TIDAL LAGOON SWANSEA BAY

SWANSEA BAY TIDAL LAGOON
Contract for Difference Offer

Prepared for the Department of Energy & Climate Change

4 December 2015

Contents

Executive Summary

We are proposing to construct a tidal lagoon in Swansea Bay, capable of generating 572GWh per annum with an installed capacity of 320MW. Capital spend will be approximately £1.3bn. The project has planning approval. Work can commence in March 2017 with construction taking 4.5 years. We have split out our offers into a 35 year Contract for Difference ("CfD"), a 50 year CfD and the more efficient capital structure CfD, dubbed an "Alternative CfD".

- Under a 35 year structure, we can deliver a £148.9/MWh strike price.
- Under a 50 year structure, we can deliver a £140.5/MWh strike price.
- Under the Alternative CfD, we can deliver a CfD equivalent strike price of £95.6/MWh.

Each structure has some linkage to Cardiff with a painshare mechanism to incentivise equity to deliver the full scale lagoons.

The Prize

Swansea will open up for the United Kingdom the option of creating a programme of larger lagoons which will be capable of generating renewable electricity at both scale and with competitive prices using simple and proven technology. We believe this wider benefit needs to be taken into account in assessing overall Value-for-Money ("VfM") of Swansea. With economies of scale, future large lagoons will be capable of generating electricity on a long term basis at a cost significantly lower than that of the initial project at Swansea. We anticipate that under an Alternative CfD model, Cardiff Tidal Lagoon can be financed in the range of £65/MWh to £70/MWh, representing a significant progression from Swansea.

Tidal lagoons offer the prospect of highly predictable, renewable low carbon electricity deployed at scale with the potential for 24/7 generation depending on locations developed. A fleet of tidal lagoon electricity generating plants around the UK coast will have the potential to supply up to 8% of the UK's electricity needs.

Swansea as a Catalyst

Swansea Bay Tidal Lagoon is the forerunner to these larger lagoons, the first of which would be Cardiff. Cardiff requires £7.7bn of construction capital and significant development capital. It would be extremely difficult to finance the development or construction of Cardiff without undertaking a pathfinder project, such as Swansea, first. Specifically, proceeding with Swansea as a pathfinder project will:

- Unlock market appetite for the development and financing of "mega" projects such as Cardiff, enabling future projects to secure financing on affordable terms;
- Build supply chain maturity and confidence to invest to meet the delivery challenge of the full scale lagoons;
- Maximize the ability of the manufacturing and engineering base of UK plc to participate through a progressive growth in delivery capacity;
- Establish processes and methodologies to create a deliverable environmental impact management blueprint and thereby provide an easier path to acceptance by regulators and nature bodies for future lagoons; and
- Create management capability fundamental to the delivery of the future much larger scale tidal lagoons.

The Offer

Swansea Bay Tidal Lagoon will be a long-life asset. It will generate electricity for at least 120 years, significantly longer than any existing technology. For this reason we have submitted an alternative CfD which reflects the long term generating capacity of the Project, drawing on principles from recent major infrastructure projects including Thames Tideway Tunnel.

We have submitted a 35 and 50 year CfD base case as requested. We have then shown variants:

- Capturing the value of the Project post the CfD period (Residual Value ("RV"));
- Receiving a benefit from Cardiff Tidal Lagoon; and
- Including a painshare mechanism.

We have also submitted a 90 year Alternative CfD offer.

Case		Long term CfD strike price (2012) £/MWh	CfD term Years	NPV of subsidy £'m	Cardiff Payment / Grant £'m
35 Year CfD					
1a	**Standard**	174.5	35	1,174	-
1b	**Standard + RV + Cardiff link**	148.9	35	919	175
50 Year CfD					
2a	**Standard**	159.1	50	1,199	-
2b	**Standard + RV + Cardiff link**	140.5	50	981	175
Alternative CfD					
3a	**90 year Alternative CfD with £150m Government grant**	95.6	90	649	150
3b	**90 year Alternative CfD without grant**	118.5	90	833	-
Cardiff					
4	**90 year Alternative CfD without grant**	68.3	90	1,123	-

Under scenario 3a, an increase of the grant by £21m would reduce the CfD requirement to £92.50.

Next Steps

We propose that:

- We are available to talk through the various options outlined in this Offer to support the Department of Energy & Climate Change ("DECC") decision making process;
- We agree what, if anything, is now required from the Company to enable Government to give a serious indication of its intention to proceed with the Swansea Bay Tidal Lagoon project, sufficient to proceed at speed with its development.

1. Introduction

Tidal Lagoon Power is preparing the ground to ensure that the UK has an option to deliver a fleet of tidal lagoon electricity generating plants around the coast with the potential to supply up to 8% of the UK's electricity needs. Tidal lagoons, which generate electricity from the rise and fall of the tides, have a number of advantages over other energy projects:

- Predictable year round power generation;
- Existing robust technology which enhances the UK generation mix;
- Long life assets with a minimum 120 year design life;
- Low operational costs;
- Socio-economic benefit from wider lagoon uses;
- UK supply chain opportunity for lagoon programme;
- Local and UK-wide job creation; and
- No carbon emissions from operations.

By using efficient capital structures leveraging the long-life nature of the assets and drawing on principles from recent major infrastructure projects including Thames Tideway Tunnel there is the opportunity for large scale lagoon projects to be funded with a CfD in the £65/MWh to £70/MWh range, which would be:

- Potentially subsidy free;
- Offering Value-for-Money to the tax payer; and
- Affordable to the consumer.

The programme sees the first full scale lagoon, located at Cardiff, with an estimated 2,700MW of installed capacity generating 5,450MWh of electricity per annum, submitting a development consent order application in 2017 with a target to start construction in 2019 and reach commercial operation in 2026.

The pathfinder project for this new industry is Swansea Bay Tidal Lagoon. We are proposing to construct and operate the first-of-a-kind lagoon located in Swansea Bay, South Wales. The lagoon will have an installed capacity of 320 MW, generating an anticipated 572 GWh net annual output. This will provide electricity for approximately 155,000 homes: more than Swansea's annual domestic electricity use (109,000 households) and circa 11% of Wales' annual domestic requirement.

We have been actively engaged with DECC since shortly after the inception of the Project in 2012. The Company has now been asked by DECC to submit a Best and Final Offer (the "Offer") in respect of a CfD support mechanism for the Project.

This document sets out our Offer, the key assumptions underpinning the Project and alternative CfD structures for consideration. The future lagoon projects are of a size that exceeds the market capacity for traditional project financing and therefore need to be funded in a different way. We have developed an alternative funding structure, applying similar principles to those found on other major infrastructure projects, such that these large lagoon assets might be financed by the capital markets. For the large projects, this results in a subsidy level at, or close to, grid parity. We have put this alternative CfD funding structure forwards for Swansea as we believe it offers value for money for the tax payer.

2. Delivery of a Lagoon Fleet

2.1. Overview

Tidal Lagoon Power is preparing the ground to ensure the UK has the option to build a series of five full scale tidal lagoons over the next 15 to 20 years that would cumulatively generate circa 30TWh of electricity per annum for over 120 years. The first full size lagoon project, Cardiff, was registered at the Planning Inspectorate in 2014 and, following responses on the Environmental Scoping Report submitted in March 2015, is now being progressed in order to submit a Development Consent Order ("DCO") application in 2017. A second lagoon, Newport (1,200MW), will submit its Environmental Scoping Report in 2016 with an expected planning submission in 2018.

2.2. Swansea & Cardiff key metrics

The scalability of tidal lagoons means that just one template project, Swansea Bay, can give confidence for the outline design and construction cost for subsequent lagoons including Cardiff. Large lagoons offer significant economies of scale in terms of both technology (larger turbines) and lagoon size (quantity of dynamic water impounded) resulting in cheaper power.

The following table captures the relative key metrics of Swansea Bay and Cardiff lagoons to illustrate the scaling effect from impounding larger areas of water and, in Cardiff's case, an increase in maximum tidal range of two metres.

	Units	Swansea	Cardiff
Area of water enclosed	*km^2*	11.5	68.4
Length of bund wall *	*km*	9.1	18.9
Number of turbines	*nr*	16	90
Capacity per turbine	*MW*	20	30
Installed capacity	*MW*	320	2,700
Annual net AEP	*GWh*	572	5,450
Capital cost	*£'m*	1,327	7,764
Annualised Opex	*£'m*	16.3	75.6
Asset life	*Years*	120	120
Anticipated Commercial Operations Date	*Date*	Feb 2022	2026
Capital cost / GWh	*£m/GWh*	2.32	1.42
CfD on Alternative CfD basis	*£/MWh*	95.6	68.3
*** Excludes turbine hall length**			

2.3. Funding of large lagoons

Cardiff has an estimated £7.7bn construction cost which, to be successfully funded, requires an approach comparable to large infrastructure projects such as Thames Tideway Tunnel.

To achieve this, the required financing structure will need to leverage the strengths of the project, namely the long life nature of the asset, predictable power output and low operating costs once built. These are factors that the existing CfD mechanism was not designed to exploit. Consequently, large lagoons are better suited to a CfD mechanism with extended tenor that can be coupled to certain support mechanism elements taken from comparative long term infrastructure projects. This will leverage the project strengths to facilitate construction and operational debt being secured at lower rates of interest.

