Transmission Price Control Review

Documentation on the Financial Model

December 2006

CONTENTS

1.0 Introduction

1. Ofgem uses two financial models to perform the calculations necessary for setting price controls for the electricity and gas Transmission companies. One model is used for electricity companies, the other for gas. These models have been originated using a Microsoft Excel workbook.
2. These financial models calculate allowed revenues and a range of financial ratios for each of the companies. Forecasts in these models focus on the period 1 April 2007 – 31 March 2012, but the models also produce data up to the year 2037.
3. The purpose of this manual is to:

- give an overview of the structure of the financial models used for the Transmission price control review 2007-12
- explain the underlying principles and assumptions adopted in the financial models
- provide an explanation of logic used in performing the calculations

4. Nothing in this manual represents a policy stance taken by Ofgem and the relevant price control documentation should be consulted where information is sought on Ofgem policies.
5. If you would like to comment on these financial models, written comments are preferred and should be sent to:

Paul O'Donovan
Networks Directorate
Ofgem
9 Millbank
SW1P 3GE

email: paul.odonovan@ofgem.gov.uk

tel: 020 7901 7414

2.0 Model overview

1. Ofgem has developed two financial models for the calculations necessary for setting price controls for the electricity and gas transmission companies. However, both the structure and the underlying basis of the calculations is the same in these models.
2. The reasons for developing two models rather than one were:

- whereas there is a large degree of commonality between the calculations, both industries have issues that are unique to their situation. It was considered to be more transparent to model these in separate models, rather than one more complex model.
- having distinct models for each industry makes it easier for end users to access the data they are interested in without having to make choices about disabling options that are not relevant to their sector

3. Given that the underlying structure and assumptions are the same for both models, this document will refer to the generic model structure as if there were just one model. Any specific differences in the content or calculations of the sector-specific models will be highlighted as necessary.
4. The purpose of the models is to calculate regulatory revenues for the transmission licensees under the forecast operational conditions (as indicated by the model data inputs). It does not attempt to replicate primary accounting statements of the type lodged at Companies House. Any references to Profit & Loss account, Balance Sheet and Cash Flow should be considered as referring to regulatory forms of these accounting statements, rather than GAAP compliant versions.
5. The general model structure comprises of a cover sheet, input sheets, calculation sheets and output sheets. Company specific data is held in a series of company specific input sheets, while generic input data (such as inflation projections, cost of capital components are held on a “main” input sheet.
6. The user selects the company to be analysed using a drop down menu, and then this company’s data is automatically replicated on the main input sheet. The calculation sheets use the main input sheet as their data source, and the output sheets extract the key results of the calculations into pre-formatted tables.
7. There are several other drop-down menus on the UserInterface sheet to select/deselect options which impact on the revenue calculation.
8. The worksheets make extensive use of range names and variable names in order to make formulaic calculations as readable as possible.
9. The calculation sheets have been designed with the following principles in mind:

- all formulae are replicated across any given row, ie the formula in column “E” is the same as that in columns “F”, “G”, etc. The sole exception to this is rows 51 – 56 of the “PostTaxRev” sheet, where the intermittent nature of the calculation makes this impractical
- there are no hidden constants in the formulae, so any variables that affect the output should only need to be changed in the input sheet(s)

10. The model contains one Visual Basic for Applications (VBA) module, which performs two tasks:

- it makes any necessary financing adjustments to regear the selected company to the notional gearing level, if this option is selected
- it uses the Excel goal-seek functionality to derive the tax component of the licensee's revenue allowance

11. The following sections of this manual discuss the structure, content and logic of the cover sheet, input sheets, calculation sheets and output sheets.

