



**K.17 Financing Feasibility Report - Final**  
*Commercial -Project Management*



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# Key Words

Key Word	Description
White Rose	The White Rose Carbon Capture and Storage project
Carbon	An element, but used as shorthand for its gaseous oxide, Carbon Dioxide, CO <sub>2</sub> .
Carbon Dioxide	A greenhouse gas produced during the combustion process, the chemical symbol for which is CO <sub>2</sub> .
Carbon Capture and Storage	A technology which reduces carbon emissions from the combustion based power generation process and stores it in a suitable location
Capture	Collection of CO <sub>2</sub> . from power station combustion process or other industrial facility
Financial Close	The point at which the final investment decision is taken and the Notice to Proceed with the Implementation Phase is issued
Oxyfuel	The technology where combustion of fuel takes place with oxygen replacing air as the oxidant for the process, with resultant flue gas being high in CO <sub>2</sub> .
Oxy Power Plant	A power plant using oxyfuel technology
OPP Process	The flow of input and output streams through the Oxy Power Plant
Pipeline	The long pipe used for conveying CO <sub>2</sub> . from the power plant to the storage facilities
Transport	Transfer of processed CO <sub>2</sub> . from the capture and process unit by pipeline, to the permanent storage
Storage	Containment of CO <sub>2</sub> . in suitable pervious rock formations located under impervious rock formations usually under the sea bed
CAPEX	Capital expenditure
OPEX	Operating expenditure
Financial Adviser	A professional who renders financial services to clients.
Export credit agency	Known in trade finance as an ECA or investment insurance agency is a private or quasi-governmental institution that is as an intermediary between national governments and exporters to issue export financing.
Multilaterals	Financial institutions that have been established (or chartered) by more than one country, and hence are subjects of international law.
Project finance	The long-term financing of infrastructure and industrial projects based upon the projected cash flows of the project rather than the balance sheets of its sponsors.

# Executive Summary

The Financing Feasibility Report was generated as part of the Front End Engineering Design (FEED) contract with the Department of Energy and Climate Change (DECC) for White Rose, an integrated full-chain Carbon Capture and Storage (CCS) Project. This document is one of a series of Key Knowledge Deliverables (KKD) from White Rose to be issued by DECC for public information.

White Rose comprises a new coal-fired ultra-supercritical Oxy Power Plant (OPP) of up to 448 MW<sub>e</sub> (gross) and a Transport and Storage (T&S) network that will transfer the carbon dioxide from the OPP by pipeline for permanent storage under the southern North Sea. The OPP captures around 90% of the carbon dioxide emissions and has the option to co-fire biomass.

Delivery of the project is through Capture Power Limited (CPL), an industrial consortium formed by General Electric (GE), BOC and Drax, and National Grid Carbon Limited (NGC), a wholly owned subsidiary of National Grid.

This report, prepared by CPL's financial adviser, Société Générale (SG), provides an advisory view on the bankability of the Project based on the best available information about the Project provided by CPL and on the then market liquidity and outlook.

# 1 Introduction

## 1.1 Background

The White Rose Carbon Capture and Storage (CCS) Project (White Rose) is an integrated full-chain CCS project comprising a new coal-fired Oxy Power Plant (OPP) and a Transport and Storage (T&S) network that will transfer the carbon dioxide from the OPP by pipeline for permanent storage under the southern North Sea.

The OPP is a new ultra-supercritical power plant with oxyfuel technology of up to 448 MWe gross output that will capture around 90% of carbon dioxide emissions and also have the option to co-fire biomass.

One of the first large scale demonstration plants of its type in the world, White Rose aims to prove CCS technology at commercial scale as a competitive form of low-carbon power generation and as an important technology in tackling climate change. The OPP will generate enough low carbon electricity to supply the equivalent needs of over 630,000 homes.

White Rose is being developed by Capture Power Limited (CPL), a consortium of GE, BOC and Drax. The project will also establish a CO<sub>2</sub> transportation and storage network in the region through the Yorkshire and Humber CCS pipeline being developed by National Grid Carbon Ltd (NGC).