We are confident that the Alternative CfD model can support Swansea, at a capex of £1.3bn, and the delivery of full scale lagoons at a higher capex, such as Cardiff.

2.4. Swansea is the industry catalyst

The tidal lagoon project at Swansea Bay is an essential first step for creating a sustainable UK industry based around proven technology. The challenge for the Project is exploiting known technology on a scale not seen before.

At £1.3bn, the construction industry would consider Swansea Bay to be a large project, whereas the first of the full scale fleet of lagoons, Cardiff, would be regarded as a mega project with an estimated £7.7bn construction cost. Swansea therefore has the advantages of being low risk in terms of predicted outcome but at a scale at which robust procurement routes, supply chain, skill sets and financing need to be established before it is credible to embark on a project the size of Cardiff.

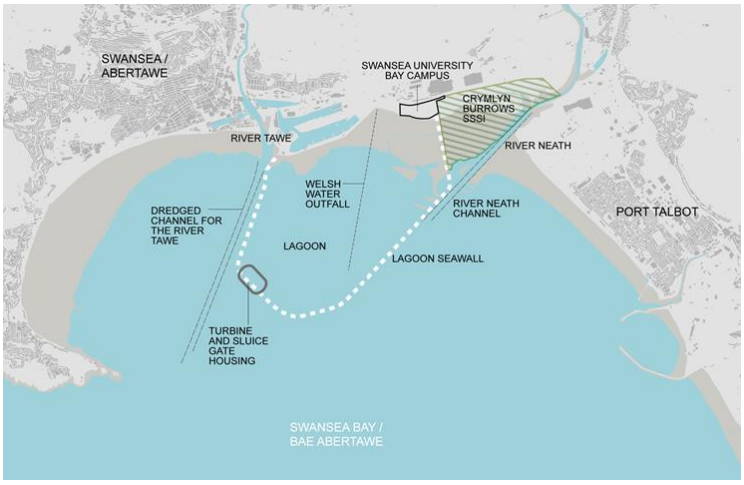
Specifically, proceeding first with Swansea as a pathfinder project will:

- Unlock capital market appetite for the development and construction of a mega project such as Cardiff, enabling future projects to secure financing on affordable terms;
- Build supply chain maturity and underpin its confidence to invest to meet the delivery challenge of the full scale lagoons;
- Maximise the ability of the manufacturing and engineering base of UK plc to participate through a progressive growth in delivery capacity;
- Establish processes and methodologies to create a deliverable environmental impact management blueprint and thereby provide an easier path to acceptance by regulators and nature bodies for future lagoons; and
- Create management capability fundamental to the delivery of the future, much larger scale, tidal lagoons.

3. Swansea Bay Tidal Lagoon

The Project is situated at the Port of Swansea, approximately 2.2km southeast of Swansea city centre. The Project straddles the administrative areas of the City and County of Swansea Council and Neath Port Talbot County Borough Council. The main onshore development lies within the Port area, immediately south of Fabian Way (A483) which is the main trunk road from Junction 42 of the M4 into Swansea.

The Lagoon will enclose part of Swansea Bay, from the eastern side of the River Tawe (western landfall) to the eastern edge of the new Swansea University Bay Campus (eastern landfall). The seawalls will extend circa 1.5km offshore and form an approximately 9.5km long, U-shaped, seawall which will impound approximately 11.5km^2 of the seabed, foreshore and intertidal area of Swansea Bay.



The seawall will have a dredged sand and gravel core which will be covered in rock armour of various sizes, reflecting the level of exposure. The crest of the seawall will include provision of an access road which will be used for the operation and maintenance of the Lagoon as well as for visitors.

The hydro turbines located within the turbine and sluice gate housing will be bi-directional, and able to generate power on both incoming and outgoing tides. There will be sixteen turbines, each one circa seven metres in diameter, and all located permanently underwater. There will also be six sluice gates able to let seawater in and out of the Lagoon, and so controlling the water passing through the turbines.

With the exception of a £1.25m loan from the Welsh Government, the Project has to date been entirely funded and guaranteed by the private sector. The construction phase equity will be funded by Infracapital (the infrastructure equity arm of the Prudential Group), funds managed by InfraRed Capital Partners Ltd and other major institutional investors.

4. Assumptions underpinning the Offer

4.1. Key project assumptions

The Company has taken on board the feedback it has received from its engagement to date with DECC and critically reviewed all assumptions underpinning the project financing model in order to put forward the Offer. As this section highlights, compared with what has previously been discussed with DECC, this exercise has resulted in the level of risk being taken by the shareholders increasing substantially. Shareholders are taking notably higher risk in backing tidal lagoons than would be the case under many comparable infrastructure projects of a similar scale. Key areas where risk has been assumed by equity is set out in the sections below and covers:

- Capital expenditure risk;
- Power output risk;
- Operational risks including opex and inflation (CPI);
- Financing risk including base rate and refinancing;
- Equity have removed assumptions from the model worth over 3% IRR;
- Development and Close risk; and
- A Painshare mechanism has been introduced to incentivise the delivery of Cardiff Tidal Lagoon.

4.2. Capital expenditure

Capital expenditure reflects best estimates following significant work done to date by the preferred bidders for a start on site date of March 2017. Details of the status and breakdown of each of these costs is set out in Appendix C.

	£'m
Marine works	330
Turbine & sluice housings	350
Turbine & power generation	316
Ancillary civils & buildings	70
Other costs	261
	1,327

- The table above reflects the expected cost out-turn following significant levels of engagement with the preferred prime contract bidders. Political uncertainty around the project has resulted in a reluctance by contractors (especially second and third tier) to make the necessary commitment to prepare competitive quotes to meet our need to get firm tender prices. We are confident that once there has been a serious public indication from Government that there is a real project to be delivered we will be able to conclude a competitive process that will deliver these costings. We are not requiring capex protections for Swansea;
- As part of the work over the last six months, we have considered further the optimal configuration of turbines and sluices to minimise the CfD requirement and undertaken further modelling. This has resulted in a reduction in the number of sluices from eight to six but the retention of sixteen turbines; and
- Other costs include risk contingency, The Crown Estate & land costs, design and value engineering, advanced works phase, costs not included elsewhere, and a developer fee to reimburse costs to financial close and compensate for the significant development risk being taken. As part of this Offer, the headline premium within the developer fee has been reduced by £5m and the difference moved into contingency. As part of the strategic future lagoons plan, a further 80% of the remaining developer premium has been allocated to fund the costs of preparing the Cardiff and Newport DCO applications. A further portion of the developer fee will be dedicated to construction equity as required by equity sponsors as part of the Offer.

4.3. Annual Energy Production ("AEP")

As set out in the table below, AEP represents the anticipated power output after electrical losses and availability factors have been deducted. This is derived from detailed tidal power modelling undertaken by Andritz Hydro GmbH which has been validated by Tidal Lagoon Power's in-house team. The Project will benefit from a manufacturer's guarantee on minimum AEP at 542 GWh. However, the Offer is made at 572GWh representing a 30GWh risk accruing to shareholders and the Company.

	GWh
Gross AEP	**623**
Less:	
Availability: 98% of time	(6)
Other losses within contractor control	(12)
Losses outside contractor control	(10)
Target AEP (as per Model)	**595**
Less: risk contingencies	(30)
Gross Minimum AEP	**565**
Less: power imported for pumping	(23)
Guaranteed net Minimum AEP	**542**

The production of the Gross AEP requires the importation of 23GWh of power per annum to optimise generation via pumping.

4.4. Operating expenditure

Operations and maintenance is an area where equity is taking risk due to the lack of any comparable projects against which to bench mark certain costs. The model reflects a number of operational assumptions which have downside risk implications for shareholders.

Operating expenditure has three major components: maintenance of the turbines and structure, general operational costs, and regulatory and business charges.

Initial operational & maintenance budget	**£'000**
Maintenance:	
Turbines	3,486
Marine structures and housings	1,459
Other	633
Periodic (annualised)	1,777
Operations:	
Insurance	2,300
Land	1,700
Other operational costs	1,300
Regulatory & business charges	
TNUoS	1,100
BSUoS	999
Business Rates	1,550
	16,304

- Periodic maintenance covers lagoon dredging, bund wall and turbine hall maintenance, and an electrical & mechanical refurbishment programme for shorter life components based on operational requirements. The Offer assumes that costs are reserved in the three year period prior to being spent rather than a day one sinking fund being established;
- Operational maintenance activities are assumed to be taken in-house once the operational reliability of the turbines has been established (from year 6);
- The land costs are linked to revenue and therefore will flex with the financial structure. The costs above assume a £155/MWh CfD rate and include an assumption regarding the commercial settlement with The Crown Estate which is still subject to negotiation. This may also result in certain costs moving between opex and capex depending upon how the dredging agreement is ultimately resolved.
- BSUoS is assumed to be a pass through cost in line with the generic CfD contract and has been priced at £1.68/MWh as per "The Contracts For Difference (Standard Terms) Regulations 2014 - CfD Standard Terms Notice" issued on 29th August 2014 by DECC. It is assumed this would be revised in line with the latest Notice at the point of signing.
- Business rates are calculated on the basis that the majority of the asset is offshore (beyond the parish boundary) and therefore excluded for rating purposes in line with the preliminary opinion from the Valuation Office;

- The decommissioning cost has been estimated on the basis that the decommissioning plan requires the removal of the turbines and sluices to ensure the free passage of water through the housing structures and the ability for pleasure craft to enter the lagoon. The cost is estimated as £30m in today's values of which £25m would be clawed back from the scrap metal value of the component parts. It is therefore assumed that no reserve is required until towards the end of the asset life. It is assumed that the bund walls will be permanent structures. The plan is still to be agreed with DECC;
- There will be one major refurbishment of turbines at or around year 60. It is assumed that new debt would be raised at that point to cover the costs rather than reserving in advance.

