing for technology failure in terms of viability or adoption e.g. CCUS, Nuclear, or other technologies.
- v. Economic recovery trajectories
- vi. Any significant assumptions or parameters in the modelling that results are sensitive too, e.g. discount rates, calibration factors, or any other variable that affects take up and cost of options e.g. for electric vehicles

Format of data

All emissions, MAC curves and other data should be provided to BEIS in a format/template to be agreed between BEIS and the contractor in the course of the project. This could include but is not limited to data in .xlsx, .csv or other format suitable for directly ingesting into a database.

Accompanying report

Datasets need to be accompanied by a report covering the following areas:

- Underlying assumptions and background information which is necessary for understanding the outputs
- Methodology used in analysis, including derivation of BaU emissions projections and MAC curves
- Brief qualitative discussion of outputs, explaining any anomalies and/or counter intuitive results, and residual emissions / constraining factors to further mitigation
- Robustness and reliability of outputs and any differences in this
 - a. over time
 - b. across countries / regions
 - c. across sectors

- An assessment of what is driving BAU emissions, abatement potential and costs for key countries/regions and changes in the last two years since the previous data update calibrated to IEA WEO2019.
- An assessment of remaining emissions, and constraints to further abatement, at maximum mitigation potential
- Any limitations to the inputs, approach and/or model used to produce the BAU emissions projections and MAC curves.
- Quality Assurance plan and an explanation of calibration used to internationally recognised source and GWP factors used for conversion of non-CO₂ emissions.

4. Deliverables

The outputs from the study will as a minimum be the following:

- i. Historical data on all sectors and regions provided;
- ii. Dataset of BaU emissions meeting the specifications outlined in this tender;
- iii. MAC curve data meeting the specifications outlined in this tender;
- iv. A quality assurance log in-line with BEIS modelling QA guidance, including references to supporting evidence of the assurance update, such as verification and sensitivity tests done;
- iv. A detailed analytical report will accompany the data outlining details of methodological approach and quality assurance, including:
 - a. underlying assumptions and background information in order to understand outputs,
 - b. the methodology behind the derivation of BaU and MACCs,
 - c. quality assurance examining the causes of any discrepancies between different data sources/assumptions or counter-intuitive regional/sectoral results
 - d. and discussion of estimates in terms of evaluating robustness, reliability, external validity, limitations and constraining factors;
 - e. A review of data sources and benchmarks including discussion of estimates in terms of robustness, reliability, limitations and constraining factors;
- v. Powerpoint and Data presentations to steering board at key project milestones, giving opportunity for constructive engagement and feedback on data and approach;
- vi. Concluding Summary Workshop by the contractors on their modelling and assumptions.

There is no expectation that deliverable v or vi need be conducted in person and may be conducted via Teams or equivalent software.

Working Arrangements

BEIS envisage the need for close interaction between the BEIS Project Manager and Supplier throughout the process, to ensure that emerging issues are dealt with promptly and that BEIS fully understands the assumptions and approach taken.

The Supplier will be expected to identify one named point of contact through whom all enquiries will be directed. To ensure that the project runs smoothly and that there is effective scrutiny, oversight and quality assurance, the project will be managed by a single BEIS project manager who will be the central point of contact. BEIS would not expect that the

Supplier key point of contact would change during delivery of the Services. If they do, or where a key member of the Supplier's delivery team were to stop working on the project and where their absence could significantly change the quality of the deliverable then BEIS would expect the Supplier to provide a suitable replacement person to continue delivering that task. BEIS would request that it is kept informed of this process, to ensure that there is no removal of an important skill set which would go on to impact the deliverable.

The BEIS project manager, and Supplier point of contact will undertake weekly online catch-up meetings as a minimum to address emerging issues and review progress.

BEIS will commonly provide two rounds of comments on deliverables before final reports are agreed, with an indicative four working day turnaround from drafts being received. This should be considered in any timetable. In terms of process to be used for collating BEIS comments, we expect to form a steering committee of BEIS staff, which will review the outputs (and with inputs from others). Comments will then be collated and prioritised by the BEIS project manager. As is normal with BEIS projects, in the event of conflicting comments from internal stakeholders, it will be the responsibility of BEIS' project manager to make the final decision on which comments the Supplier should address.

