Guidance

Long Duration Electricity Storage Cap and Floor Financial Model Handbook

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The Long Duration Electricity Storage (LDES) Cap and Floor Financial Model (CFFM) handbook explains the purpose, structure, and operation of the LDES CFFM model. It outlines the building-blocks approach used to calculate revenue cap and floor levels, and describes the inputs, calculations, and outputs of each worksheet in the model.

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Contents

1. Purpose of the LDES CFFM

This section sets out the purpose of the LDES CFFM and provides an overview of each section of this handbook and the appendices.

1.1 The purpose of the Long Duration Electricity Storage (LDES) Cap and Floor Financial Model (CFFM) handbook is to provide an overview of the aim, structure and functioning of the LDES CFFM, the underlying building-blocks approach, and the content of each worksheet within the model (in terms of its inputs, calculations and outputs).

1.2 Section 2, 'Introduction to the LDES CFFM', provides a high-level overview of the purpose of the LDES CFFM.

1.3 Section 3, 'Building blocks of the LDES CFFM', explains what the building blocks used in the LDES CFFM are and how they interact with each other to determine revenue cap and floor levels.

1.4 Section 4, 'Relevant documents and inputs data to the LDES CFFM', provides a brief overview of the policy documents that are relevant to the LDES CFFM and of the type and source of input data that are used in the model.

1.5 Section 5, 'High-level overview of the LDES CFFM worksheets', provides a brief overview of the content of each worksheet within the LDES CFFM:

a) Cover;

b) Version Control;

c) Inputs;

d) Data Sources;

e) Pre Op RAV;

f) Finance;

g) Op RAV;

h) Allowances Cap;

i) Allowances Floor;

j) Tax Deductions;

k) Tax Cap;

l) Tax Floor; and

m) Cap Floor Levels.

n) Future Cashflows

1.6 Appendix A.1 provides a detailed overview of the purpose and structure of each worksheet within the LDES CFFM; of the inputs and calculations used within each worksheet; of the outputs produced by each worksheet; and of the interlinkages between different worksheets.

2. Introduction

This section provides a high-level overview of the purpose of the LDES CFFM, which is to provide an estimate of the cap and floor levels for an LDES project based on the input parameters that can be varied by the user. The model also provides a sheet illustrating how future cashflows could be managed after the C&F regime in cases where there is residual value.

2.1 The LDES CFFM is a Microsoft based financial model that is used to determine, for a project-financed LDES projects granted the cap and floor regime:

a) The cap level.

b) The notional floor level.

c) The actual cost of debt (ACOD) floor level.

d) Future cashflows after the C&F contract.

2.2 The cap and floor and floor levels are determined as real-term annuities aimed to limit the upward and downward exposure to merchant risk of the revenue earned by the LDES developer during the operational period.

2.3 The cap level represents the maximum amount of annual revenue that the developer is allowed to retain; any revenue above this level must be shared with consumers as per the soft cap that is implemented by Ofgem.

2.4 The notional floor level represents the minimum amount of annual revenue that the developer is guaranteed to earn. It is based on a notional COD and applied to 100% of the RAV.

2.5 The ACOD floor level represents the minimum amount of annual revenue that the developer can claim to service its debt; any difference between actual and notional floor level is paid to the developer on a temporary basis and needs to be returned to consumers in a net present value (NPV)-neutral way and in line with the requirements set out in a developer's licence.

2.6 The future cashflows represents payments the developer will receive following the end of the C&F regime in cases where the project will be left will some residual value.

2.7 During operations, the cap and floor levels are subject to inflation indexation, incentives, and potential adjustments to reflect changes to operating and decommissioning cost baselines; these are all outside the scope of the LDES

CFFM, which is only used to set preliminary notional cap level, notional floor level and actual floor level.

2.8 The model contains several switches and options for the user to choose in operating the model:

a) The number of operational years for the asset. This can be selected to be up to 40 years provided costs are inputted up to year 40.

b) A 'partial inflation indexation switch' which when switched on means the model calculates the cap and notional floor as two separate annuities. This is to enable fixed-rate debt to be indexed to forecast inflation and the rest of the RAV to be indexed to outturn inflation.

c) An 'IDC delivery incentive switch' which when switched on means the model applies an adjustment to the IDC rate if the project is delivered early or late by a set amount of basis points for every year of early delivery or delay.

3. Building Blocks of the LDES CFFM

This section explains what the building blocks used in the LDES CFFM are and how they interact with each other to determine revenue cap and floor levels; this is also illustrated through the flowchart in Figure 1 for the cap level and notional floor level.

3.1 The cap and floor levels are calculated using a building blocks approach. There are four revenue building blocks to the overall cap and floor levels:

a) Operating expenditure (Opex) and Decommissioning costs (Decom);

b) Depreciation of the Regulatory Asset Value (RAV);

c) Return on the RAV;

d) Tax.

3.2 The first two building blocks (Opex/Decom and depreciation) are common to the cap and the floor, while the other two (return and tax) have different values at the cap and the floor.

3.3 Opex is an estimate of the annual operating expenditure that will be incurred during the operational period; Decom an estimate of the costs that will need to be incurred to decommission the assets at the end of the operational period.

3.4 Depreciation is the annual run-off of the RAV built up during the pre-operational period as the sum of development expenditure (Devex), capital expenditure (Capex), cost of spares, capitalised interest during construction (IDC) and capitalised transaction costs; and during the operational period through the addition of replacement expenditure (Repex).

3.5 The return earned on the RAV depends on the rate of return applied. A higher rate of return is applied at the cap than at the floor.

3.6 Once the first three building blocks have been calculated, they are aggregated to determine pre-tax cap and floor allowances. These are set in real terms and are then inflated to allow for tax calculations, which require nominal inputs.

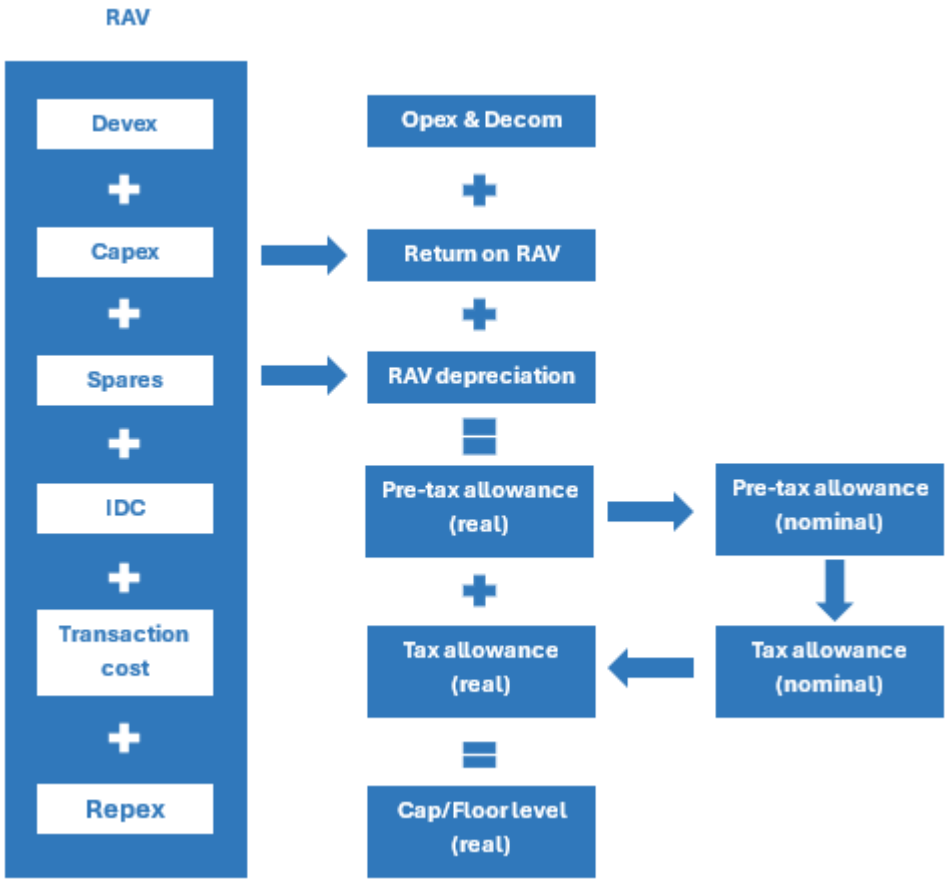
3.7 Cap and floor tax allowances are then calculated in nominal terms relative to pre-tax cap and floor allowances respectively, and subsequently deflated back to real terms so that they can be added to the other three building

blocks previously determined in real terms (Opex/Decom, RAV depreciation and RAV return).