During the Bid Improvement Phase (BIP) phase of the competition, Société Générale (SG) and Lloyds were appointed as Financial Advisers to Alstom Power Limited, Drax Power Limited and BOC Group Limited (together the Consortium) in relation to the White Rose CCS project (the Project) in order to review the preliminary financing plan presented with the initial bid of the Consortium and work with the Consortium to start the process of optimising the financial plan and firming up on sources of financing for the oxy-power plant and CO<sub>2</sub> capture facility element of the Project. The main part of the work programme undertaken by SG and Lloyds was a market sounding carried out with commercial banks, Export Credit Agencies (ECAs), bilaterals and multilaterals. Letters of Support from these institutions were obtained in order to support the BIP submission of the Consortium. In April 2013, commercial banks re-confirmed their interest based on the risk structure presented at BIP submission.

Following the signing of the Front End Engineering Design (FEED) contract between DECC and the Project company, CPL was formed by the Consortium and SG was appointed sole Financial Adviser to CPL. Since then, SG and CPL continued to make progress on the financing aspect of the Project.

For the CO<sub>2</sub> transport and storage element, CPL would pay NGC a fixed capacity fee under a Transport & Storage Services Agreement (TSSA) which had been included in the financial model as an operating cost as described in the BIP submission. It is understood that NGC would have its own separate financing arrangements which were corporately based i.e. sourced and/or supported by its parent's balance sheet.

## 1.2 Scope

This report is an edited summary of the last quarterly Financing Feasibility Report Deliverable to DECC. It consists of four parts:

- 1) Summary of financing process;
- 2) Liquidity analysis;
- 3) Project risks and mitigants; and
- 4) Conclusion.

## 2 Financing Process

### 2.1 Process to date

During the FEED period, CPL and SG maintained constant engagement with potential funders and also completed an initial phase of lenders due diligence, leading to feedback from these advisors on bankability of the project.

Furthermore, CPL and SG undertook the compilation and distribution of an Interim Briefing Document (IBD) which commenced on 25th June 2015, which sought to solicit the views from a sub-set of its funder group (the Pathfinder Banks) on the bankability of the current draft of the Project Contract and Contract for Difference (CfD) presented by DECC. The Pathfinder Banks are experienced financial institutions in the project financing sector with the ability to understand and structure complex energy projects such as White Rose. To further assist with their review, Pathfinder Banks were also given access to the Lenders Legal and Technical Advisors in order that they could make fully informed comments on the bankability of the Project as proposed. It is important to note that this consultation process was run at arm's length from CPL in order to try to get an independent view on key issues from the Pathfinders and the advisors.

Based on the feedback on this process (provided to DECC on 5 August 2015, and summarised in KKD K.11), SG consider the IBD process to have been a very useful exercise in identifying/confirming key bankability issues in relation to the project commercial structure as presented. It was also very encouraging that, based on their assessment, all Pathfinders considered that the Project should be capable of being financed if a commercially acceptable solution was found for these issues.

As further described below, the IBD process was supplemented with a detailed Project update briefing for the wider group of potential finance providers in order to obtain updated indications of their support for the Project as part of the preparation for the anticipated Risk Reduction Phase (RRP) submission in December 2015. The responses from this update were also very positive, and all banks expressed willingness to provide Letters of Support (LoS) for the RRP submission.

Notwithstanding the challenges highlighted above, SG had been continuing to work closely with CPL and DECC to optimise the financing timetable and in working to achieve a bankable commercial structure.

### 2.2 Bankability Issues

The lenders' due diligence advisors (legal, technical, insurance) provided their first phase preliminary due diligence reports based on the most current commercial development, i.e. the Project Contract and CfD issued by DECC on 22nd December 2014. As highlighted to DECC by CPL and SG, and described in KKDs K.04 Full chain FEED lessons learned and K.16 Financial Plan – Final, the lenders legal and technical advisors concluded that elements of the current drafts of the Project Contract and CfD are not bankable.

In light of this conclusion, CPL organised the IBD process to validate the conclusion and test the banking market on what may be considered to be a bankable structure. Whilst it is not usual to go to the market at this stage of the process, given the fundamental nature of the bankability issues and the impact on the financing work stream, it was considered necessary to go through the IBD process for validation from the wider bank market of the bankability issues highlighted by CPL and their advisors.

Due to the protracted negotiation of the Project Contract and CfD, and the addition of the IBD process into the financing programme, the financing work stream became a critical path item within the master FEED programme. CPL and SG worked hard with DECC to optimise the financing timetable to adapt to the constant changes in the process to maintain the same Financial Close (FC) date; however, certain critical milestones, i.e. basic risk allocation and commercial structure, had to be reached within a reasonable timeframe so that the target FC date had a chance of being reached.