All research tools and methodologies will need to be agreed by BEIS prior to their utilisation in delivering this research. If quality standards are not met or if BEIS considers that the deliverables have not been met, BEIS reserves the right to require additional drafts.

The Supplier shall commit to being fully prepared in the event any decision made to scale up (increase) or scale down (decrease) the scope of the project, subject to the amendments continuing to meet the objectives of this project and compliance with the [Public Contracts Regulation 2015](#). Sufficient lead-in time will be provided and discussed with the Supplier if these changes to the requirement take place.

Invoicing Arrangements

When invoicing, Suppliers should provide a full and detailed breakdown of costs. This should include staff (and day rate) allocated to specific tasks, which will be in line with the anticipated deliverable costs.

Payment will be aligned with successful and timely completion of all deliverables. Late or poor quality delivery of deliverable will lead to delayed payment.

BEIS aims to pay all correctly and uncontested submitted invoices and following approval of deliverables, as soon as possible with a target of 10 days from the date of receipt and within 30 days at the latest.

Performance Management

Performance of the Supplier will be assessed against the tasks as set out in this Specification measured (using a red, amber, green scale) against:

- **Quality** – the strength of the methodological approach and application of this throughout the research. We would not expect to undertake more than two (2) reviews of draft deliverables before agreeing a final version, and only have relatively immaterial comments on the second draft;

- **Accessibility** – the presentation of the findings in a way that is succinct and accessible to the desired audience, as judged by BEIS, e.g. user interfaces to summarise data and findings;
- **Timeliness** - the timely submission of requested outputs, judged on whether deliverables are submitted on time (according to contract milestones) and extent of any delays; and
- **Accuracy** – the detail within the reports as well as the number of outputs that are error free (inaccuracies in evidence, analysis and report text and formatting).

Assessment of performance against the final report will be managed by the BEIS project manager and will be undertaken by BEIS upon delivery of each work package. Where a score of Amber or Red occurs against a deliverable, BEIS may reasonably request the Supplier to provide, at its own cost, a short rectification plan detailing measures it will undertake to complete the work to the required quality in an agreed timeframe. BEIS may reasonably delay payment of all invoices until all work packages are completed to the required standard.

If the Supplier were to be awarded Red scores in one or more assessment criteria listed above in consecutive invoicing periods for measures within their control, BEIS may consider this to be a material breach of the Contract.

Gender Equality

The Supplier will ensure that it considers promotion of gender equality¹ in the delivery of this project with practical and demonstrable measures to report against this objective. This is not limited to its own internal processes and strategies, but how the outputs of this project will deliver on this principle.

ANNEX B
Supplier Proposal

PROJ1.1: APPROACH AND METHODOLOGY

1.1. Introduction

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1.2. Overall Approach's Specificities

1.2.1. Geographical Coverage

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1.2.2. Time Coverage

[Redacted content]

1.2.3. Calibration of the BAU scenario

[Redacted content]

¹ [Redacted content]

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1.2.3.1. Calibration of the BAU to match a WEO scenario (Options 1 & 2)

[Redacted text block]

[Redacted text block]

⁴ EnerBase (EnerFuture service, last updated in April 2021)

[Redacted text block]

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1.2.3.2. Development of a customized BAU scenario (Option 3)

[Redacted text block]

[Redacted text block]

1.2.4. **Non-CO₂ Emissions**

[Redacted text block]

1.2.5. **MACCs Specificities**

[Redacted text block]

⁶The reason for limiting the higher range of carbon prices is explained by modelling constraints. In the case of a full calibration to an external scenario, the modelling process already implies numerous constraints to match given detailed figures, e.g. sub-sectoral consumption by energy source. Such constraints limit the possibility to explore very high carbon prices in MACCs and increase the risk of model infeasibilities. BEIS may keep in mind for this or future work that reducing the BAU calibration criteria may lead to higher chances of exploring higher carbon prices in the MACCs.