3.8 The overall cap and floor levels are therefore determined as the sum of pre-tax cap and floor allowances and tax cap and floor allowances (all expressed in real terms).

3.9 The flow chart in Figure 1 illustrates this building blocks approach and the key calculations underpinning the cap and notional floor levels.

Figure 1: Building blocks of the LDES CFFM



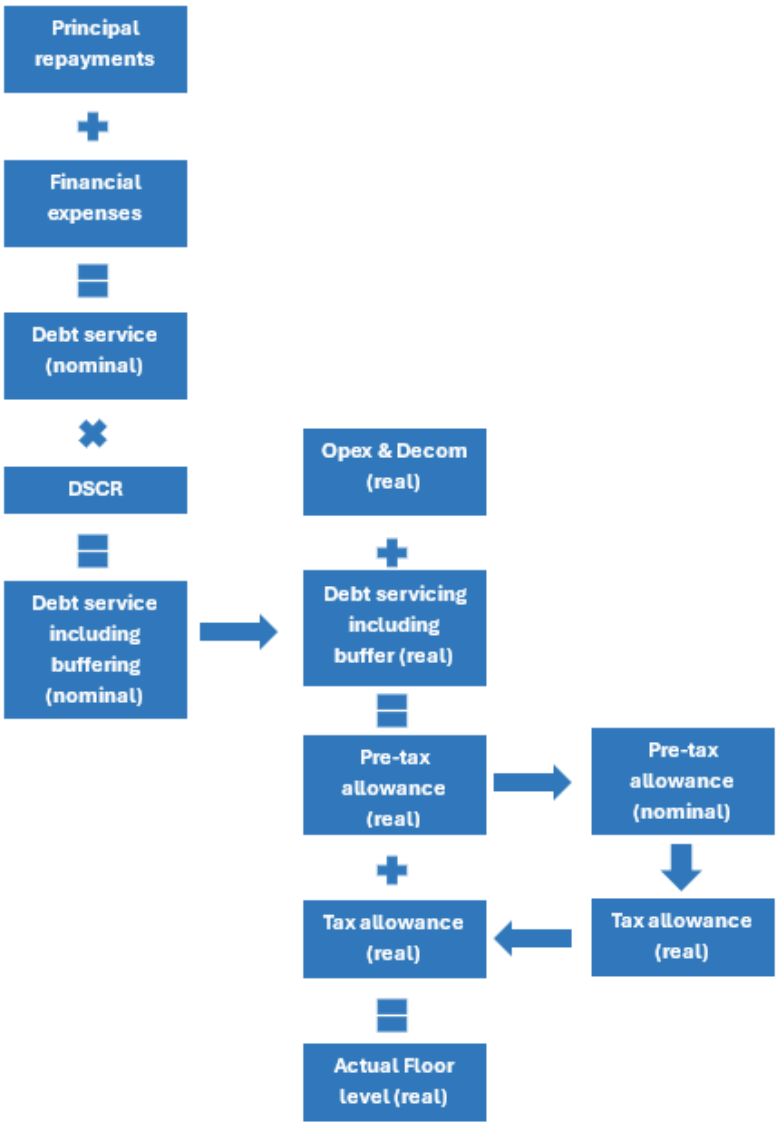
3.10 The flowchart shows how the LDES CFFM calculates the C&F level in real terms. It starts by adding together devex, capex, spares, IDC, transaction costs, and replacement costs. Using this total, it calculates the return on the RAV and RAV depreciation. It then adds operating and decommissioning costs to form the total pre-tax allowance in real terms. From this, the model calculates the pre-tax and tax allowances in nominal terms. Finally, it combines the real-term pre-tax and tax allowances to determine the C&F level in real terms.

3.11 The actual floor level is calculated using the same building block approach but replacing two of the building blocks used to determine the notional floor level (RAV depreciation and return) with an alternative project-finance related building block: debt service (including buffer).

3.12 The pre-tax actual floor allowance is determined as the sum of Opex, Decom (both of which have the same value as in the notional floor), and debt service (including buffer). The tax building block is then calculated as a function of the pre-tax actual floor allowance and is therefore different from the tax building block used to determine the notional floor level.

3.13 The flow chart in Figure 2 illustrates the key calculations underpinning the actual floor level.

Figure 2: Building blocks of the LDES CFFM ACOD floor level



3.14 The flowchart illustrates the building blocks of the LDES CFFM ACOD floor. The process begins by adding principal repayments to financial expenses to calculate the nominal debt service. This nominal debt service is then multiplied by the Debt Service Coverage Ratio (DSCR) to determine the nominal debt service including buffer. Next, this value is converted into real terms by adjusting for inflation. The resulting real debt service including buffer is added to real Opex and Decommissioning costs to calculate the pre-tax allowance in real terms. From this point, the model derives both the pre-tax allowance and the tax allowance in nominal terms. Finally, it adds the real pre-tax allowance to the real tax allowance to arrive at the actual floor level in real terms.

4. Relevant Documents and Inputs Data to the LDES CFFM

This section provides a brief overview of the policy documents that are relevant to the LDES CFFM and of the type and source of input data that are used in the model.

4.1 The LDES CFFM is structured to comply with the licence conditions to which the developer granted the cap and floor regime is subject. Similarly, this handbook (LDES CFFMH) is written to comply with the relevant licence conditions and, where stated, integrate these conditions where the licence does not prescribe a specific approach or calculation.

4.2 In addition to the project's licence, the LDES CFFM and its handbook aim to reflect any relevant policy decision taken during the pre-operational phase of the project, at the:

a) Initial Project Assessment (IPA) stage;

b) Final Project Assessment (FPA) stage, and

c) Post Construction Review (PCR) stage.

4.3 In addition, the LDES CFFM and its handbook aim to reflect policy decision in relation to the financing of projects through project finance.

4.4 Licence conditions, decision documents and other relevant documents (e.g. technical availability models) concur to determine the structure and functioning of the LDES CFFM, the content of this handbook and the value of some of the data inputs used within the model.

4.5 Overall, the LDES CFFM uses inputs from a variety of sources, including submissions from the developer and Ofgem's subsequent assessment of these submissions (e.g. in relation to capital and operating costs) for the purposes of the draft model we have inputted some assumed figures; determinations made by Ofgem in relation to the appropriate value of certain parameters (e.g. cost of capital); and a number of independent external data sources (e.g. inflation).

4.6 The inputs used throughout the model are populated in the 'Inputs' sheet; the sources of these inputs are listed in the 'Data Sources' sheet.

5. High-Level Overview of the LDES CFFM Worksheets

This section provides a brief overview of the content of each worksheet within the LDES CFFM; for a detailed overview of the purpose and functioning of each sheet, please refer to Appendix A.1.

5.1 The LDES CFFM comprises of 13 sheets:

Cover

5.2 The 'Cover' sheet includes a key to interpret the formatting used throughout the model, a brief description of the content of each sheet in the model and a summary of the checks performed throughout the model.

Version Control

5.3 The 'Version Control' sheet contains a log tracking all relevant versions of the LDES CFFM and detailing the changes introduced within each version relative to the previous version.

Inputs

5.4 The 'Inputs' sheet contains all the inputs used throughout the model to calculate the estimated revenue cap, notional floor and actual floor allowances.

5.5 These include all project-finance related inputs.

5.6 All values exported from this sheet to the rest of the model are either inserted manually into the sheet or calculated in the sheet using manually inserted inputs.

Data Sources

5.7 The 'Data Sources' sheet details the sources of all the inputs in the 'Inputs' sheet and provides links to these sources.

Pre Op RAV

5.8 The 'Pre Op RAV' sheet contains the calculations used to build up the Regulatory Asset Value (RAV) during the pre-operational period and determine the final RAV amount at the end of this period, which is then used as a starting point to calculate two of the building blocks of revenue cap and notional floor allowances: RAV depreciation and return on RAV.

5.9 In addition, the 'Pre Op RAV' sheet contains the calculations used to determine eligible costs, which in turn are used to calculate the project-finance related building block of the actual floor allowance, i.e. debt service (including buffer).

Finance

5.10 The 'Finance' sheet contains the calculations used to determine the amount of IDC and transaction costs (including IDC capitalised on transaction costs) that are capitalised into the RAV before the start of the operational period and contribute to determine revenue cap and notional floor allowances.

5.11 In addition, the 'Finance' sheet contains the calculations used to determine, in relation to the project-finance senior debt, the outstanding debt balance on an annual basis (as a function of either senior debt amount or gearing, and drawdown and repayment profiles), which in turn is used to determine financial expenses during construction and operations, and debt service as the sum of financial expenses and principal repayments. Debt service (including buffer) is the project-finance related building block of the actual floor allowance.