4.5. Contract for Difference

The Offer is made on the basis that a discrete number of changes to the generic CfD are reflected primarily covering:

- Tenor;
- Change in Law & regulations;
- Qualifying shut down events;
- Adverse impact of Business Rates classification; and
- Clarifications of process and definitions.

These changes reflect the long term nature of the project together with this project being the first of its kind and that the financing is more challenging than for established technologies. We have sought to keep such changes to a minimum and the list reflects a significant shift in the Company and shareholders' position and therefore the risk/reward balance, with a number of material asks having been dropped since the previous submission to DECC.

The offer to Government giving best value for money is predicated on a move to the Alternative CfD model. We propose the Alternative CfD can be based on the generic CfD contract. To secure the necessary investment grade rating from agencies in order to achieve a structure that could deliver a 100% CPI equivalent CfD of £95.6/MWh for Swansea and £68.3/MWh for Cardiff tidal lagoon, it will be necessary to have a limited opex protection for certain cost categories.

A summary of the changes and rationale together with a full mark-up of the generic CfD contract is set out at Appendix D.

4.6. Financing assumptions

A number of adjustments have been made to the financing assumptions since the last submission to DECC which has lowered the overall CfD strike price ask but at additional risk to the Company and equity. These include:

- The financing structure now assumes a refinance 12 months post commercial operations date so as to take advantage of short term funding in construction and refinance in operations that reflect the reduce risk profile. However, this introduced refinancing risk for equity providers and is a material move from the preferred funding structure of longer term (30+ year) debt;
- Increased assumed senior debt leverage from 70% to 75%;
- Long term base rate assumption reduced to reflect latest market rates and removing any equity buffer; and
- Long term CPI forecast increased from 2.00% to 2.25%.

4.7. Other

This Offer is predicated on an expectation that:

- The Project will benefit from a Public Benefit Exemption in the event that shareholder loans stop being deductible in full for tax purposes following any changes in law or tax rules (i.e. Base Erosion and Profit Shifting ("BEPS") proposals); and
- Whilst shareholders are willing to take the risks set out in this document, the Offer still requires that any changes in certain Government influenced costs to those assumed in the models are reflected in the final CfD strike price. This principally covers:
  - The Crown Estate, which is still subject to commercial negotiation;
  - Business Rates, where the asset is assumed to be offshore; and
  - Cost implications of the decommissioning plan to be agreed with DECC.

5. Offer

This section describes the scenarios which comprise the Company's 'Best and Final Offer' ("BAFO") to DECC in respect of the required CfD strike price required to deliver the Swansea Bay tidal lagoon project.

5.1. Overview of cases

TLP has prepared a number of proposals as part of its submission to DECC, which are categorised as a "Base Case" offer under a standard CfD contractual structure (both at 35 and 50 years), with a variant.

We have also presented an alternative CfD offer.

The cases presented are summarised in the table below:

No.	Case	Comment	CfD (2012) £/MWh	Subsidy NPV £m	Cross ref.
35 Year CfD					
1a	**Standard**	• Project delivered under standard CfD structure with no other forms of support • 35 year CfD, same as Hinkley Point C	174.5	1,174	
1b	**Standard + RV + Cardiff link**	• Variant of Case 1a assumes Government acquires the project upon CfD expiry (year 35), for a pre-determined residual value ("RV") • RV calculated using the nominal unlevered, pre-tax free cash flow forecast in the post-CfD period, discounted at 6.5% • Capital structure is then optimised to reflect RV buyout • In this case, Government obtains the asset at year 35 and initial equity must therefore earn its return over 35 years • A £175m one-off capital payment from Cardiff lagoon received in 2nd year of operations • Proceeds of Cardiff payment used to prepay a portion of senior debt and equity, reducing overall long term capital servicing requirement	148.9	919	5.2.2 5.2.3
50 Year CfD					
2a	**Standard**	• As per 1a with CfD term of 50 years - considered more appropriate in context of a long-life asset	159.1	1,199	5.2.4
2b	**Standard + RV + Cardiff link**	• Case 1b with a 50 year CfD and RV buy-out at year 50 • In this case, Government obtains the asset at year 50 and initial equity must therefore earn its return over 50 years	140.5	981	5.2.2 5.2.3
Alternative CfD					
3a	**90 year Alternative CfD with £150m Government grant**	• CfD term of 90 years, considered optimal • CfD revenues inflated at 25% of CPI to better match nominal debt service, ensuring a more efficient capital structure over time • CfD contract includes additional support mechanisms to insulate the project from certain risks, in particular cost of debt over time and certain operational period risks (change in law, business rates, exceptional events) • Increased robustness of project risk lowers financing cost • Confidence in long term financing cost and refinancing, allowing construction debt to be raised on short term rates • Equity IRR reduced by 25 bps to reflect risk reduction • £150m Government grant committed at FC and paid through construction to reduce equity capital requirement • VfM maximisation	95.6	649	5.2.4 5.2.5 5.2.6 5.2.7
3b	**90 year Alternative CfD <u>without</u> grant**	• As for Case 3a but with no grant	118.5	833	5.2.5 5.2.6
Cardiff					
4	**90 year Alternative CfD <u>without</u> grant**	• The same case as 3b with allowance for £150m payment to be made to Swansea as a cross subsidy	68.3	1,123	

NPV calculations are provided in order to facilitate comparability between cases given the differing nature of support being explored between scenarios. NPV calculations are based on a real discount rate of 3.5% p.a. and represent the net present value of subsidy payments (CfD less forecast power price plus grants) over the life of the project.

For the Alternative CfD case, the CfD is only partially indexed at 25% (the "X-factor"), in order to incorporate a structural inflation hedge to nominal debt service. However, this consequently results in a higher starting CfD as compared to a 100% CPI-index linked strike price. Therefore, to facilitate comparability, results also headline a "100% index-linking" strike price equivalent, derived by back-solving to the same NPV. This is discussed in more detail below

5.2. Rationale for Variant Cases

5.2.1. Overview

There are six mechanisms utilised by TLSB in its Variant Cases:

- Residual Value buyout;
- Capital payment from Cardiff;
- Longer-term CfD;
- "X-factor" inflation;
- Support mechanism elements taken from comparable long term infrastructure projects; and
- Government grant funding.

5.2.2. Residual Value buyout

As a long life asset, at the end of the CfD term there is genuine economic and social value in the asset, and therefore TLSB has proposed a structure where Government can recognise the long term value in the assets and agree to acquire the assets at a point in the future (e.g. at the end of the CfD term) for a pre-determined residual value. In particular:

- Government agrees to buy the project at an agreed price, subject to certain handback requirements;
- We calculate the RV by discounting the unlevered project cash flows period after the CfD support expires, using DECCs forecast power price and TLSBs forecast operating costs. A discount rate of 6.5% on the nominal cash flows is used, which we understand is representative of the Government discount rate for this type of asset; and
- With sufficient certainty in the buyout amount, a portion of the senior debt in the Project could be left unamortised and paid with a bullet payment out of the buy-out proceeds.

5.2.3. Capital payment from Cardiff

We propose a one-off capital payment of £175m made to the Swansea project and a step down in the CfD strike price upon the successful financial close of Cardiff. Proceeds of payment would be used to prepay a portion of senior debt and equity at refinancing, reducing overall long term capital servicing requirement.

This mechanism includes painshare for equity providers of Swansea to incentivise closing of the Cardiff project. In the event of no Cardiff Tidal Lagoon, the shareholders agree a partial cash sweep from free cash flow from year 35 to pay 50% of this cash amount (£87.5m) to Government.

5.2.4. Longer-term CfD

Swansea Bay Tidal Lagoon will be a long life asset. It will generate electricity for 120 years. It will generate electricity for significantly longer than any existing technology. We have therefore requested a longer CfD tenor.

5.2.5. X-factor inflation

By lowering the level of revenue linked to CPI, the subsidy burden of tidal lagoons as long life assets can be significantly reduced.

Capacity in the project finance market is greatest for nominal debt (i.e. debt balance and payments that do not vary with inflation). However, with a revenue profile that increases 100% with inflation and asset that has low operational leverage, funding with nominal debt can produce an inefficient capital structure especially over the long term. This is because with exponentially increasing Cash Flow Available for Debt Service ("CFADS") and a stable debt level, cover ratios have to increase over time, effectively under-leveraging the asset over the long term.

By reducing the amount of inflation applied to the revenue, the project can better match the CFADS profile to the nominal debt service. This means leverage (measured in terms of cover ratio) is maintained longer through the asset life, and so the capital structure is more efficient.

While the starting revenue (and thus subsidy) is higher under this scenario, over time the subsidy reduces in real terms and overall can provide a significant VfM benefit. In other words, the X-factor approach means that, assuming market prices increase with inflation, then market prices will eventually exceed the CfD price and the project will start paying back to Government.

The table below shows the step down in the CfD under this mechanism.