### 2.3 Update on National Grid Carbon Limited's TSSA

The TSSA heads of terms document was drafted by CPL's legal advisor, Linklaters, and meetings were held with NGC to discuss various key provisions such as levels of liquidated damages and security packages. Discussions in relation to the TSSA were ongoing. As financial advisor, SG provided comments as required.

### 2.4 Updates to other Key Sub-Contracts

SG was provided with a number of initial drafts of the key contract heads of terms, including Engineering, Procurement and Construction (EPC), Operation & Maintenance (O&M), Power Purchase Agreement (PPA) and Fuel Supply, and provided comments on these documents as required. It was envisaged that these sub-contracts would be revisited in light of developments at Project Contract and CfD levels to allow for appropriate risks pass down.

### 2.5 Developments in Energy Market Reform

We were not aware of any new developments in the Energy Market Reform process that would cause additional bankability issues for the Project.

### 2.6 Interactions with potential Providers of Finance and Insurances

As mentioned previously, CPL and SG continued to engage with potential funders in order to maintain the positive momentum garnered so far.

- All potential funding institutions were invited to the CPL/DECC Funder Engagement Event which took place in January, 2015; the first time all these institutions were brought together. Feedback from the most recent meeting of our funders (with 18 institutions in attendance) was encouraging.
- The Project has successfully completed the pre-qualification process of a European multilateral agency in February 2015 and a support letter was received.
- At the beginning of FEED, CPL had secured LoS from three major ECAs. In early 2015, given the diverse equipment sourcing potential of this Project, CPL, SG and the Sponsors export finance team were invited by another leading European export credit agency to a meeting at their headquarter, in order to introduce the project along with the transmission and storage assets. Their feedback was positive and they proposed to issue a letter of interest prior to the RRP submission. Following the most updated CAPEX figure in October 2015, CPL expected to receive a new sourcing matrix shortly from GE. This would enable CPL and SG to revisit the Project's approach to ECA financing.

- As indicated above, CPL conducted the IBD process to validate the list of key bankability issues with the Project Contract and CfD. This was supplemented with a series of bi-lateral project updates (23rd – 25th November 2015) with 14 financial institutions. As a result of this process, all such institutions reconfirmed their interest in the financing of the Project and were willing to provide a letter of support to accompany the RRP submission.

However, as noted previously, the extent of progress that could be made with potential funders was still impeded by the lack of bankable commercial structure, and until a mutual agreement could be reached between CPL and DECC, SG and CPL continued to keep the potential funders apprised and to prepare the grounds for the financing phase to the extent possible.

## 2.7 Alternative Sources of Financing (including Funding Competition)

Whilst not in the base funding plan at this stage, CPL and SG maintained a dialogue with Infrastructure UK. We also discussed the Project with a UK pension fund as a means to engage with the institutional investors, and had started to open discussions with the European Commission and the EIB in respect of the applicability of the products under the European Fund for Strategic Investment (the EFSI or Juncker Plan). The Juncker Plan could conceivably provide equity, mezzanine debt and loan guarantees that could facilitate a more effective risk allocation and/or improve liquid for the Project.

Separately, further to completing the pre-qualification process with a European multilateral agency in February 2015 in respect of its debt finance offering, continuous follow-up was made to gain a better understanding of the agency's wider product suite/portfolio as well as meeting their due diligence requirements for the appraisal of the Project.

Whilst the required amount of additional Base Equity needs to be assessed on the basis of the revised funding requirement, CPL took steps to identify potential investors and mandated another financial advisory firm to undertake an initial equity sounding process. The initial sounding process was completed and there was clearly interest in the Project, subject to greater understanding of the risk allocation and return available from the Project. One very positive development on this front in our view was the emergence of a large Chinese utility company as a potential investor in the transaction. This was received very positively by the finance community and signing of the proposed Letter of Interest. The involvement of a major Chinese utility company in the equity could have also opened a new pool of debt liquidity with Chinese ECAs and banks.

In light of the various financing and equity work streams mentioned above, we planned to revisit the Financial Plan once the risk allocation and the project documents were further developed with DECC and we endeavoured to continue doing so in order to optimise the Financial Plan.