Op RAV

5.12 The 'Op RAV' sheet contains the calculations used to carry forward the RAV throughout the operational period and to calculate two of the building blocks of the revenue cap and notional floor allowances: RAV depreciation and return on RAV.

Allowances Cap

5.13 The 'Allowances Cap' sheet contains the calculations used to determine the annual cap allowances (excluding tax) through a building blocks approach and then convert these annual revenue cap allowances into an annuity.

Allowances Floor

5.14 The 'Allowances Floor' sheet contains the calculations used to determine the annual minimum, notional and actual floor allowances (excluding tax) through a building blocks approach and then convert these annual revenue floor allowances into annuities.

Tax Deductions

5.15 The 'Tax Deductions' sheet contains the calculations used to determine the annual amount of tax deductions during the operational period.

5.16 Tax deductions are calculated as the sum of revenue pool additions, capital allowances, interest payable (notional), and debt transaction costs for the revenue cap and notional floor allowances; and as the sum of revenue pool additions, capital allowances, and financial expenses during operations (actual) and debt transaction costs for the actual floor allowance.

Tax Cap

5.17 The 'Tax Cap' sheet contains the calculations used to determine the annual tax allowances at the cap to be added to the revenue cap allowances (excluding tax) and then convert these annual tax allowances into an annuity.

Tax Floor

5.18 The 'Tax Floor' sheet contains the calculations used to determine the annual tax allowances at the floor to be added to the notional and actual floor allowances (excluding tax) and then convert these annual tax allowances into annuities.

Cap Floor Levels

5.19 The annual cap, notional floor, and actual floor allowances (excluding tax) and the annual tax allowances at the cap and floor calculated, respectively, in the 'Allowances Cap/Floor' and 'Tax Cap/Floor' sheets are imported into the 'Cap Floor Levels' sheet and aggregated to determine the overall cap, notional floor and actual floor levels (including tax).

A.1. Detailed Overview of the LDES CFFM Worksheets

1. The purpose of Appendix 1 is to provide a detailed overview of the purpose and structure of each worksheet within the LDES CFFM; of the inputs and calculations used within each worksheet; of the outputs produced by each worksheet; and of the interlinkages between different worksheets.

2. The LDES CFFM comprises 13 sheets:

   a) Cover;

   b) Version Control;

   c) Inputs;

   d) Data Sources;

   e) Pre Op RAV;

   f) Finance;

   g) Op RAV;

   h) Allowances Cap;

   i) Allowances Floor;

   j) Tax Deductions;

   k) Tax Cap;

   l) Tax floor; and

   m) Cap Floor Levels;

Cover

3. The 'Cover' sheet contains three sections:

   a) Model key: a key to interpret the font and fill colours used throughout the model;

   b) Contents: a brief description of the content of each sheet in the model (with hyperlink to the sheets to aid navigation), with colour coding used to group the sheets depending on whether they contain inputs (yellow sheets), calculations (purple sheets) or final outputs of the model (green sheet); and

   c) Checks: a summary of the checks performed throughout the model.

Version Control

4. The 'Version Control' sheet contains a log listing, for each relevant version of the LDES CFFM:

   a) Version number, with any major changes to the model being identified through an increase in integer (e.g. from 1.0 to 2.0) and minor change through an increase in decimal (e.g. from 1.0 to 1.1);

   b) File pathname;

   c) Previous version of the model on which the relevant version is based;

   d) Name of the model author or editor responsible for implementing the changes in the relevant version;

   e) Date on which the relevant version is finalised;

   f) High-level description of the changes implemented;

   g) Rationale for implementing the changes;

   h) Location of the changes within the model;

   i) Impact of the changes on the outputs of the model (if any);

   j) Indication of whether quality assurance (QA) was performed and by whom; and

   k) Any relevant comments relating to QA.

Inputs

5. The 'Inputs' sheet contains all the inputs used throughout the model to calculate the Cap and Floor levels.

6. All values exported from this sheet to the rest of the model are either inserted manually in the sheet or calculated in the sheet using manually inserted inputs.

7. Section **Base year price term** indicates the base year in which the cap and floor values are expressed and therefore the base year to which the cost inputs need to be converted before being exported into the calculation sheets, as the model sets Cap and Floor levels in real terms and in a predetermined base year.

8. Section **Variables set after financial close** contains two sub-sections: 'Actual values' and 'Ex-ante allowances for the operational period'.

9. In sub-section **Actual values**, costs during construction (Development costs, Capex and Spares) are input in rows 15-17 for each relevant calendar year in nominal terms. Row 19 is populated with the relevant UK inflation index in the base year (in column I, 'Constant') and the expected inflation value in each calendar year covered by the model is inputted in row 21.

10. In row 23 an indexation factor is calculated for each year covered by the model.

11. In rows 26-28, the nominal costs input in rows 15-17 are converted from nominal to real terms.

12. Cell I29 allows the user to input the residual value at the end of the operational period. If there is to be no residual value, the number 0 should be inputted by the user.

13. In sub-section **Ex-ante allowances for the operational period**, costs during operations (Replacement Capex, Decommissioning baseline, Controllable Opex and Noncontrollable Opex baseline) are input in real terms (with reference to a base year which is generally different from the base year required to set Cap and Floor levels as indicated in row 6) in rows 35-38 for the operational years of the project (please note these are referred to generically as year 1 to year X, as the exact date on which operations will start might be unknown or subject to change at the time when the LDES CFFM is used).

14. Section **Variables set at financial close** contains four sub-sections: 'Finance', 'Actual cost of debt', 'Model operation', and 'Tax – Operational years'.

15. In sub-section **Finance**, the allowed cap and floor return rates are input into cells I45-46. The cost of debt for tax purposes in cell I46 equals the floor return rate in cell I45.

16. The administrative IDC rate and IDC incentive amount are input into cells I48-49. These are used to calculate the IDC applied based on whether the IDC incentive switch in cell I131 is switched on or off.

17. Pre-operational and operational notional gearing are input in cells I52-53.

18. Equity and debt transaction cost allowances are input in cells I55-56 as percentages to be applied to the Regulatory Asset Value (RAV) transferred from the pre-operational phase into the operational phase.

19. In subsection **Actual cost of debt**, the developer's Project Financial Model (PFM) will be used to select inputs as placeholder numbers to the regulatory model, which will subsequently set the Preliminary Actual Floor Level to match the ACOD floor in the PFM. The numbers currently in the LDES CFFM are placeholder values and not based on a developer PFM.

20. Cell I60 allows a choice in relation to the key project-finance input to be included in the modelling: senior debt amount in cell I61 (option 1) or actual gearing in cell I62 (option 2). The input of senior debt amount (option 1) or actual gearing (option 2) will deliver an ACOD floor matching the floor calculated in the Project Finance Model (PFM) developed by the licensee and its financial advisor for the benefit of the Project Finance lenders, once these inputs are added into the LDES CFFM.

21. The proportion of debt secured by the project at a fixed-rate debt is inputted in cell I64. This is used for the purposes of calculating the cap and notional floor as two separate annuities if the partial inflation indexation switch in cell I129 is switched to 'Yes'.

22. Senior debt tenor and tail requirement (in years) are input in cells I66-68; Debt Service Coverage Ratio (DSCR) sizing in cell I68.

23. Fixed interest rates during construction and operations are input in cells I70-71.

24. Senior debt construction margin (with separate indication of the swap margin), upfront fee and commitment fee are input in dell I73-76.

25. Senior debt drawdown years and profile in terms of regime years are input in rows 78-79.

26. Debt Service Reserve Facility/Account (DSRF/DSRA) amount, upfront fee, construction margin and commitment fee are input in cells I81-84.

27. Cap and Floor Liquidity Facility amount, average outstanding loan, upfront fee, construction margin and commitment fee are input in cells I86-90.

28. Standby Debt Facility amount, upfront fee, construction margin and commitment fee are input in cells I92-95.

29. VAT Facility amount, average outstanding loan, upfront fee, construction margin and commitment fee are input in cells I97-101.

30. Other facilities' amount, upfront fee, construction margin and commitment fee are input in cells I103-106.

31. Cells I108 allows a choice between DSRF and DSRA; cell I109 a choice between notional and actual transaction costs for the purpose of tax calculation.

32. Senior debt repayment years and profile are input in rows 114-115.

33. Operation margins for senior debt (including swap margin), DSRF, Cap and Floor Liquidity Facility, Standby Debt Facility, VAT Facility and other facilities are input in rows 117-122.