	Swansea 90yr Modified CfD + grant £/MWh	Swansea 90yr Modified CfD no grant £/MWh	Cardiff 90yr Modified CfD no grant £/MWh
100% equivalent CfD (£2012 / MWh)	**95.6**	**118.5**	**68.3**
2012	*148.4*	*183.9*	*109.8*
Ops yr 1	*134.4*	*166.6*	*96.0*
Ops yr 45	*69.1*	*85.7*	*50.0*
Ops yr 90	*47.6*	*59.0*	*34.9*

5.2.6. Long life project support mechanisms

The Project can be delivered under a structure which incorporates characteristics of the regulated asset base model. Such an approach has recently been employed on the Thames Tideway Tunnel project. We propose a scenario that assumes certain bespoke contractual protections are included in the Swansea CfD contract, similar to the Thames Tideway Tunnel.

Protections included would be allocated based on the most appropriate risk allocation to deliver overall optimal VfM, and for this submission we assume requirements we believe will achieve the following objectives:

- Achieve a BBB/BBB+ credit rating in operations; and
- Provide confidence in the ability to refinance regularly through the asset life.

By achieving these objectives, the project can deliver further value enhancements:

- Construction debt to be raised on short term basis and on short term rates;
- Ability to access capital markets and deliver cheaper debt throughout operations phase; and
- Sustain an optimal capital structure through time, with periodic refinancing managed to coincide with resetting of CfD payments.

For the Alternative CfD structure and in order to achieve an investment grade rating in operations, funders would need the following additional amendments to the CfD contract for Swansea Bay:

- Revenue adjustment for increased costs or loss of revenue for exceptional events during operations phase; and
- Revenue adjustment for changes in the cost of debt in the market over time.

For Swansea Bay, capex protections have not been requested. We have instead assumed and modelled short term debt in construction which we think is available in the market for the unmodified risk profile. However, for larger projects, such as Cardiff, some protection for exceptional events may be required to achieve investment grade and maximise debt capacity in construction (in line with the Thames Tideway Tunnel).

The support mechanisms described in this section are expected to have a material benefit on the ability to finance a pipeline of large projects.

5.2.7. Government capital grant

Grant funding is also proposed in the Alternative CfD cases to help maximise overall Value for Money.

Grant funding being provided to the Project will help deliver Value for Money savings due to the impact on lowering the overall private financing requirement of the Project. Grant funding is most efficient when injected during construction so as to reduce the overall equity requirement, and this is the form of grant proposed by TLSB. In particular:

- Requires upfront commitment by Government;
- Used as first source of finance, thereby reducing the overall funding requirement and by extension the headline CfD price; and
- More efficient on an NPV basis than an overtime subsidy which is used to repay more expensive private capital over longer CfD period.

Grant funding into Swansea Bay Tidal Lagoon can be structured as a fully repayable loan. To be repaid:

- At financial close of Cardiff Tidal Lagoon as a one off payment from Cardiff to Government; or
- Via a painshare mechanism. Cardiff does not reach financial close, Swansea Bay equity investors allow a partial cash sweep from free cash flow from year 35 to repay the grant in full.

6. Appendices:

Swansea

A. Overview of Funding Cases

B. Status of Project Elements
- DCO, Marine Licence & AEMP
- Land including The Crown Estate
- Turbine Machining and Pre-assembly Plant
- Decommissioning Plan
- Supply Chain Plan

C. Capex:
- Construction presentation

D. Revenue:
- CfD Justification Tables
- Contract for Difference mark-up
- Power Management and Agreements

Strategic

E. Management Biographies

F. Organisation Chart

G. Cardiff Lagoon Development
- Environment & Planning
- Construction costs and programme

H. Why Swansea First?

I. Wider Value of UK Tidal Lagoons

J. UK Export Potential

Swansea Bay Tidal Lagoon
Contract for Difference Offer

Appendix A
Overview of funding cases

Dec-15

Page left intentionally blank

1. Case summary table

Item	Case 1a: 35yr Standard CfD	Case 1b: 35yr + RV + Cardiff link	Case 2a: 50yr Standard CfD	Case 2b: 50yr + RV + Cardiff link	Case 3a: 90yr Alternative CfD + grant	Case 3b: 90yr Alternative CfD no grant	Case 4: Cardiff 90yr Alternative CfD no grant
100% equivalent CfD (£/MWh, 2012)	174.5	162.6	159.1	152.9	95.6	118.5	68.3
2012					*148.4*	*183.9*	*109.8*
Ops yr 1					*134.4*	*166.6*	*96.0*
Ops yr 45					*69.1*	*85.7*	*50.0*
Ops yr 90					*47.6*	*59.0*	*34.9*
Step-down CfD[1]	n/a	148.9	n/a	140.5	n/a	n/a	n/a
CfD indexation	100%	100%	100%	100%	25%	25%	25%
CfD term (yrs)	35	35	50	50	90	90	90
NPV of subsidy	1,174	919	1,199	981	649	833	1,123
IRR	12.00%	12.00%	12.00%	12.00%	11.75%	11.75%	11.75%
RV (£m)	-	824	-	1,062	-	-	-
Cardiff payment (£m)	-	175	-	175	-	-	-
Capex (£m)	1,327	1,327	1,327	1,327	1,327	1,327	7,914
Total funding (£m)	1,561	1,561	1,561	1,561	1,509	1,509	8,990
Equity (£m)	370	370	370	370	207	357	2,247
Amenity grant (£m)	20	20	20	20	20	20	-
Treasury grant (£m)	-	-	-	-	150	-	-
Initial debt size (£m)	1,171	1,171	1,171	1,171	1,132	1,132	6,742
Refi debt size (£m)	1,176	996	1,177	999	1,136	1,137	6,881
Initial avg DSCR	1.8x	1.6x	1.6x	1.6x	1.9x	2.5x	2.6x
Refi avg DSCR	2.0x	2.5x	2.3x	2.8x	1.8x	2.6x	2.7x

[1] Step down in CfD post capital payment from Cardiff

2. Detailed funding cases

2.1 Case 1a: 35 year Standard CfD

2.1.1 Key assumptions

The Base Case (and Variant Cases) reflect updated project and financing assumptions from the previous structure provided to DECC. The table below summarises key assumptions in the Case 1a.

Key assumptions[2] – Case 1a

Item	Assumption	Comment
Project Assumptions		
CfD term	35 yrs	— In line with HPC precedent
Capital expenditure	£1,327.1m	— Excludes financing costs during construction — Refer section 4.2 of main submission
Construction period	per programme	— Programme derived by TLSB
Net generation	572 GWh	— Refer section 4.3 of main submission
Initial annual O&M	£16.3m	— Reduced from £17.1m (increased equity risk) — Refer section 4.4 of main submission
Asset life	120 years	— Asset life of 120 years, with replanting taking place at year 50, financed by additional senior debt loan
Inflation forecast	2.25%	— Updated from 2% (increased equity risk)
Capital structure		
Total funding requirement	£1,561m	— Total funding requirement during construction, including all project costs including financing costs / reserve funding etc.
Gearing	75%	— Senior debt is sized to 75% of total funding, increased from 70% (increased equity risk)
Total initial senior debt	£1,171m	— 75% of total funding requirement as above — Assumed short-term commercial bank debt during construction, with capital markets refinancing in year 2 of operations — Refinancing does not assume any re-leveraging
Nominal / CPI-linked	Nominal and CPI linked	— Construction debt assumed to nominal — Refinanced debt nominal and CPI-linked debt to hedge 100% index-linked revenues
Total refinancing debt	£1,178m	— Refinancing debt sized to repay existing senior debt plus refinancing costs (i.e. no re-leveraging) — Refinancing costs of 2% arranging fee (plus other advisory costs)
Total equity	£370m	— Comprised of shareholder loans 90% and pure equity 10%
Drawdown	Pro rata	— Monthly pro rata draw downs from each funding source during construction
Debt		
Debt tail / tenor	2 years before CfD end	— Initial debt refinanced in year 2 of operations with long term capital markets debt — Refinancing debt sculpted over notional amortisation profile, repaid to 2 year CfD tail
Debt margins	150bps	— Reduced from previous assumption based on current market conditions and assumption of short term debt in construction
Base rate	Nominal debt: 2.59% (excl swap	— Long term rates locked in at construction to manage interest rate risk

[2] This is a summary of key model assumptions. A complete assumptions book can be provided on request.