3.0 Common issues across Licensees

3.1 Cover sheet

1. The cover sheet has the following functions:

- to inform the user as to the purpose of the model
- to inform the user of the conventions used in the model
- to provide a contact for the user for queries and comments
- to display appropriate warnings to users, indemnifying Ofgem from users who rely on the model outputs

2. The cover has three areas of text:

- a note describing the purpose of the model
- a note on the conventions used when displaying data in the model
- a note indemnifying Ofgem from the consequences of use of the model

3.2 UserInterface sheet

1. The UserInterface sheet is where the user selects the options for running the model. The options for running the model are presented through a series of drop-down lists. These are:

- the company selection list
- the "base year" selection list
- the regearing switch

2. The electricity model has the following additional drop-down lists:

- include/exclude TIRG
- advance TIRG depreciation/leave as normal
- accelerate RAV depreciation/leave as normal
- include/exclude revenue drivers
- revenue driver scenario selection

3. The gas model has the following additional drop-down lists:

- include/exclude gas entry revenue drivers
- include/exclude gas exit revenue drivers
- exit revenue driver scenario selection

4. The electricity model has the additional option to input an amount of equity in nominal terms over any of the years 04/05 – 13/14, in order to determine its effect on the financial ratios of the company being analysed.
5. The user selects the options required from the drop down lists (and inputs equity in the electricity model as required), then clicks on the "Iterative Tax Calculation" button to calculate revenue allowances under that scenario. The user is then taken to the output sheet where the resulting allowances are presented in the format as used in Ofgem's price control proposals documents.
6. The list boxes all come from the "Forms" toolbar, so their functionality is governed by Excel's inbuilt controls (rather than being programmable ActiveX components).

3.3 Common Drop-down lists

3.3.1 Company selection list

7. This list is used to select the company to be analysed. The electricity model has four options; Scottish Hydro Electric Transmission Limited (SHETL), Scottish Power Transmission Limited (SPTL), National Grid Electricity Transmission Limited – Transmission Owner (NGET_TO) and National Grid Electricity Transmission Limited – System Operator (NGET_SO). The gas model has two options; National Grid Gas Transmission Limited – Transmission Owner (NGGT_TO) and National Grid Gas Transmission Limited – System Operator (NGET_SO).
8. The options for inclusion in this list are given from row 30 onwards, with the cell immediately below the list giving the selected element's relative position in the list (these are the "input cells" and "cell link" elements of the drop-down list's format control properties).

9. When a company is selected from the drop-down list, the resulting cell link value is used by a CHOOSE function in the main input page to determine which company specific input sheet to use for its source data.

3.3.2 Base year selection list

10. During the price control process, Ofgem uses normalised costs (ie costs on a constant price basis) for conducting its operating costs expenditure (Opex) and capital expenditure (Capex) analysis. This is done to facilitate the direct comparison of costs across a number of years.

11. For the Transmission Price Control Review 2007-12, the base-year for normalisation is 2004-05. Accordingly, much of the company specific input data is in 2004-05 prices.

12. The base year selection list allows for the conversion of model calculations and outputs to prices in years other than 2004-05.

13. By default, the base year is 2004-05. Changing this option changes the value of the variable BaseRPI on the main input sheet, and consequently, the value of all dependent values.

3.3.3 Regearing switch

14. Ofgem's assumption on the weighted cost of capital used in the price control is that the licensees start off the control period at a notional gearing level. This notional level is stated in the main input sheet as the variable "Gearing". Please note that in this regulatory environment, gearing is evaluated as (Net debt)/(Regulated asset value [RAV]).

15. The financial model allows for the calculation of revenue allowances either by using the company's actual gearing level as of 31 March 2007, or by making an adjustment to the company's debt position in order to bring it to the required level (all of the licensees are forecast to be under-geared with respect to the notional starting position). The appropriate calculations are done through the use of VBA code.

16. If the regearing option is selected, then when the user clicks on the button to run the revenue calculations, the following events occur:

- the model clears any prior input value in the range DebtAdj07 (= cell G43 in the electricity CF worksheet, cell G41 for gas)
- it adds the value of 0.6*2006/07 closing RAV to the existing debt at end 2006/07
- if this value is positive, then the debt is less than 60% of the RAV, so the company has to take on extra debt to regear to 60%. The negative of the above value is input to the cell DebtAdj07 as a one off debt issuance, while the positive amount is placed on the balance sheet (Cash due to debt issuance for regearing at end 07) as a current asset
- if the value was negative, then the company is geared above 60%, so it needs to issue extra equity. This positive of the above calculated value is input to the cell DebtAdj07, and the value is replicated in the Capital and reserves section of the balance sheet (Equity issuance for regearing at end 07).