34. In sub-section **Model operation**, a number of switches, dates and flags are inputted and calculated.

35. The partial inflation indexation switch in cell I129 that determines whether the model calculates the Cap and Floor as two separate annuities or not. If 'Yes' is selected, fixed-rate debt is annuitised separately to other cashflows and indexed to forecast inflation, with other cashflows indexed to outturn inflation. If 'No' is selected, the model annuitises all cashflows in a single annuity that is indexed to outturn inflation.

36. The IDC delivery incentive switch in cell I131 determines whether the administrative IDC rate in cell I48 is adjusted if the project is delivered early or late. If 'Yes' is selected, the IDC rate is increased by the amount in cell I49 for every year of early delivery or reduced by the amount in cell I49 for every year of delay. If 'No' is selected, the IDC rate applied is equal to the administrative IDC rate regardless of the timeliness of project delivery.

37. Key dates for the model, including the model start date, regime start date, end date for IDC, planned start of operations and actual start of operations are input in cells I133-137. The full years of delivery ahead of or behind schedule delay is calculated in cell I138.

38. The number of operational years is input in cell 142. This is used in conjunction with the key dates inputted in I133-137 to determine the regime, debt and debt tail end dates in cells I139-141.

39. The test in cell I144 checks whether the debt tenor input in cell I66 is shorter than or equal to the period between start of operations in cell I137 and regime end date in cell I139, or whether it is longer than this period; this check is for information purposes only and does not indicate and error or problem with the inputs.

40. In row 146, the number of days in each financial year is calculated.

41. Rows 146-159 contain a number of key flags and counters, determined through formulas applied to the dates and other inputs in the sheet and used throughout the model; the flags and counters in rows 155-159 are project-finance related.

42. In sub-section **Tax – operational years**, annual corporation tax rates and capital allowance rates (to be applied using a declining balance approach) are input in rows 165-166.

43. In sub-section **Tax – inflation**, the expected inflation rate inputted in row 21 is attributed to the appropriate year of the regime. Long-term expected UK CPIH inflation is inputted in cell I173 for the purposes of the cost of debt calculation in the 'Tax_Deductions' tab. UK CPIH uplift from 2024 to the start of the regime is calculated in cell I176.

Data Sources

44. The 'Data Sources' sheet details the sources to all the inputs in the 'Inputs' sheet (yellow or red cells) and, where relevant, provides hyperlinks to these sources.

45. The structure of the sheet is the same as the structure of the 'Inputs' sheet, with the same sections and sub-sections, but a reduced number of rows, as only the rows of the 'Inputs' sheet in which values are input directly (rather than being calculated or imported from other rows) are covered in the 'Data Sources' sheet.

46. For each parameter in the 'Data Sources' sheet, column I shows the relevant row in which the parameter is input in the 'Inputs' sheet; column K is to be populated with a text string describing the source of the data; and column L with a hyperlink to the source of the data (if the data was sourced from an online source).

47. For the purposes of the draft model, many of the data inputs are simply assumptions used for illustrative purposes.

Pre Op RAV

48. The 'Pre Op RAV' sheet contains the calculations used to build up the Regulatory Asset Value (RAV) during the construction period and determine the final amount which is then used as a starting point to calculate two of the building blocks of the revenue cap and notional floor: RAV depreciation and return on RAV.

49. In addition, the 'Pre Op RAV' sheet contains the calculations used to determine eligible costs, which in turn are used to calculate the project-finance related building block of the actual floor allowance, i.e. debt service (including buffer).

50. Section **Flags** contains six flags imported from the 'Inputs' sheet:

a) The 'IDC flag' in row 8 equals 1 when IDC is earned in the entire year (construction year); is between 0 and 1 when IDC is earned for part of the year (i.e. because construction finishes during that year); and equals 0 when no IDC is earned (operational year).

b) The 'Post-IDC and pre-operations flag' in row 9 identifies whether there is a gap between the time when construction finishes (and therefore the project stops earning IDC) and the time when operations start.

c) The 'Operations flag' in row 10 equals 0 during construction years; is between 0 and 1 in a year during which construction finishes and operations start; and equals 1 during full operational years.

d) The 'Transfer construction to operations flag - Notional' in row 11 identifies the year in which the final value of the RAV built up during construction is transferred into the operational RAV to determine the depreciation allowance and return allowance that are included in the revenue cap and notional floor during operations.

e) The 'Transfer construction to operations flag – ACOD' in row 12 identifies the year in which eligible project-finance costs during construction are transfer to operations, i.e. the year in which the debt drawn down to finance these costs starts to be repaid.

f) The 'Financial close flag' in row 13 equals 1 in the year of financial close and 0 in all other years.

51. Section RAV, subsection Pre-operational, contains the calculation used to build up the RAV during construction.

52. Row 19 contains the opening pre-operational RAV (before transfers) for the year, which is equal to zero in the first year and then equals the closing pre-operational RAV (after IDC and adjusted for RAV transfers) in the previous year.

53. In rows 20-22, costs during construction (Development costs, Capex and Spares) are imported from rows 25-27 of the 'Inputs' sheet.

54. In row 23, the capitalised interest during construction is imported from sheet 'Finance'.

55. In row 24, the closing operational RAV (after IDC but before any transfers) is calculated as the sum of the values in rows 19-23.

56. Row 25 determines whether a RAV transfer occurs between pre-operational and operational RAV, by multiplying the closing operational RAV in row 24 by the 'Transfer construction to operations flag - Notional' in row 11.

57. In row 26, the closing pre-operational RAV (after IDC and transfers) is calculated by deducting from the RAV in row 24 the transfers in row 25.

58. Section Actual cost of debt contains three subsections: 'Development costs', 'Pre-operational costs' and 'Eligible costs'.

59. In subsection Development costs, development costs are built up in rows 32-34 before being transferred to the eligible costs balance at financial close via row 35, using the flag in row 13. The calculations in this subsection are similar to those in the 'RAV' section but use cost inputs in nominal terms rather than real terms.

60. In subsection Pre-operational costs, eligible costs are built up during construction in rows 40-45 as the sum of development cost transfers, Capex, cost of spares, DSRA funding and financial expenses during construction. The calculations in this subsection are similar to those in the 'RAV' section but use cost inputs in nominal terms rather than real terms.

61. Subsection Eligible costs contain the workings required to break the circularity emerging from calculating financial expenses during construction. This circularity occurs because the senior debt amount, which is a function of the eligible costs when the gearing option is selected in cell I59 of the 'Inputs' sheet, is a component of the financial expenses during construction, while the eligible costs are also a function of financial expenses (and therefore, a function of the senior debt amount).

62. Eligible costs in row 53 are calculated as the sum of the values in rows 41-45; these have to be copied and pasted as values into row 54 for as many times as is required for the circularity check in cell I57 to signal 'OK' rather than to flag that further 'Copy-Paste' is required.

Finance

63. Section **Flags** contains seven flags, and two counters imported from the 'Inputs' sheet:

a) The 'Post-IDC and pre-operations flag', 'Operations flag', 'Transfer construction to operations flag - Notional', 'Transfer construction to operations – ACOD', and 'Financial close flag' are the same as those in the 'Pre Op RAV' sheet.

b) The 'Regime years' counter in row 10 indicates the years as well as the period count for any given year within the 25-year regime period.

c) The 'Initial transaction costs flag' in row 13 identifies the year in which notional transaction costs are calculated and start being rolled over, earning interest during construction (this is the year immediately before the year in which Capex starts to be incurred).

d) The 'Debt drawdown flag' in row 15 indicates the years in which senior debt is drown.

e) The 'Debt repayment years' counter in row 16 indicates the years as well as the period count for any given year in which debt repayment occurs.

64. Section **Pre-operational interest during construction** contains the calculations used to determine the amount of interest during construction (IDC) that is capitalised into the pre-operational RAV in the 'Pre Op RAV' sheet.

65. In cell I22, the interest during construction rate is imported from the 'Inputs' sheet.

66. In row 24, the opening pre-operational RAV (before transfers) is imported from row 19 of the 'Pre Op RAV' sheet.

67. In rows 25-27, costs during construction (Development costs, Capex and Spares) are imported from rows 26-28 of the 'Inputs' sheet.

68. Row 28 calculates the interest during construction that is capitalised into the pre-operational RAV in the 'Pre Op RAV' sheet, based on the following formula:

$$IDC = IDC\ rate * \left(Opn\ PreOp\ RAV + \frac{Devex + Capex + Spares}{2 + IDC\ rate}\right) * IDC\ flag$$

69. The formula calculates IDC by applying the IDC rate to the NPV at the start of the year of the average RAV during the year, which in turn is calculated by adding to the opening RAV half of the costs incurred during the year, discounted from halfway through the year to the start of the year. The two flags are used to ensure that no IDC is earned between the end of

construction and the start of operations (Flag1) and during operations (Flag2).