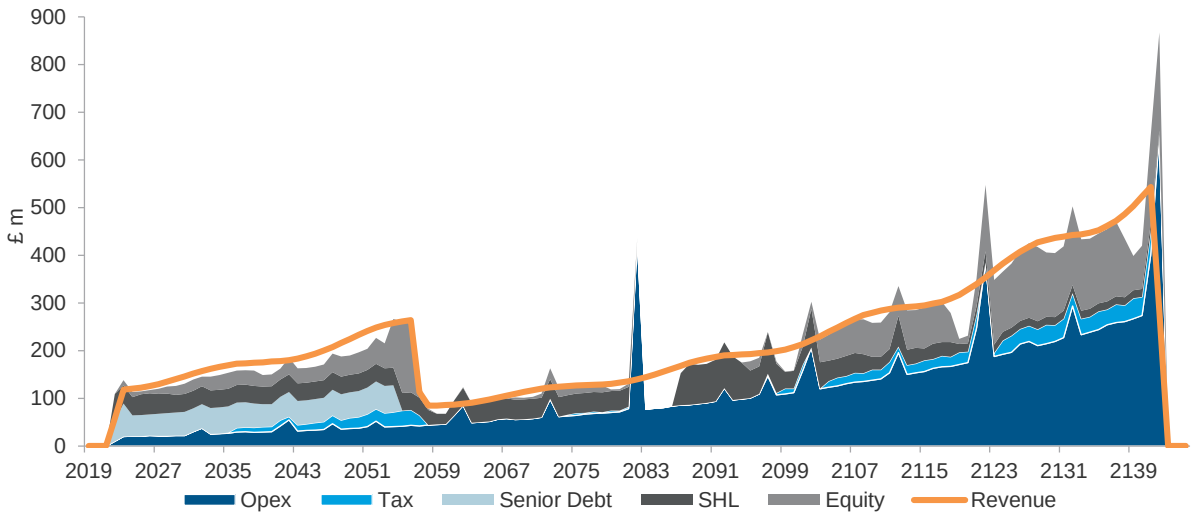
Item	Assumption	Comment
	credit spread where applicable) CPI-linked debt: -0.12%	— Based on current market rates; no buffer included (increased equity risk) — Additional 15bps swap credit margin on initial senior debt (as assumed to be short-term bank debt) — No swap credit margin on refinanced debt as assumed to be capital markets take-out which is provided on fixed-rate basis (no interest rate swap
Equity		
IRR	12%	— Solved to 12%
Investment horizon	60 years	— Period over which IRR is calculated
Other		
Tax deductibility of interest	100%	— 100% of senior debt and shareholder loan interest is deductible — Recent announcements indicate legislation is being considered to limit deductibility of interest ○ Expected deductibility cap of up to 30% of EBITDA ○ Uncertain how this will impact renewable energy transactions — This offer assumes BEPS exemption
Merchant power prices	DECC update – Nov 15	— DECC updated power prices. DECC Energy & Emissions Projections – November 2015 — Generation expenses are assumed to run from flat £71, inflating at CPI
Grant		— £20m assumed for public realm works
Pre-completion revenue		— Net pre-completion revenue paid to equity at end of construction

2.1.2 Key outputs

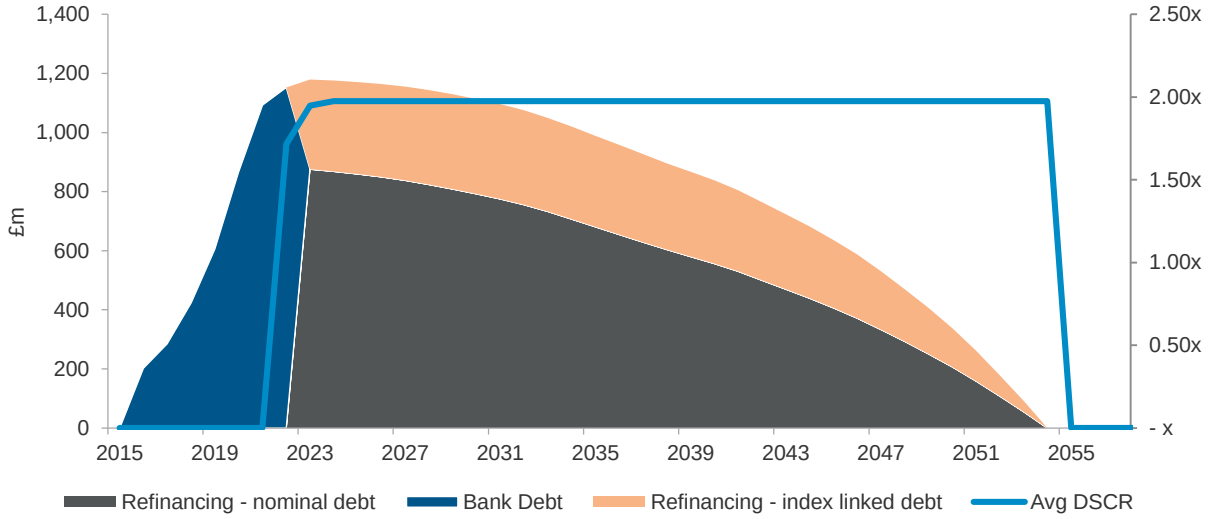
Summary of results: Case 1a

Item	Case 1a: 35 year Standard CfD
Starting CfD (£/MWh, 2012)	174.5
Step-down CfD	n/a
CfD indexation	100%
CfD term (yrs)	35
NPV of subsidy	1,174
IRR	12.00%
RV (£m)	-
Cardiff payment £m)	-
Capex (£m)	1,327
Total funding (£m)	1,561
Equity (£m)	370
Amenity grant (£m)	20
Treasury grant (£m)	-
Initial debt size (£m)	1,171
Refi debt size (£m)	1,176
Initial avg DSCR	1.8x
Refi avg DSCR	2.0x

2.1.3 Project cash flows



2.1.4 Debt profile



2.2 Case 1b: 35 year + RV + Cardiff payment

2.2.1 Key assumptions

This Case uses Case 1a as a starting point.

The case assumes that the Project's senior debt is only partially amortised such that the remaining balance outstanding is equal to the RV at the time of buyback. This allows the Project to sustain a lower WACC over the course of the project, as there is limited de-leveraging.

It further assumes the addition of a £175m capital payment provided to the Project which is financed by, and contingent upon the successful financial close of the Cardiff (or similar) tidal lagoon project. This case assumes the Cardiff payment proceeds are used to pay off senior debt and equity (in proportion to the existing capital structure). The CfD then steps down from the date of the payment to reflect the lower overtime capital servicing requirement.

Key differences in the assumptions of this case are provided relative to the Case 1a assumptions:

Key input changes from Case 1a

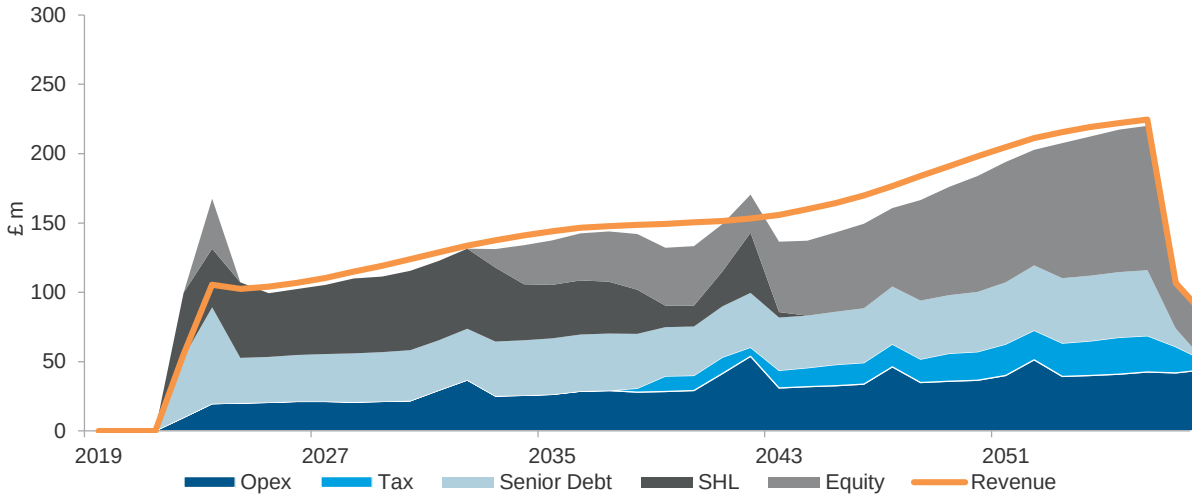
Item	Difference to Case 1a
Residual Value	— £824m (proceeds used to pay down senior debt at year 35)
Debt amortisation	— Partial amortisation so that balance = RV at year 35
Equity investment horizon	— 35 years (limited by buyout period)
Cardiff payment	— £175m Cardiff payment, assumed to be paid in year 2 of operations — Used for prepayment of portion of senior debt and equity