As previously highlighted, CPL was willing to work with the Authority on the financing in the interest of best value for money and transparency, including through a Preferred Bidder Debt Funding Competition (PBDFC) if required as used in certain PFI projects. Our aim was to ensure that the most transparent and efficient process was run to raise finance for the Project, including:

- providing transparency to the Authority regarding the terms of debt finance and the process in securing it;

- enabling the Authority to provide input and guidance in relation to the financing;
- ensuring competition among potential financiers to the extent possible, including in respect of margins and other fees, reserving and hedging requirements, etc; and
- overall, capturing best value in terms of finance.

### 3 Liquidity Analysis

The proposed capital formation for the Project remained broadly the same as the BIP submission and incorporated the following principal elements:

- Equity (Base and Contingent) provided by CPL existing and potential Sponsors;
- Grant from the Authority; and
- Long and medium term debt.

Our working assumption of the various liquidity pools in the financial model was as follows:

**Figure 3.1: Financing Plan**

Financing Plan (excl. FEED)	%	Comment on Estimated Liquidity
Equity and Grant Funding	35	Include base equity, third party equity and committed grant funding through DECC
Debt	65	Include the following sources: <ul style="list-style-type: none"> <li>• ECA covered debt based on qualifying content (subject to final sourcing plan and contract packages);</li> <li>• Multilateral debt; and</li> <li>• Commercial debt available on an uncovered basis for a well-structured project.</li> </ul>
Total	100	

Source: CPL

As the contractual structure of the Project was being developed by CPL, DECC and CPL's supply chain, we believed there was merit to constantly revisit and re-evaluate all of the above sources of financing. Generally speaking, in view of the current pipeline in the UK renewables sector, we envisaged sufficient liquidity in the market for projects which are well structured, i.e. with appropriate risk allocation and contractual structure. The addition of the potential Juncker Plan, institutional and Chinese debt further would have provided additional liquidity options for the Project.

One challenge of the financing plan was to optimize the tenor of the debt. Given the extended construction period, the difference in available tenors between the ECAs and commercial lenders would have to be carefully considered and optimized vis-à-vis other influencing factors such as duration of CfD and the Projects overall economics.

However, as a result of the extensive work undertaken with each of the liquidity pools identified in the financing plan above, particularly the commercial banks and multilaterals, we were confident that significant liquidity was available and that a competitive financing was possible for the Project. It was also our view that with increasing insight into the proposed technology and commercial structure, the financial institutions involved in the process would have been able to take a significant level of non-recourse risk on

the Project. Obviously, this would have been subject to the presence of a bankable commercial structure and risk allocation.

## 4 Project Risks and Mitigants

During the FEED Phase, CPL was seeking to maximise the transfer of risk to its supply chain and lenders in accordance with its Initial Bid.

Given the then status of the Project, where elements of the present Project Contract and CfD were not bankable, we outlined in the table below the generic risks perceived by potential lenders and potential mitigants available for addressing these risks. Also included is the latest status of these risks.

**Table 4.1: Project Risks**

Project Risks	Potential Mitigants	Status Update
Regulatory	<ul style="list-style-type: none"> <li>Change in law provisions in project and CfD agreements</li> <li>Due diligence on legal and regulatory framework</li> <li>Sensitivity analysis</li> </ul>	<ul style="list-style-type: none"> <li>The decision by DECC to terminate the CCS Commercialisation competition has significantly increased the perception of regulatory risk in the UK CCS sector.</li> </ul>
Construction	<ul style="list-style-type: none"> <li>EPC contracts</li> <li>Legal, technical and contractual due diligence prior to Financial Close</li> <li>Base Case sensitivity analysis and contingency allowance</li> <li>Insurance</li> <li>CfD rebasing</li> </ul>	<ul style="list-style-type: none"> <li>The FEED study undertaken has provided greater visibility around the construction risk, facilitating mitigation of this risk</li> <li>Draft heads of terms for key commercial agreements have been drafted and provide some clarity on the construction risk</li> <li>The lack of a revised draft of the Project Contract, and agreement on various aspects of the risk allocation with the Authority had delayed a more detailed assessment of this area of risk</li> </ul>
Revenues	<ul style="list-style-type: none"> <li>Availability assumptions in the base case validated by due diligence</li> <li>CfD terms and conditions</li> <li>Off-take contract terms</li> </ul>	<ul style="list-style-type: none"> <li>The standard for CfD has been accepted, by the credit committee of financiers of offshore wind, providing some comfort on the acceptability of the underlying CfD revenue structure for CCS</li> <li>The lack of a final risk allocation, including the revenue protections available in the occurrence of CCS risk, had delayed the financial structuring around CCS risk</li> <li>The process of securing an off-take contract was underway and suggests that there is appetite for off-take, fuel supply and combined hedging of the project.</li> </ul>
Operations	<ul style="list-style-type: none"> <li>Supply and off-take contract terms</li> <li>O&amp;M contract terms (KPIs with corresponding LDs within a liability cap)</li> <li>Quality/Experience of developer and O&amp;M contractor</li> <li>Technical DD on O&amp;M arrangements</li> </ul>	<ul style="list-style-type: none"> <li>The process of securing an O&amp;M provider was underway</li> <li>Initial due diligence is underway on the O&amp;M approach</li> <li>The FEED work had defined in more detail the O&amp;M requirements for the project, assisting in the mitigation of this risk</li> <li>Work with insurance advisors on the CPL and full chain operating insurance strategy was also</li> </ul>