70. Section Transaction costs contains two sub-sections: 'Parameters' and 'Allowance'.

71. Sub-section Parameters contains the relevant transaction costs parameters. Pre-operational and operational notional gearing in cells I34-35 are imported from the 'Inputs' sheet.

72. Debt and equity transaction costs rates in cells I37-38 are also imported from the 'Inputs' sheet.

73. Sub-section Allowance contains the calculations used to determine the value of transaction costs (including capitalised IDC on transaction costs) that is added to the RAV at the start of operations.

74. The opening balance of transaction costs in row 42 equals the closing balance in the previous year (from row 50).

75. Initial debt transaction costs in row 43 are calculated by multiplying pre-operational RAV transfers to the operational RAV (from sheet 'Op RAV') by the pre-operational notional gearing in cell I34, by the debt transaction costs rate in cell I37, and by the 'initial transaction costs flag' in row 13.

76. Initial equity transaction costs in row 44 are calculated by multiplying pre-operational RAV transfers to the operational RAV (from sheet 'Op RAV') by one minus the pre- operational notional gearing in cell I34, by the equity transaction costs rate in cell I38, and by the 'initial transaction costs flag' in row 13.

77. Final debt transaction costs in row 45 are calculated by multiplying the final preoperational RAV transfers to the operational RAV (from sheet 'Op RAV') by the difference between operational notional gearing in cell I35 and pre-operational notional gearing in cell I34, by the debt transaction costs rate in cell I37, and by the 'transfer construction to operations flag - Notional' in row 11.

78. Final equity transaction costs in cell I46 are calculated by multiplying the final preoperational RAV transfers to the operational RAV (from sheet 'Op RAV') by the difference between pre-operational notional gearing in cell I34 and operational notional gearing in cell I35, by the equity transaction costs rate in cell I38, and by the 'transfer construction to operations flag – Notional' in row 11.

79. Transaction costs annual movements in row 47 are calculated as the sum of rows 43-46.

80. Capitalised IDC on transaction costs in row 48 is calculated using the same approach and formula as the IDC on construction costs calculated in row 28, but with initial/final debt/equity transaction costs as additions to the opening balance (instead of construction costs).

$$IDC = IDC\ rate * \left(Opening\ balance + \frac{Transaction\ costs}{2 + IDC\ rate}\right) * IDC\ flag$$

81. Transaction costs transfers to the operational RAV in row 49 are calculated as the sum of opening transaction costs balance from row 42, movement in transaction costs from row 47, and capitalised IDC on transaction costs from row 48, multiplied by the 'transfer construction to operations flag – Notional' in row 11.

82. The closing balance of transaction costs in row 50 is calculated as the sum of opening balance (row 42), annual movements (row 47), capitalised IDC (row 48) and transfers to operational RAV (row 49).

83. Section Actual cost of debt contains four subsections: 'Debt balance and reserves', 'Financial expenses during construction', 'Financial expenses during operation' and 'Debt service'.

84. Subsection Debt balance and reserves contains the calculations used to determine the opening and closing senior debt balance.

85. Eligible costs in row 56 are imported from the 'Pre Op RAV' sheet.

86. The senior debt amount in cell I58 is either imported from cell I60 in the 'Inputs' sheet or calculated as the product of eligible costs in row 56 and gearing in cell I59 (depending on the choice selected in cell I55 in the 'Inputs' sheet).

87. The actual gearing level in cell I59 is either imported from cell I61 in the 'Inputs' sheet or calculated as debt amount in cell I58 divided by eligible costs in row 56 (depending on the choice selected in cell I59 in the 'Inputs' sheet).

88. Senior debt drawdown and repayment profiles in rows 60 and 61 are imported from the 'Input' sheet where appropriate using the flags in rows 15 and 16.

89. Rows 63-66 calculate the opening and closing senior debt balance in each year as a function of senior debt drawdowns and repayments in rows 64-65,

which in turn are calculated as the product of the senior debt amount in cell I58 and, respectively, the drawdown and repayment profiles in rows 60-61.

90. In cells I68-74, the amounts of all ancillary facilities (DSRF, Cap and Floor Liquidity, Standby Debt, VAT, others), the average outstanding loan for the Cap and Floor Liquidity Facility, and the average outstanding loan for VAT Facility are imported from the 'Inputs' sheet.

91. Subsection Financial expenses during construction contains the calculations used to determine financial expenses during the construction period as the sum of interest payable, upfront fees and commitment fees for the senior debt and ancillary facilities.

92. In cells I78-83, upfront fees for senior debt and ancillary facilities are imported from the 'Inputs' sheet.

93. In cells I85-92, the fixed rate for the construction period and the construction margins for senior debt (with separate indication of the swap margin) and ancillary facilities are imported from the 'Inputs' sheet.

94. In rows 94-99, total interest rates on senior debt and ancillary facilities are calculated as the sum of the fixed rate in cell I85 and construction margins in cells I86-92.

95. In cells I101-106, commitment fees for senior debt and ancillary facilities are imported from the 'Inputs' sheet.

96. In rows 108-109, upfront fee payable on senior debt and ancillary facilities is calculated, in each year, as the product of debt/facility amount, upfront fee and financial close flag.

97. In row 110, interest payable on senior debt is calculated, in each year, multiplying the sum of opening debt balance and drawdowns in rows 63-64 by the total interest rate in row 94 by the debt drawdown flag in row 15.

98. In row 111, interest payable on ancillary facilities is calculated, in each year, multiplying the average outstanding loan for the VAT facility in cell I73 by the total interest rate in row 98 by the debt drawdown flag in row 15.

99. In row 112, commitment fee payable on senior debt is calculated, in each year, as the product of:

    a) Non-drawn portion of the debt (calculated as debt amount minus opening balance minus debt drawdowns);

b) Relevant margin (calculated as total interest rate minus fixed rate minus swap margin);

c) Commitment fee; and,

d) Debt drawdown flag.

100. In row 113, commitment fee payable on ancillary facilities is calculated, in each year and for each facility, as the product of facility non-drawn amount by construction margin by commitment fee by debt drawdown flag.

101. In row 114, financial expenses during construction are calculated as the sum of upfront fee payables (rows 108-109), interest payables (rows 110-111) and commitment fee payables (rows 112-113) for both senior debt and ancillary facilities.

102. Subsection Financial expenses during operation contains the calculations used to determine financial expenses during the operational period as the sum of interest payable on senior debt and commitment fees on ancillary facilities.

103. In cell I118, the fixed rate for the operational period is imported from the 'Inputs' sheet.

104. In rows 119-123, the operation margins for senior debt (including swap margin) and ancillary facilities are imported from the 'Inputs' sheet and applied based on the debt repayment counter.

105. In rows 125-129, total interest rates on senior debt and ancillary facilities are calculated as the sum of the fixed rate in cell I118 and operation margins in rows 119-123.

106. In cells I131-135, commitment fees for senior debt and ancillary facilities are imported from the 'Inputs' sheet.

107. In row 137, interest payable on senior debt is calculated, in each year, as the product of total interest rate on senior debt by the sum of opening debt balance and debt drawdowns.

108. In row 138, interest payable on the Cap and Floor Liquidity Facility is calculated, in each year, as the product of total interest rate of this facility by the average outstanding loan in cell I70.

109. In row 139, commitment fee payable on ancillary facilities is calculated, in each year and for all facilities, as the product of facility non-drawn amount by operation margin by commitment fee.

110. In row 140, financial expenses during operations are calculated as the sum of interest payable on senior debt, interest payable on ancillary facilities and commitment fee payable on ancillary facilities.

111. Subsection Debt service contains the calculations used to determine total debt service (including buffer).

112. In row 144, principal repayment is set equal to the negative of senior debt repayments in row 65.

113. In row 145, financial expenses during operations are set equal to the values in row 140.

114. In row 146, total debt service is calculated as the sum of the principal repayment and financial expenses.

115. In cell I148, the sizing of the DSCR is imported from the 'Inputs' sheet.

116. In row 150, total debt service including buffer is calculated multiplying total debt service in row 146 by DSCR sizing in cell I148.

117. In row 151, the total debt service including buffer is converted from nominal into real terms using the indexation factor in row 23 of the 'Inputs' sheet.

118. In row 153, the proportion of debt that has been secured at a fixed-rate over for the duration of the debt tenor is imported from the 'Inputs' sheet.

119. In row 155, the total fixed-rate debt service including buffer is calculated by multiplying the total debt service including buffer by the proportion of fixed-rate debt in cell I153.

120. In row 156, the total fixed-rate debt service including buffer is converted from nominal into real terms using the indexation factor in row 22 of the 'Inputs' sheet.