2.2.2 Key outputs

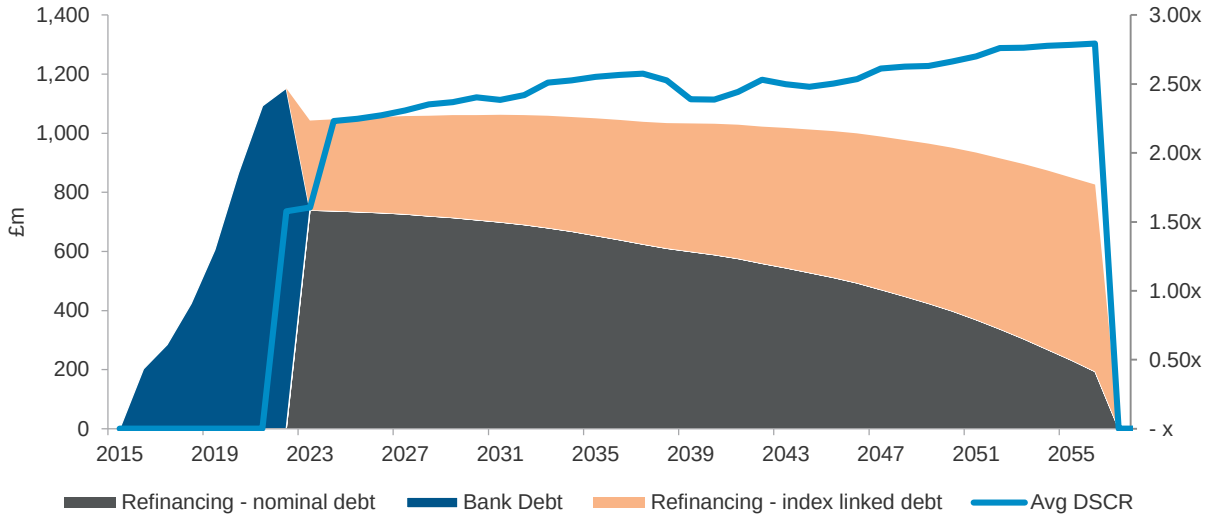
Summary of results: Case 1b

Item	Case 1b: 35 year + RV + Cardiff payment
Starting CfD (£/MWh, 2012)	162.6
Step-down CfD	148.9
CfD indexation	100%
CfD term (yrs)	35
NPV of subsidy	919
IRR	12.00%
RV (£m)	824
Cardiff payment £m)	175
Capex (£m)	1,327
Total funding (£m)	1,561
Equity (£m)	370
Amenity grant (£m)	20
Treasury grant (£m)	-
Initial debt size (£m)	1,171
Refi debt size (£m)	996
Initial avg DSCR	1.6x
Refi avg DSCR	2.5x

2.2.3 Project cash flows



2.2.4 Debt profile



2.3 Case 2a: 50 year Standard CfD

2.3.1 Key assumptions

This is the same as Case 1a but for a longer term CfD and debt structure extended to match. Key differences in the assumptions of this case are provided relative to the Case 1a assumptions:

Key input changes from Case 1a

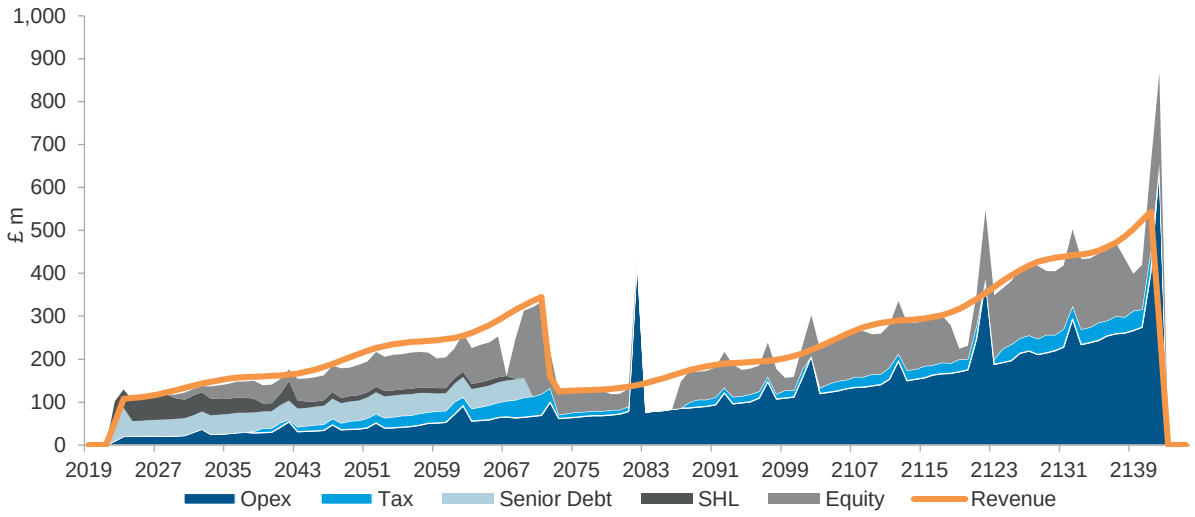
Item	Difference to Case 1a
CfD term	— 50 years
Debt tail / tenor	— As 35 year debt is considered 'tenor ceiling', notional profile implicitly assumes a further refinancing however this is not explicitly modelled

2.3.2 Key outputs

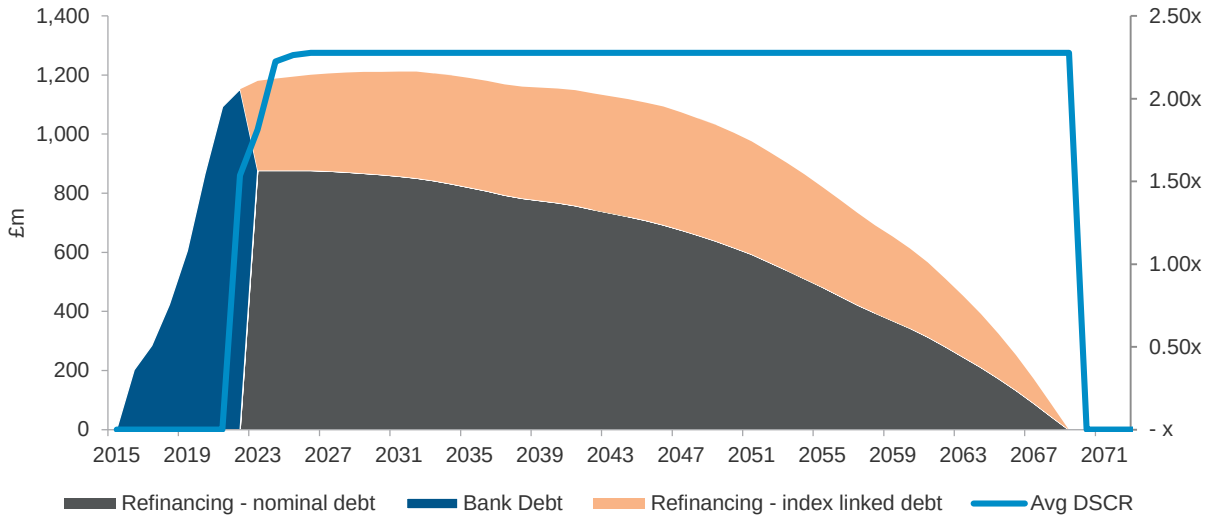
Summary outputs – Case 2a

Item	Case 2a: 50 year Standard CfD
Starting CfD (£/MWh, 2012)	159.1
Step-down CfD	n/a
CfD indexation	100%
CfD term (yrs)	50
NPV of subsidy	1,199
IRR	12.00%
RV (£m)	-
Cardiff payment £m)	-
Capex (£m)	1,327
Total funding (£m)	1,561
Equity (£m)	370
Amenity grant (£m)	20
Treasury grant (£m)	-
Initial debt size (£m)	1,171
Refi debt size (£m)	1,177
Initial avg DSCR	1.6x
Refi avg DSCR	2.3x

2.3.3 Project cash flows



2.3.4 Debt profile



2.4 Case 2b: 50 year + RV + Cardiff payment

2.4.1 Key assumptions

This Case uses Case 2a as a starting point.

The case assumes that the Project's senior debt is only partially amortised such that the remaining balance outstanding is equal to the RV at the time of buyback. This allows the Project to sustain a lower WACC over the course of the project, as there is limited de-leveraging.

It further assumes the addition of a £175m capital payment provided to the Project which is financed by, and contingent upon the successful financial close of the Cardiff (or similar) tidal lagoon project. This case assumes the Cardiff payment proceeds are used to pay off senior debt and equity (in proportion to the existing capital structure). The CfD then steps down from the date of the payment to reflect the lower overtime capital servicing requirement.

Key differences in the assumptions of this case are provided relative to Case 1a:

Key input changes from Case 1a

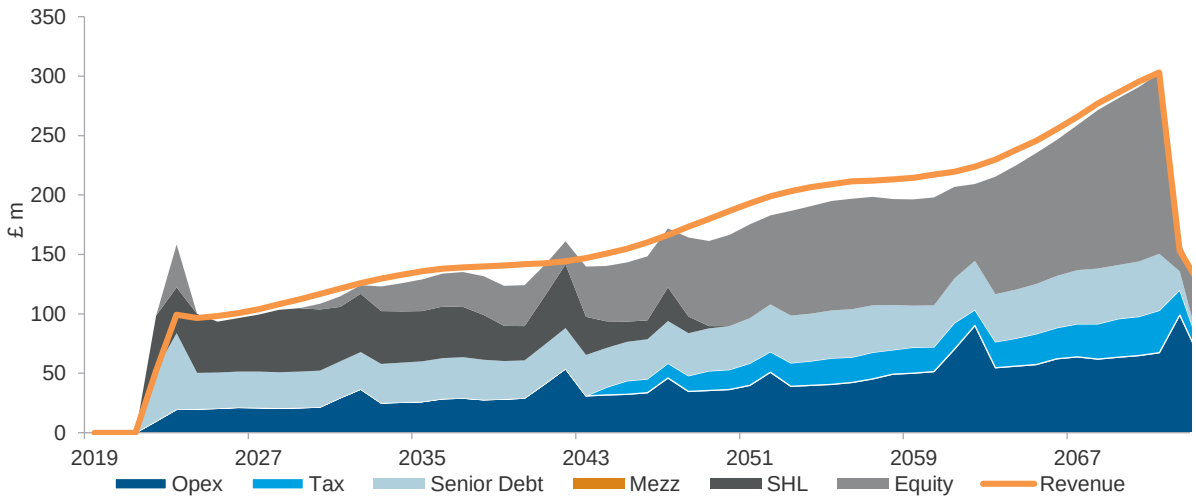
Item	Difference to Case 1a
CfD term	— 50 years
Debt tail / tenor	— As 35 year debt is considered 'tenor ceiling', notional profile implicitly assumes a further refinancing however this is not explicitly modelled
Residual Value	— £1,062m (proceeds used to pay down senior debt at year 50)
Debt amortisation	— Partial amortisation so that balance = RV at year 50
Equity investment horizon	— 50 years (limited to buyout period)
Cardiff payment	— £175m Cardiff payment, assumed to be paid in year 2 of operations — Used for prepayment of portion of senior debt and equity