17. If the actual gearing option is selected, then when the user clicks on the button to run the revenue calculations, it just clears any prior input value in the range DebtAdj07.

3.4 Electricity model specific options

3.4.1 Include/exclude TIRG

18. Electricity transmission owner licensees have a sector-specific revenue stream from Transmission Investment for Renewable Generation (TIRG). However, the actual revenues from this activity differ for each of the three licensees.

19. By default, this list is set to the "Exclude TIRG" option, since these revenues were agreed outside of the price control, and the associated capital expenditure is not included in the capex being considered for the control. However, due to the financial commitments involved in these programmes, it is important to consider their impact on any price control proposals, particularly in relation to financeability ratios.

20. If the "Include TIRG" option is selected, it impacts on the model through:

- including the scheduled TIRG capex into the cash flow
- using TIRG revenues to offset the additional interest on borrowing due to TIRG, so that the net taxable income from the base revenues won't be affected by TIRG (otherwise, the base control tax allowance would vary , which is undesirable)
- including the annual revenues from the TIRG scheme (net of any TIRG revenue used to offset interest) in the P&L account, net of a nominal 30% tax rate and
- including TIRG considerations into the calculated financial ratios

3.4.2 Advance TIRG depreciation/leave as normal

21. When the TIRG mechanism was originated, it was agreed that licensees would receive financing costs for the average capex commitment during the build phase, but depreciation would not be given on the assets during the course of construction.

22. This drop down list gives the option of examining the effect of including depreciation during the course of construction on the licensees' finances and financial ratios. However, it will only have an effect if the include TIRG option is selected.

3.4.3 Accelerate RAV depreciation/leave as normal

23. The electricity model includes two options for dealing with the RAV:

- "do nothing", which depreciates the pre & post-vesting RAVs at 20 and 40 years respectively (on a straight-line basis)
- "Accelerated depreciation", which recalculates the post-vesting asset lives at a variable number of years (within limits of 20 and 40 years) in order to forward depreciation to the licensees

24. Each of these options will have different effects on the RAV, which will have a consequential impact on the allowed revenue calculation

3.4.4 Include revenue drivers

25. This switch gives the option of including or excluding the impact of revenue driven capex in the model.

3.4.5 Revenue driver scenario selection

26. This switch gives the option of selecting one of five scenarios relating to revenue drivers. However, it will only have an effect if the include revenue drivers option is selected.

3.4.6 Pre-emptive equity injection

27. The electricity model has the option to allow for the forced injection of equity in to the company's capital structure, in order to evaluate its impact on the financial ratios. This is effected by typing a value of equity (in £m nominal) in any of the years 04/05 – 13/14, as bounded by the input box. Entries can be made in any or all of the years over the time frame.

3.5 Gas model specific options

3.5.1 Include gas entry revenue drivers

28. This switch gives the option of including or excluding the impact of gas entry revenue driven capex in the model.

3.5.2 Include gas exit revenue drivers

29. This switch gives the option of including or excluding the impact of gas exit revenue driven capex in the model.

3.5.3 Gas exit revenue driver scenario selection

30. This switch gives the option of selecting one of three scenarios relating to gas exit revenue drivers. However, it will only have an effect if the include gas exit revenue drivers option is selected.

3.6 Iterative Tax Calculation button

31. Clicking on the Iterative Tax Calculation button runs a module of VBA code, which does two things:

- effects the regearing option as described above
- runs a goal seek to solve for the tax allowance in the allowed revenue calculation

32. There is an inherent circularity in determining the tax allowance for a given year, because the tax charge is dependent on the revenue allowance, but the tax charge is itself one of the components which makes up the revenue allowance.

33. The revenue allowance is determined in the PostTaxRev worksheet, and this is fed through to the P&L account as the annual turnover. The tax charge to be paid on this turnover is calculated in the Notes worksheet, and this is then fed through to the profit and loss (P&L) account.