121. In row 160, the DSRA pre-funding is calculated multiplying the 'transfer construction to operations flag – ACOD' in row 12 by the DSRF/DSRA amount in cell I74 of the 'Inputs' sheet, but only if option 2 is selected in cell I56 of the 'Inputs' sheet (otherwise, the DSRA pre-funding is equal to zero).

Op RAV

122. The 'Op RAV' sheet contains the calculations used to update the RAV during the operational period and to calculate two of the building blocks of the revenue allowed during operations: RAV depreciation and return on the RAV.

123. Section RAV, sub-section Operational, contains the calculations used to update the RAV during operations.

124. The opening operational RAV (before transfers) in row 9 is equal to the closing operational RAV in the previous year (row 16).

125. The transfers of transaction costs and pre-operational RAV in cells K10-11 are imported from sheets 'Finance' and 'Pre Op RAV' respectively.

126. The residual value at the end of the regime in cell K12 is imported from the 'Inputs' sheet.

127. Opening operational RAV (after transfers) in row 13 is the sum of rows 9-12.

128. Replacement Capex in row 14 is imported from the 'Inputs' sheet.

129. Depreciation in row 15 is the negative of row 26 'RAV depreciation' from sub-section 'Operational RAV depreciation'.

130. Closing operational RAV in row 16 is the sum of rows 13-15.

131. Average operational RAV in row 18 is the average of opening operational RAV (after transfers) from row 13 and closing operational RAV from row 16.

132. Section Operational RAV depreciation is used to calculate the annual depreciation which is deducted from the opening balance of the operational RAV in section 'RAV', and which is one of the building blocks of the operational revenue cap and floor.

133. The number of operation years in cell I22 is imported from the 'Inputs' sheet.

134. In row 23, a countdown to the end of operations is calculated by setting year 1 equal to the value in cell I22 and then deducting one in each subsequent year.

135. The flag in row 24 checks that the number of remaining years in row 23 is greater than zero and returns 'TRUE' where this is the case.

136. In row 26, an IF statement calculates annual depreciation where the flag is TRUE and return zero where it is FALSE. Annual depreciation is calculated according to a second IF statement: if the countdown in row 23 is equal to 1 (i.e. the last year of operations), then depreciation equals the full residual balance (calculated as opening balance plus replacement Capex in the year); in any other year, depreciation is calculated by dividing the sum of opening operational RAV (after transfers) in row 13 and replacement Capex in row 14 by the number of remaining year in the operational period from row 23.

137. The test in cell I28 checks that total depreciation over the operational period in row 26 equals the sum of total construction costs and capitalised IDC on these costs from rows 20-23 in the 'Pre Op RAV' sheet, total transaction costs and capitalised IDC on these costs from rows 43-46 and 48 in the 'Finance' sheet and total replacement Capex from row 14 in the 'Op RAV' sheet.

138. Section Operational RAV return is used to calculate another one of the building blocks of the operational revenue cap and floor: the return on RAV.

139. Cap and floor return rates in cells I32-33 are imported from the 'Inputs' sheet.

140. Opening operational RAV (after transfers) and closing operation RAV in rows 35-36 are imported from the 'RAV – Operational' section of the sheet.

141. The NPV-neutral return base for the cap and floor in rows 38-39 is calculated by averaging the opening RAV from row 35 and the closing RAV from row 36, with the latest discounted using the discount rate in cells I32-33 (i.e. cap return rate for the cap return base and floor return rate for the floor return base).

142. In rows 43-44, allowed returns at the cap and floor are calculated by multiplying, respectively, the cap return rate in cell I32 by the NPV-neutral cap return base in row 38, and the floor return rate in cell I33 by the NPV-neutral floor return base in row 39.

Allowances Cap

143. The 'Allowances Cap' sheet contains the calculations used to determine the annual revenue allowances (excluding tax) at the cap through a building blocks approach, and then convert these revenue allowances into an annuity. This process involves calculating two separate annuities – one for fixed-rate debt and the other for the remaining RAV allowanced – before combing the two into a total cap to allow for the fixed-rate debt to be indexed to forecast inflation and for the remainder of the RAV to be indexed to outturn inflation.

144. Section Unprofiled allowances except tax (cap) contains three sub-sections: 'Total allowances', 'Fixed-rate debt' and 'Allowances excluding fixed-rate debt'.

145. In sub-section Total allowances all relevant building blocks are imported into rows 10-14 and the aggregated in row 15 to determine the unprofiled (i.e. prior to annuitisation smoothing) total cap allowances (except tax). The relevant building blocks included in the cap allowances are:

a) Controllable Opex in row 10, imported from the 'Inputs' sheet;

b) Non-controllable Opex baseline in row 11, from the 'Inputs' sheet;

c) Decommissioning baseline in row 12, from the 'Inputs' sheet;

d) RAV depreciation in row 13, from the 'Op RAV' sheet; and

e) RAV return at the cap in row 14, from the 'Op RAV' sheet.

146. In sub-section Fixed-rate debt the total fixed-rate debt allowance is calculated by multiplying the total allowance in row 15 by the gearing (cell I19) and proportion of fixed-rate debt (I20). This will display 'N/A' if the 'two separate annuities option' in cell I10 of the 'Inputs' sheet is switched to 'No' (using an IF function).

147. In sub-section Allowances excluding fixed-rate debt is calculated in row 25 by subtracting the fixed-rate debt allowance in row 19 from the total profile allowances in row 15.

148. Section Profiled allowances except tax (cap) contains four sub sections: 'Annuity parameters', 'Fixed-rate debt allowances', 'Remaining RAV allowances', and 'Total allowances except tax'.

149. In sub-section Annuity parameters, the cap return rate and number of operational years are imported into cells I31-32 from the 'Inputs' sheet, and used to calculate the annuity factor for the cap in cell I33 through the following formula:

$$Annuity\ factor = \frac{CapRate}{1-(1+CapRate)^{-(no.of\ op\ years)}}$$

150. The flag in row 35 checks that the progressive year reference in row 4 is within the operational period (i.e. larger than zero and equal to or smaller than the number of operational years set within the 'Inputs' sheet).

151. Row 36 calculates a discount factor to the start of operations, to be used in the following subsection to discount the un-profiled revenue allowances at the cap; this discount factor is calculated according to the following formula:

$$Discount\ factor = (1+CapRate) - year$$

152. In sub-section Fixed-rate debt, the unprofiled revenue allowances calculated in sub-section 'Fixed-rate debt' are discounted, aggregated and reprofiled in the form of an annuity. This will display 'N/A' if the 'two separate annuities option' in cell I10 of the 'Inputs' sheet is switched to 'No' (using an IF function).

153. In row 40, discounted un-profiled allowances are calculated by multiplying the unprofiled allowances in row 21 by the discount factor in row 36.

154. The NPV of the un-profiled allowances is calculated in cell I41 as the sum of all discounted un-profiled allowances in row 40.

155. This NPV is then multiplied by the annuity factor in cell I43 (imported from cell I33) to determine the annual revenue cap allowance in the form of an annuity in cell I45.

156. In row 46, the annual revenue allowance (except tax) at the cap is set equal to the annuity calculated in cell I45.

157. In sub-section Remaining RAV allowances, the steps applied to fixed-rate debt in the previous sub-section are applied to the unprofiled remaining RAV allowances from row 25 to discount, aggregate and reprofile the remaining RAV allowances in the form of an annuity.

158. In sub-section Total allowances except tax, the fixed-rate debt annuity in row 46 and the remaining RAV allowance annuity in row 56 are summed to form the annuity of total allowances (except tax) at the cap in I56. In row 61, the total allowance (except tax) at the cap is set equal to the annuity calculated in cell I60.

Allowances Floor

159. The 'Allowances Floor' sheet contains the calculations used to determine the annual revenue allowances (excluding tax) at the cap through a building blocks approach, and then convert these revenue allowances into an annuity. This process involves calculating two separate annuities – one for fixed-rate debt and the other for the remaining RAV allowanced – before combing the two into a total cap to allow for the fixed-rate debt to be indexed to forecast inflation and for the remainder of the RAV to be indexed to outturn inflation. This is done for the notional floor and ACOD floor.

160. Section **Unprofiled allowances except tax (notional floor)** contains three sub-sections: 'Total allowances', 'Fixed-rate debt' and 'Allowances excluding fixed-rate debt'.