2.4.2 Key outputs

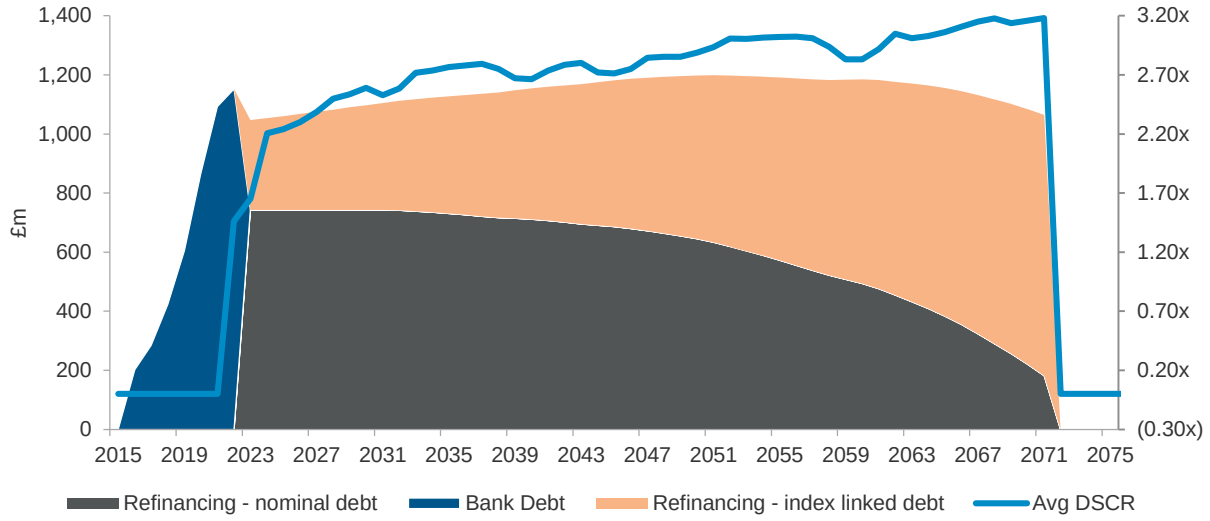
Summary of results: Case 2b

Item	Case 2b: 50 year + RV + Cardiff payment
Starting CfD (£/MWh, 2012)	152.9
Step-down CfD	140.5
CfD indexation	100%
CfD term (yrs)	50
NPV of subsidy	981
IRR	12.00%
RV (£m)	1,062
Cardiff payment £m)	175
Capex (£m)	1,327
Total funding (£m)	1,561
Equity (£m)	370
Amenity grant (£m)	20
Treasury grant (£m)	-
Initial debt size (£m)	1,171
Refi debt size (£m)	999
Initial avg DSCR	1.6x
Refi avg DSCR	2.8x

2.4.3 Project cash flows



2.4.4 Debt profile



2.5 Case 3a: 90 year Alternative CfD + grant

2.5.1 Key assumptions

This Case assumes a 90 year CfD, an "X-factor" inflation approach, and the long term support mechanism outlined in the main submission.

Accordingly the capital structure assumptions for this case are altered to reflect these amendments:

- Construction is assumed to be funded using short-term commercial bank debt, with a capital markets take out into operations
- Implicit assumption that over operational phase of the Project, periodic refinancing can be achieved at pre-defined intervals, with any changes to financing assumptions being offset by corresponding changes in revenues under the CfD

It further incorporates £150m of Treasury grant funding through construction. This grant reduces the projects equity requirement and is used to fund the Project's funding requirement pro-rata with other sources of finance. The intention however is that this amount is repaid out of an equivalent capital payment from Cardiff (which is modelled in the Cardiff Case 4 below).

Reflecting the enhanced risk profile, equity providers are also willing to cut their equity return requirement in this case, to 11.75%.

Key differences in the assumptions of this case are provided relative to Case 1a:

Key input changes from Case 1a

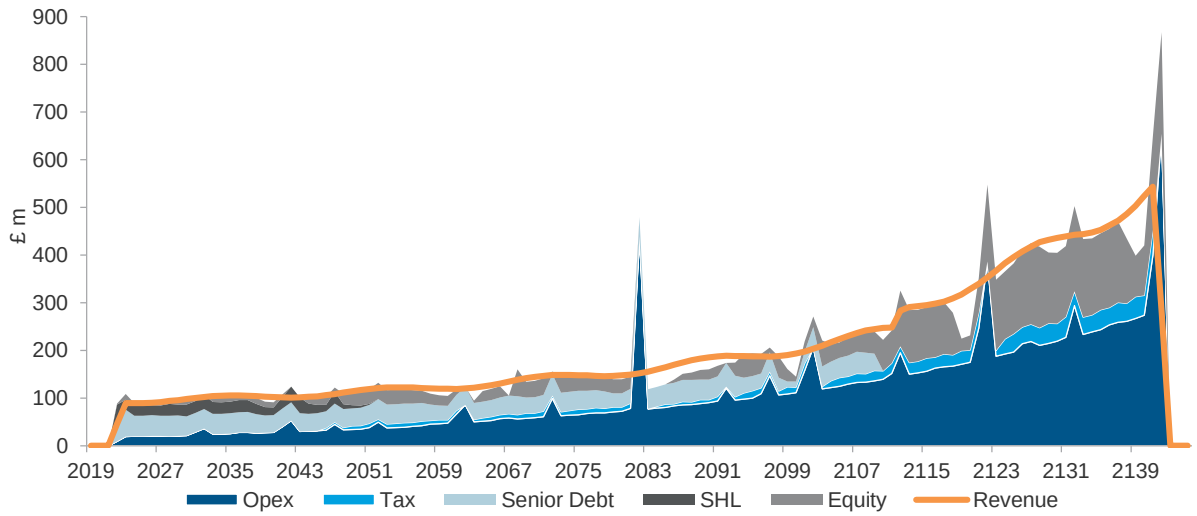
Item	Difference to Case 1a
CfD term	— 90 years
CfD indexation	— 25% index-linked
Capital structure	— Short term construction debt with short term funding rates — Periodic refinancing with managed amortisation of debt towards end of asset life at lower margins of 140bps (modelled as one notional profile)
Equity IRR	— 11.75%
Grant	— £150m grant committed at FC and drawn over construction — Reduces equity capital requirement

2.5.2 Key outputs

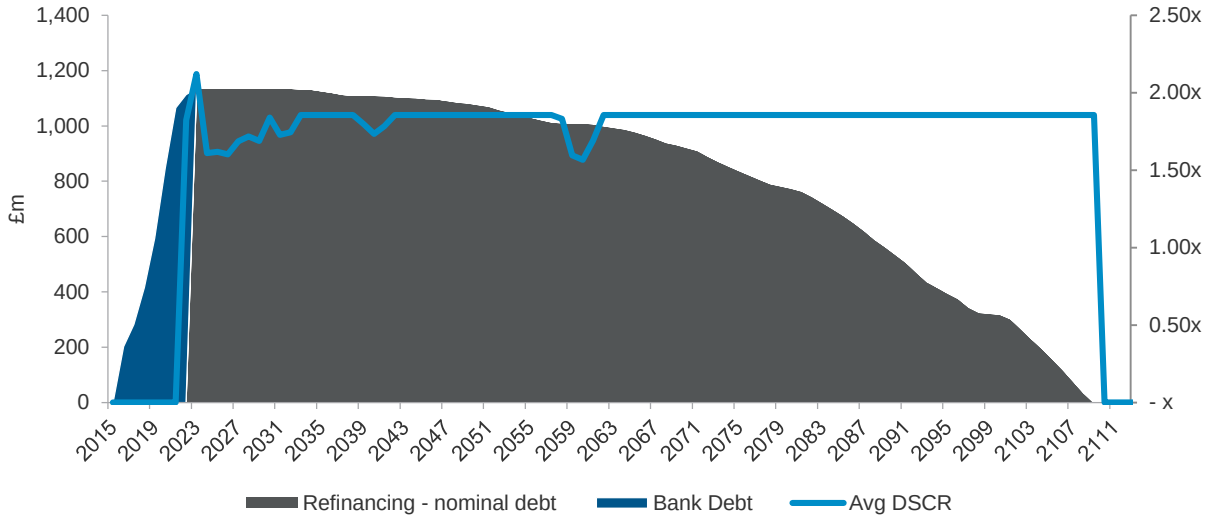
Summary of results: Case 3a

Item	Case 3a: 90 year Alternative CfD + grant
100% equivalent CfD (£/MWh, 2012)	95.6
2012	*148.4*
Ops yr 1	*134.4*
Ops yr 45	*69.1*
Ops yr 90	*47.6*
Step-down CfD	n/a
CfD indexation	25%
CfD term (yrs)	90
NPV of subsidy	649
IRR	11.75%
RV (£m)	-
Cardiff payment £m)	-
Capex (£m)	1,327
Total funding (£m)	1,509
Equity (£m)	207
Amenity grant (£m)	20
Treasury grant (£m)	150
Initial debt size (£m)	1,132
Refi debt size (£m)	1,136
Initial avg DSCR	1.9x
Refi avg DSCR	1.8x

2.5.3 Project cash flows



2.5.4 Debt profile



2.6 Case 3b: 90 year Alternative CfD no grant

2.6.1 Key assumptions

This Case uses case 3a as a starting point. In this case however, no grant is assumed.