	<ul style="list-style-type: none"> <li>Involvement of the Insurance Advisor and quality of the brokers</li> </ul>	informing structuring and risk mitigation
Counterparty	<ul style="list-style-type: none"> <li>Technical and financial due diligence</li> <li>Documentation to provide for equity subscription and timing of equity</li> <li>Possible credit support for the base and contingent equity obligations</li> </ul>	<ul style="list-style-type: none"> <li>Discussions were ongoing around counterparty risk mitigation</li> </ul>
Other risks	<ul style="list-style-type: none"> <li>Initial financing plan covers diverse sources of funding, including ECAs, multilaterals and commercial banks</li> <li>Hedging of FX and interest rate risk at close</li> <li>Focus on experienced financial institutions</li> </ul>	<ul style="list-style-type: none"> <li>Project risk matrix and within this the financing risk matrix were compiled</li> <li>Initial assessment of the FX, Interest Rate and other commodity exposure were undertaken and hedging options investigated in order to define a high level hedging strategy for the project</li> </ul>

Source: CPL

It was the intention that the above issues would be discussed, worked through and mitigated with prospective lenders in the normal way for a complex, structured financing of the type which was being contemplated.

## 5 Conclusion

The ongoing funders engagement process, together with feedback from the Pathfinder Banks from the IBD process, the briefing of the full bank group as well as an enhanced equity investor profile, suggested that there was increasing interest in the financing of the Project and a growing confidence that the Project could be executed in an acceptable form.

However, this positive market consensus was curtailed when DECC announced the termination of the CCS Commercialisation Competition on 25<sup>th</sup> November, 2015. This decision was not foreseen by CPL or its funders and has been interpreted by many of CPL's funders as the UK Government reaching the conclusion that CCS is no longer considered as core to the UK's decarbonisation policy. This has been very negatively perceived by the financing community in general i.e. including institutions not directly involved in the process, and will have a significantly damaging impact on the financing prospects for the White Rose project and CCS more generally. We await further clarification of the implications of this decision for White Rose, but on the face of it, project financing of the project without the grant funding and potentially the CfD and backstopping of some CCS risk seems highly unlikely.

The finance community, through the banks involved in this process, have expressed their frustration that what appeared to be a bankable project with increasing support and confidence built up over several years of carefully managed briefing and education of the finance community had been brought to an abrupt end by withdrawal of the government support, essential for delivery of the project.

## 6 Glossary

Abbreviation	Meaning or Explanation
BIP	Bid Improvement Phase
CCS	Carbon Capture and Storage
CfD	Contract for Difference
CPL	Capture Power Limited
DECC	the Department of Energy and Climate Change
ECA	Export credit agencies
EFSI	the European Fund for Strategic Investment
EPC	Engineering, procurement and construction
FC	Financial close
FEED	the Front End Engineering Design
FOAK	First of a kind
FX	Foreign exchange
GE	General Electric
IBD	Interim Briefing Document
KKD	Key Knowledge Deliverables
LoS	Letters of Support
NGC	National Grid Carbon Ltd
O&M	Operation and maintenance
OPP	Oxy Power Plant
PBDFC	Preferred Bidder Debt Funding Competition
PPA	Power Purchase Agreement
RRP	Risk Reduction Phase
SG	Société Générale
TSSA	Transport & Storage Services Agreement