161. In sub-section **Total allowances** all relevant building blocks are imported into rows 12-16 and the aggregated in row 17 to determine the unprofiled (i.e. prior to annuitisation smoothing) total floor allowances (except tax). The relevant building blocks included in the cap allowances are:

    a) Controllable Opex in row 12, imported from the 'Inputs' sheet;

b) Non-controllable Opex baseline in row 13, from the 'Inputs' sheet;

c) Decommissioning baseline in row 14, from the 'Inputs' sheet;

d) RAV depreciation in row 15, from the 'Op RAV' sheet; and

e) RAV return at the floor in row 16, from the 'Op RAV' sheet.

162. In sub-section Fixed-rate debt the total fixed-rate debt allowance is calculated by multiplying the total allowance in row 17 by the gearing (cell I21) and proportion of fixed-rate debt (I22).

163. In sub-section Allowances excluding fixed-rate debt is calculated in row 27 by subtracting the fixed-rate debt allowance in row 23 from the total profile allowances in row 17. This will display 'N/A' if the 'two separate annuities option' in cell I10 of the 'Inputs' sheet is switched to 'No' (using an IF function).

164. Section Profiled allowances except tax (notional floor) contains four sub sections: 'Annuity parameters', 'Fixed-rate debt allowances', 'Remaining RAV allowances', and 'Total allowances except tax'.

165. In sub-section Annuity parameters, the floor return rate and number of operational years are imported into cells J33-34 from the 'Inputs' sheet, and used to calculate the annuity factor for the cap in cell J35 through the following formula:

$$Annuity\ factor = \frac{CapRate}{1-(1+CapRate)^{-(no.of\ op\ years)}}$$

166. In sub-section Fixed-rate debt, the unprofiled revenue allowances calculated in sub-section 'Fixed-rate debt' are discounted, aggregated and reprofiled in the form of an annuity. This will display 'N/A' if the 'two separate annuities option' in cell I10 of the 'Inputs' sheet is switched to 'No' (using an IF function).

167. In row 42, discounted un-profiled allowances are calculated by multiplying the unprofiled allowances in row 23 by the discount factor in row 38.

168. The NPV of the un-profiled allowances is calculated in cell J43 as the sum of all discounted un-profiled allowances in row 42.

169. This NPV is then multiplied by the annuity factor in cell J45 (imported from cell J33) to determine the annual revenue cap allowance in the form of an annuity in cell J47.

170. In row 48, the annual revenue allowance (except tax) at the floor is set equal to the annuity calculated in cell J47.

171. In sub-section Remaining RAV allowances, the steps applied to fixed-rate debt in the previous sub-section are applied to the unprofiled remaining RAV allowances from row 27 to discount, aggregate and reprofile the remaining RAV allowances in the form of an annuity.

172. In sub-section Total allowances except tax, the fixed-rate debt annuity in row 47 and the remaining RAV allowance annuity in row 57 are summed to form the annuity of total allowances (except tax) at the floor in J62. In row 63 the total allowance (except tax) at the floor is set equal to the annuity calculated in cell J62.

173. Section Unprofiled allowances except tax (ACOD floor) uses the same building-block approach and three of the same building blocks (controllable Opex, non-controllable Opex baseline and decommissioning baseline) as section 'Unprofiled allowances except tax (notional floor)', with the only difference being that total debt service including buffer in row 72 replaces the sum of RAV depreciation and return.

174. Section Profiled allowances except tax (ACOD floor) has three sub-sections: 'Annuity parameters during debt tenor', 'Allowances except tax during debt tenor' and 'Allowances except tax during tail period'.

175. Sub-section Annuity parameters during debt tenor uses the same approach to calculate the annuity factor as section 'Profiled allowances except tax (notional floor)', but with the following differences:

a) The discount rate in cell J84 is calculated as the weighted average (based on weights in row 82, calculated using financial expenses during operation from row 140 of the 'Finance' sheet) of the actual cost of debt rates in row 81, which in turn are determined by deflating the nominal rates imported into row 80 from the 'Finance' sheet using expected annual inflation in each year of the regime imported from row 172 of the 'Inputs' sheet; and

b) The annuity factor in cell J86 is calculated as a function of the discount rate in cell J84 and the debt tenor in cell J85 (rather than the number of operational years used to calculate the annuity factor for the notional floor).

176. Sub-sections Allowances except tax during debt tenor and Allowances except tax during tail period use the same annuitisation approach as in section 'Profiled allowances except tax (notional floor)', with the difference that it allocates the resulting annuity only to the years within the debt tenor and tail period, and not to any subsequent years.

Tax Deductions

177. Section **Tax deductions** contains three sub-sections: 'Inflation', 'Total tax deductions – Nominal cost of debt', and 'Total tax deductions – Actual cost of debt'.

178. In sub-section **Inflation**, an CPIH uplift scalar (from the base year to the start of the regime) imported into cell I10 and the expected annual CPIH inflation for each year of the regime is imported into row 11. These are used to calculate the forecast UK inflation uplift in row 13. Inflation forecasts are required because tax calculations must be performed in nominal terms, while the core of the LDES CFFM operates in real terms.

179. In sub-section **Total tax deductions – Notional cost of debt**, the total annual amount of tax deductions during the years of operation are calculated as the sum of the following four components:

a) Revenue pool additions, from row 39 (section 'Tax pools', sub-section 'Revenue pool');

b) Capital allowances, from row 54 (section 'Tax pools', sub-section 'Capital allowance pool');

c) Principal repayment and interest payable, from row 71 (section 'Interest', sub-section 'Net debt'); and

d) Debt transaction costs, imported in real terms from the 'Finance' sheet and inflated using an inflation uplift from the 'Inputs' sheet.

180. In sub-section Total tax deductions – Actual cost of debt, the total annual amount of tax deductions during the debt tenor and tail period (as identified by the flag in row 25) are calculated as the sum of the following four components:

a) Revenue pool additions, from row 39 of the Tax Deductions sheet;

b) Capital allowances, from row 54 of the Tax Deductions sheet;

c) Financial expenses during operation, from row 140 of the Finance sheet, based on the actual debt terms; and

d) Debt transaction costs, linked to the switch in cell I108 of the 'Inputs' sheet, selects between actual debt transactions costs, calculated in rows 108 and 109 of the Finance sheet, and notional debt transaction costs, calculated in row 20 of the 'Tax Deductions' sheet.

181. Section Tax pools contains two sub-sections: 'Revenue pool' and 'Capital allowance pool'.

182. In sub-section Revenue pool, the revenue pool additions are calculated as the sum of controllable Opex and non-controllable Opex baseline, which are imported in real terms from the 'Inputs' sheet and inflated using the forecast inflation uplift in row 13.

183. In sub-section Capital allowance pool, the annual capital allowance rates in row 43 and the number of operational years in cell I44 are imported from the 'Inputs' sheet.

184. In row 46, the opening asset balance brought forward is set equal to the closing balance in the previous year, in row 52.

185. Capex in cell K47 is imported in real terms from the 'Pre Op RAV' sheet and inflated using an inflation uplift from the 'Inputs' sheet.

186. Replacement Capex in row 48 is imported in real terms from the 'Op RAV' sheet and inflated using the forecast inflation uplift in row 13.

187. The tax book value pre-depreciation in row 49 is the sum of rows 46-48.

188. The capital allowances in row 50 are calculated by multiplying the tax book value pre-depreciation in row 49 by the capital allowance rate in row 43, based on a 'declining balance' approach.

189. The write-back allowance in row 51 is calculated as the negative of the residual asset balance after capital allowances in the final year of operations, so that the resulting closing balance in the final year is equal to zero.

190. In row 52, the closing balance carried forward is the sum of rows 49-51.

191. Capital allowances in row 54, which are exported to section 'Tax deductions', sub-section 'Total tax deductions', are calculated as the negative of the sum of capital allowances and write-back allowance in rows 50-51 (as these two lines are populated with negative values, while the figures need to be exported as positive values).

192. **Section Interest – Notional cost of debt** contains two sub-sections: 'Cost of debt' and 'Net debt'.

193. In sub-section **Cost of debt**, real terms cost of debt and expected CPIH inflation rate are imported into cells I60-61 from the 'Inputs' sheet, and used to calculate nominal cost of debt in cell I62 through the Fisher formula:

$$NominalRate = (1 + RealRate) * (1 + InflationRate) - 1$$

194. In sub-section **Net debt**, the number of operational years and the operational notional gearing are imported into cells I66-67 from the 'Inputs' sheet.

195. The flag in row 69 checks that the progressive year reference in row 4 is within the operational period (i.e. larger than zero and equal to or smaller than the number of operational years set within the 'Inputs' sheet).

196. The principal repayment in row 70 is calculated by subtracting the net interest paid in row 71 from the total debt payment in row 72.