Key differences in the assumptions of this case are provided relative to Case 1a:

Key input changes from Case 1a

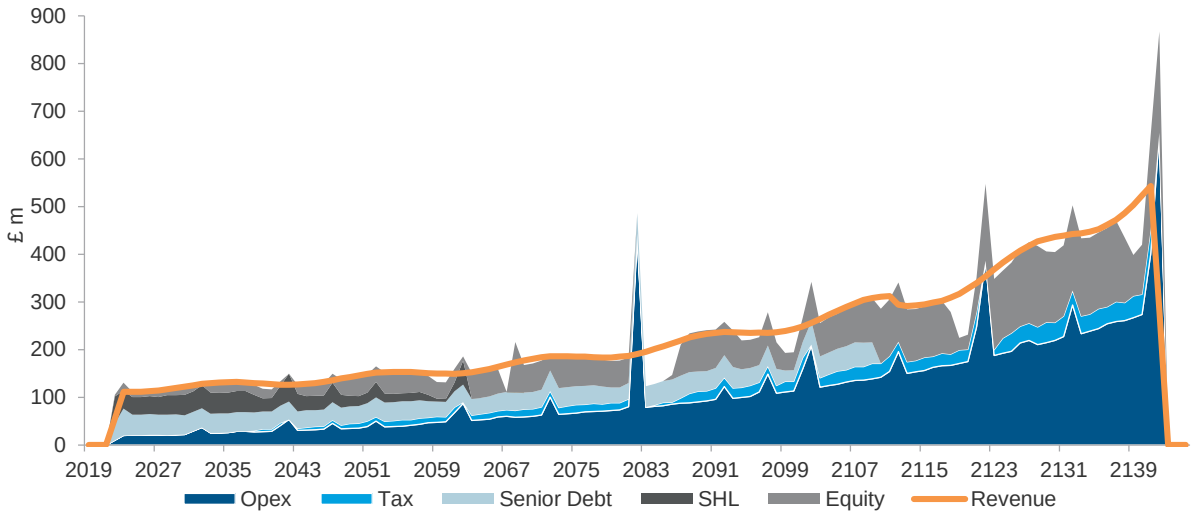
Item	Difference to Case 1a
CfD term	— 90 years
CfD indexation	— 25% index-linked
Capital structure	— Short term construction debt with short term funding rates — Periodic refinancing with managed amortisation of debt towards end of asset life at lower margins of 140bps (modelled as one notional profile)
Equity IRR	— 11.75%

2.6.2 Key outputs

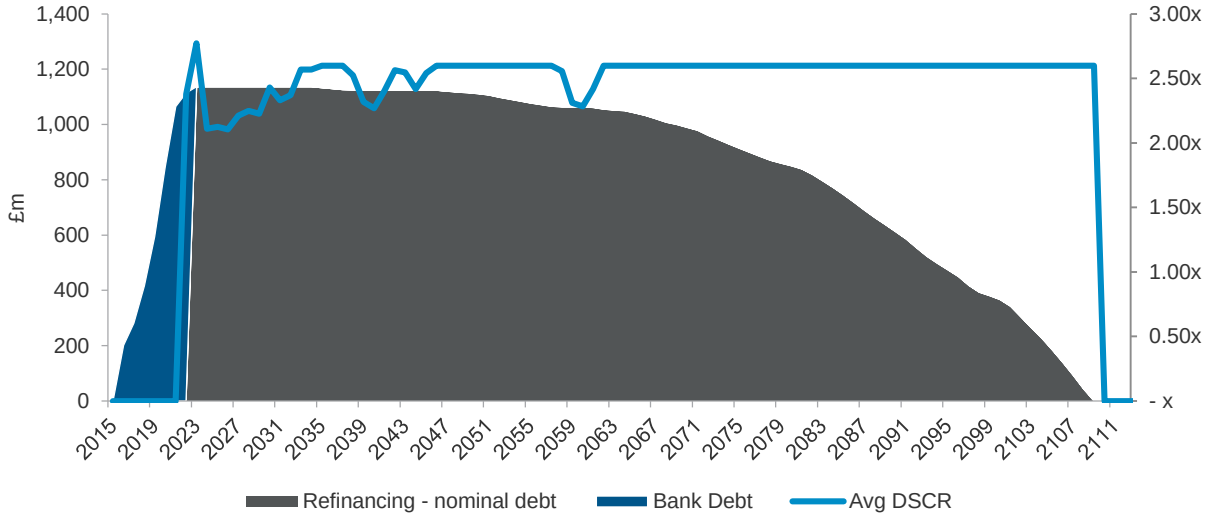
Summary of results: Case 3b

Item	Case 3b: 90 year Alternative CfD no grant
100% equivalent CfD (£/MWh, 2012)	118.5
2012	*183.9*
Ops yr 1	*166.6*
Ops yr 45	*85.7*
Ops yr 90	*59.0*
Step-down CfD	n/a
CfD indexation	25%
CfD term (yrs)	90
NPV of subsidy	833
IRR	11.75%
RV (£m)	-
Cardiff payment £m)	-
Capex (£m)	1,327
Total funding (£m)	1,509
Equity (£m)	357
Amenity grant (£m)	20
Treasury grant (£m)	-
Initial debt size (£m)	1,132
Refi debt size (£m)	1,137
Initial avg DSCR	2.5x
Refi avg DSCR	2.6x

2.6.3 Project cash flows



2.6.4 Debt profile



2.7 Case 4: Cardiff

2.7.1 Key assumptions

This Case uses applies the Case 3b (90 year Alternative CfD without grant) to the Cardiff project. Capex, construction programme, opex and generation assumptions provided by TLSB.

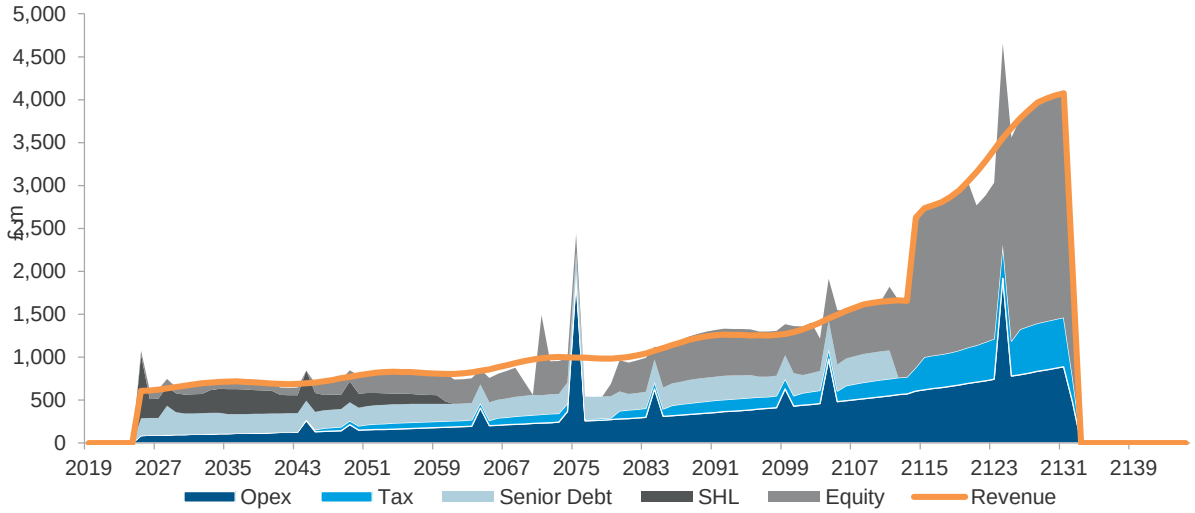
A further £150m is added to the capex (paid upfront) which is a repayment of the grant provided by HMG to Swansea Bay Tidal Lagoon in Case 3a.

2.7.2 Key outputs

Summary of results: Case 4

Item	Case 4: Cardiff
100% equivalent CfD (£/MWh, 2012)	68.3
2012	*109.8*
Ops yr 1	*96.0*
Ops yr 45	*50.0*
Ops yr 90	*34.9*
Step-down CfD	n/a
CfD indexation	25%
CfD term (yrs)	90
NPV of subsidy	1,123
IRR	11.75%
RV (£m)	-
Cardiff payment £m)	-
Capex (£m)	7,914
Total funding (£m)	8,990
Equity (£m)	2,247
Amenity grant (£m)	-
Treasurty grant (£m)	-
Initial debt size (£m)	6,742
Refi debt size (£m)	6,881
Initial avg DSCR	2.6x
Refi avg DSCR	2.7x

2.7.3 Project cash flows



2.7.4 Debt profile