[Redacted]

[Redacted]

1.3. Methodology by Tasks

1.3.1. Task 1: Production of BAU Energy and Emissions Scenario by 2050

1.3.1.1. Approach

[Redacted]

[Redacted]

1.3.1.2. Deliverables

[Redacted]

[Redacted]

1.3.2. Task 2: Generation of MACCs including sub-sectoral technology options

1.3.2.1. Approach

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1.3.2.2. Deliverables

[Redacted text block]

1.3.1. Task 3: Report on Methodology and Discussion of Results

1.3.1.1. Approach

[Redacted text block]

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1.3.1.2. Deliverable

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⁸Total abatement is also provided for international shipping and inland waterways, but without a breakdown by abatement options

PROJ1.2: UNDERSTANDING THE PROJECT ENVIRONMENT

1.1. Context of the Project

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

1.2. Specificities of the Project Environment

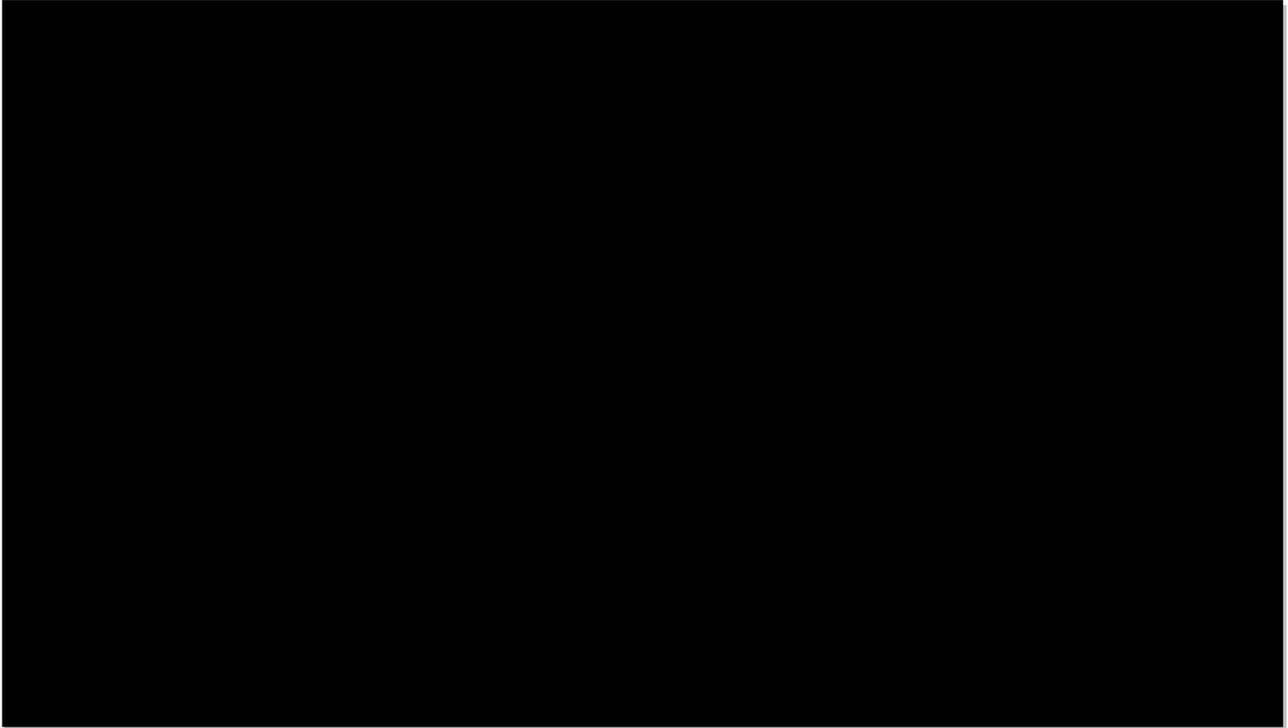
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¹ See 1.1 on Approach and Methodology



Global CO₂ emissions per sector in the "progressive policy" carbon path in 2050



PROJ1.3: STAFF TO DELIVER

1.1. Overview

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1.2. Short Biographies of Key Staff

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PROJ1.4:PROJECT PLAN AND TIMESCALES