197. The net interest paid in row 71, which is then exported into section 'Tax deductions', sub-section 'Total tax deductions', is calculated by multiplying the opening net debt balance in row 74 by the nominal cost of debt rate in cell I62.

198. The total annual debt payment in row 72 is calculated as a fixed annuity according to the following formula:

$$DebtPayment = OpeningDebtYear1 * \frac{CostOfDebt}{1 - (1 + CostOfDebt)^{-no.of\ op\ years}}$$

199. The opening net debt balance in row 74 is calculated, in Year 1, by multiplying the opening pre-operational RAV (in real terms) imported from sheet 'Op RAV' by the notional gearing in cell I67 and inflation uplift in cell I10; in all subsequent years, it is set equal to the closing net debt balance from the previous year (row 76).

200. The principal repayment in row 75 is set equal to the negative of principal repayment in row 70 in years in the operational period, and equal to the negative of the opening net debt balance in row 74 in the final year of operation (using an IF statement).

201. The closing net debt balance in row 76 is the sum of rows 74-75.

202. Debt payment calculations are set up in the way described above to avoid circularities.

Tax Cap

203. The 'Tax Cap' sheet contains the calculations used to determine the annual tax allowances at the cap to be added to the revenue cap allowances (excluding tax), and then convert these annual tax allowances into an annuity.

204. Section **Unprofiled tax allowance (cap)** has three sub-sections: 'Profits attributable to corporation tax', 'Tax losses', and 'Tax allowance'.

205. In sub-section **Profits attributable to corporation tax**, annual tax deductions (row 13) are imported from the 'Tax Deductions' sheet and deducted from the revenue allowances at the cap (row 12), which are imported from the 'Allowances Cap' sheet and inflated using the inflation uplift in row 12 of the 'Tax Deductions' sheet, to determine the annual level of profit attributable to corporation tax (row 14).

206. The flag in row 11 checks that the progressive year reference in row 4 is within the operational period (i.e. larger than zero and equal to or smaller than the number of operational years set within the 'Inputs' sheet).

207. Sub-section **Tax losses** is used to calculate the balance of losses that are carried forward into subsequent years and netted off the profits attributable to corporation tax for years within the operational period.

208. In row 18, the opening balance of taxable losses brought forward is set equal to the closing balance of taxable losses in the previous year (row 21).

209. In row 19, in-year taxable losses are set equal to profits attributable to corporation tax in row 14 if these are negative, or equal to zero if these are positive (using a MIN function).

210. In row 20, profits used to offset losses are set equal to zero if profits attributable to corporation tax (row 14) are negative or, if these are positive, equal to the smaller of profits attributable to corporation tax and the negative of the opening balance of taxable losses brought forward in row 18 (using an IF statement and a MIN function).

211. In row 21, taxable losses carried forward into the next year are calculated as the sum of rows 18-20.

212. Sub-section **Tax allowance** is used to calculate the un-profiled tax allowances at the cap (row 31).

213. In row 25, profits attributable to corporation tax (after taxable losses) are set equal to the difference between profits attributable to corporation tax in row 14 and profits used to offset tax losses in row 20 if this difference is positive, or equal to zero if this difference is negative (using a MAX function).

214. In row 26, the corporation tax rate is imported from the 'Inputs' sheet.

215. In row 27, corporation tax charges after losses are calculated by multiplying profits after losses from row 25 by the corporation tax rate in row 26.

216. The tax grossing-up factor in row 29 is calculated using the corporation tax rate in row 26 and the following formula:

$$Grossing - up\ factor = \frac{1}{1 - Corporation\ tax\ rate}$$

217. In section **Profiled tax allowance (cap)**, the annual un-profiled tax allowances calculated in section 'Unprofiled tax allowances (cap)' are deflated, discounted, aggregated and re-profiled in the form of an annuity.

218. In row 35, nominal tax allowances are deflated to real term equivalents using the inflation uplift in row 12 of the 'Tax Deductions' sheet.

219. In row 38, discounted un-profiled allowances are calculated by multiplying the deflated unprofiled allowances from row 35 by the discount factor in row 36, which is imported from the 'Allowances Cap' sheet.

220. The NPV of the un-profiled allowances is calculated in cell I39 as the sum of all discounted un-profiled allowances in row 38.

221. This NPV is then multiplied by the annuity factor in cell I41 (imported from the 'Allowances Cap' sheet) to determine the annual tax allowance at the cap in the form of an annuity in cell I43.

Tax Floor

222. The 'Tax Floor' sheet contains the calculations used to determine the annual tax allowances at the floor to be added to the revenue cap allowances (excluding tax), and then convert these annual tax allowances into an annuity.

223. Section Unprofiled tax allowance (notional floor) has three sub-sections: 'Profits attributable to corporation tax', 'Tax losses', and 'Tax allowance'.

224. In sub-section Profits attributable to corporation tax, annual tax deductions (row 13) are imported from the 'Tax Deductions' sheet and deducted from the revenue allowances at the floor (row 12), which are imported from the

'Allowances Cap' sheet and inflated using the inflation uplift in row 12 of the 'Tax Deductions' sheet, to determine the annual level of profit attributable to corporation tax (row 14).

225. The flag in row 11 checks that the progressive year reference in row 4 is within the operational period (i.e. larger than zero and equal to or smaller than the number of operational years set within the 'Inputs' sheet).

226. Sub-section Tax losses is used to calculate the balance of losses that are carried forward into subsequent years and netted off the profits attributable to corporation tax for years within the operational period.

227. In row 18, the opening balance of taxable losses brought forward is set equal to the closing balance of taxable losses in the previous year (row 21).

228. In row 19, in-year taxable losses are set equal to profits attributable to corporation tax in row 14 if these are negative, or equal to zero if these are positive (using a MIN function).

229. In row 20, profits used to offset losses are set equal to zero if profits attributable to corporation tax (row 14) are negative or, if these are positive, equal to the smaller of profits attributable to corporation tax and the negative of the opening balance of taxable losses brought forward in row 18 (using an IF statement and a MIN function).

230. In row 21, taxable losses carried forward into the next year are calculated as the sum of rows 18-20.

231. Sub-section Tax allowance is used to calculate the un-profiled tax allowances at the cap (row 31).

232. In row 25, profits attributable to corporation tax (after taxable losses) are set equal to the difference between profits attributable to corporation tax in row 14 and profits used to offset tax losses in row 20 if this difference is positive, or equal to zero if this difference is negative (using a MAX function).

233. In row 26, the corporation tax rate is imported from the 'Inputs' sheet.

234. In row 27, corporation tax charges after losses are calculated by multiplying profits after losses from row 25 by the corporation tax rate in row 26.

235. The tax grossing-up factor in row 29 is calculated using the corporation tax rate in row 26 and the following formula:

$$Grossing - up\ factor = \frac{1}{1 - Corporation\ tax\ rate}$$

236. In section Profiled tax allowance (notional floor), the annual un-profiled tax allowances calculated in section 'Unprofiled tax allowances (floor)' are deflated, discounted, aggregated and re-profiled in the form of an annuity.

237. In row 35, nominal tax allowances are deflated to real term equivalents using the inflation uplift in row 12 of the 'Tax Deductions' sheet.

238. In row 38, discounted un-profiled allowances are calculated by multiplying the deflated unprofiled allowances from row 35 by the discount factor in row 36, which is imported from the 'Allowances Cap' sheet.

239. The NPV of the un-profiled allowances is calculated in cell I39 as the sum of all discounted un-profiled allowances in row 38.

240. This NPV is then multiplied by the annuity factor in cell I41 (imported from the 'Allowances Cap' sheet) to determine the annual tax allowance at the cap in the form of an annuity in cell I43.

241. Section Unprofiled tax allowance (ACOD floor) has the same three sub-sections ('Profits attributable to corporation tax', 'Tax losses', and 'Tax allowance') and uses the same approach and calculations as section 'Unprofiled tax allowance (notional floor)'.

242. Similarly, section Profiled tax allowance (ACOD floor) uses the same approach and calculations as section 'Profiled tax allowance (notional floor)'. The only difference between how the tax allowances for the notional and ACOD floor are calculated is in relation to the following input values:

a) Annuitized allowances except tax (floor) and tax deductions in rows 12-13 for the notional floor and 51-52 for the ACOD floor;

b) Discount factor to start of operational period (floor) in rows 36 for the notional floor and 75 for the ACOD floor; and

c) Annuity factor (floor) is cell I41 for the notional floor and cell I80 for the ACOD floor.

Cap Floor Levels

243. The annual cap and floor annuities (excluding tax) and the annual tax allowances at the cap and the floor calculated throughout the model are imported into the 'Cap Floor Level' sheet and aggregated to determine the overall cap and floor levels (including tax) in real prices.