1.1. Work Plan



Figure 1. Expected project timeline

1.2. Deliverables



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1.3. Meetings

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1.4. Client Communication

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1.5. Optional Work

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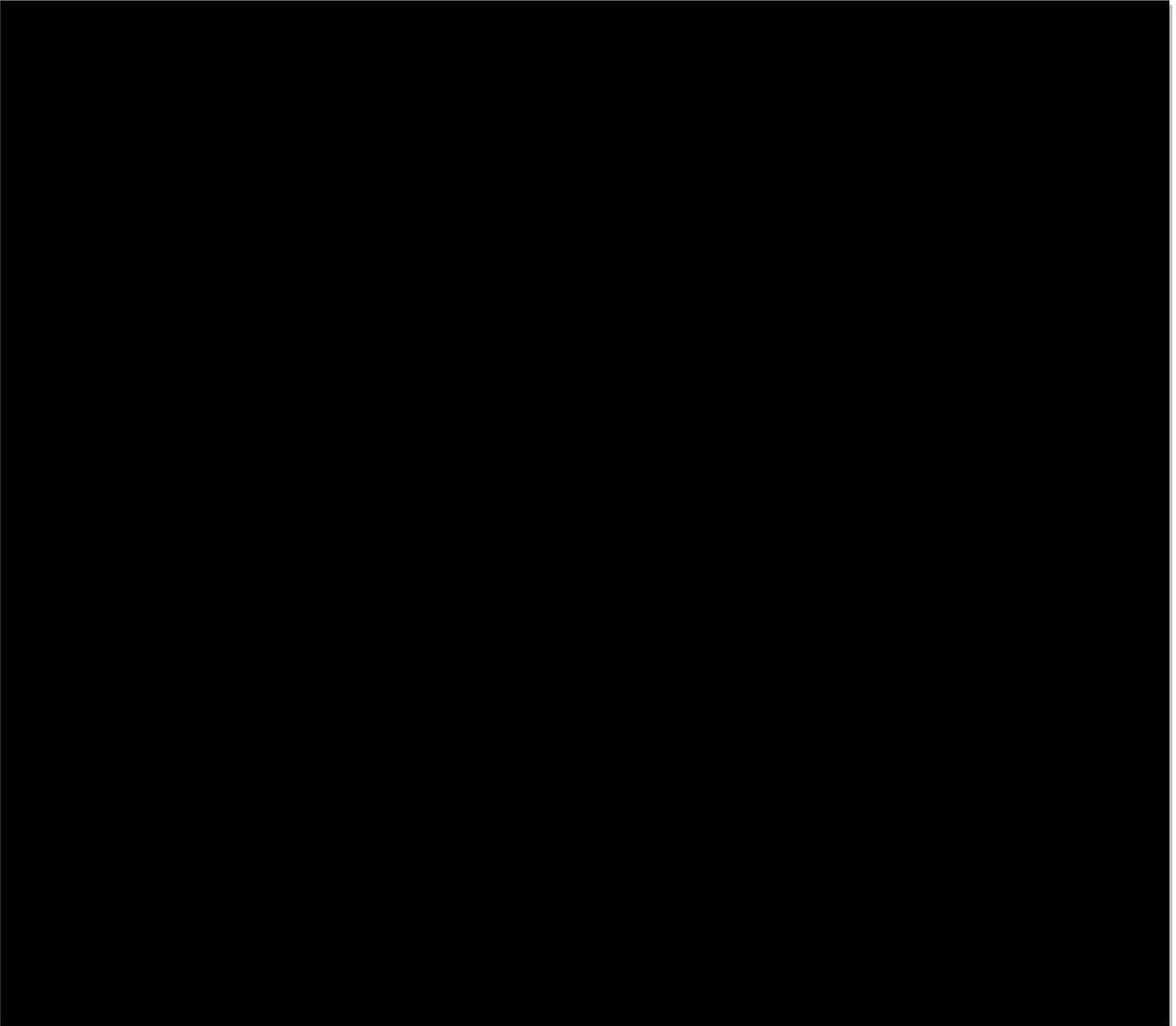
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1.6. Financial Information

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Annex D



Part 2: Contract Terms



Contract Terms v6.0