34. The tax allowance in a given year is determined by assuming an initial tax allowance of nil, and using the consequential revenue allowance figure in the P&L. The tax charge using this revenue will be calculated in the Notes worksheet, and this value is then used as the initial estimate of the tax allowance for incorporation into the revenue allowance. The new revenue allowance is then fed forward to the P&L, which generates a new tax charge, which forms the new estimate of the tax component of the revenue build-up, etc. Excel's Goal-seek function automates this

procedure to continue for either 100 iterations or until the difference between successive tax iterations is below a threshold value.

35. The VBA code instructs Excel to perform a goal-seek for the first year of the price control period, using the criteria of minimising the difference between the tax charge as calculated in the Notes worksheet and the tax component of the allowed revenue. It then performs identical goal-seeks on the successive 29 years of revenue allowances. (see appendix 1 for more details)

36. Because of the interdependence of tax payments on successive/preceding years' cash flows, performing a goal-seek on a given year's tax payments will have a small affect the tax payments in adjacent years. The model addresses this point by performing the goal-seek on successive years across the entire timespan, and then repeating this process 9 times. This number of repeats has been shown in practice to result in a stable solution where despite the interactions, the tax differences for any given year are effectively zero.

37. As a safeguard that the solution is stable, the heading of the table in the PC_POut worksheet varies; if the sum of the residual differences for the price control period is above a threshold value (currently £0.005m), the user is alerted that the tax computations should be redone.

3.7 Assumptions underlying the model

38. The model calculates regulated revenues net of Value Added Tax, and as such, there are no VAT workings in the model.

39. For periods beyond the projected 2007-12 price control, it is assumed that all inputs (eg opex, capex) are rolled forward on a constant level in real terms.

40. Projected revenues are assumed to be accumulated by licensees on a uniform basis throughout the year; this impacts on the discounting factors adopted in the revenue calculations in the PostTaxRev sheet.

41. The model does not take any account of the licensees being subjected to significant delays[1] in receipt of, or defaults of, payments due, nor does it deal with how annual over/under recovery of revenues will be dealt with. These are subject to conditions within the Transmission licenses.

[1] It assumes values for Debtor and Creditor days of 7 and 45 days respectively. These values can be changed on the input sheet.

4.0 Input sheets

1. Both financial models have company-specific input sheets and a main input sheet. The electricity model has four company-specific input sheets; SHETL, SPTL, NGET_TO and NGET_SO. The gas model has two such sheets; NGGT_TO and NGGT_SO.
2. The company-specific sheets have input data relating to the following topics:

- Profit & Loss (P&L) account
- Balance sheet
- Cash flow
- Taxation
- RAV
- Capital expenditure (Historic and forecast) and disposals
- Pensions
- Sector specific incentive schemes (TIRG and revenue drivers for electricity, Entry and Exit revenue drivers for gas)

3. The main input sheet has data which is common for all companies, as well as company-specific data. The common data comprises:

- Dates (Model start date, price control start year, length of control)
- Retail Price Indices and inflation data/assumptions
- Text labels
- Cost of capital components
- Tax writing down allowances
- Dividend assumption

4. The company specific content is structured as per the individual company sheets. The actual company data populating this worksheet at any given time is dependent on the user selection from the company selection switch, as described in the “Cover Sheet” section.

4.1 Company specific input sheets

4.1.1 Profit & Loss (P&L) account inputs

5. Each transmission licensee has submitted a P&L account for the year 2004/05, from which the turnover, pensions, interest and taxation elements have been used to generate opening financial statements. In addition, Ofgem’s estimates of efficient operating costs for the period 2004 – 2012 (in real 04/05 prices) are used for opex going forward. These data are found in each company’s individual data input sheet.

4.1.2 Balance sheet inputs

6. Each transmission licensee has submitted a balance sheet statement for the year 2004/05, from which the balances on assets, liabilities, provisions, capital and reserves have been used to generate an opening balance sheet.

4.1.3 Cash flow inputs

7. Each transmission licensee has submitted a cash flow for the year 2004/05, from which the cash flow and opening debt positions have been derived.

4.1.4 Taxation inputs

8. Each transmission licensee has submitted a forecast of its capital allowances from the year 2004/05. These have been used to derive a starting position, and going forward, the allocations to the various capital allowance pools has been based upon either:

- an apportionment of the Ofgem capex allowance in line with the relative apportionment of the capital allowance projections (SPTL)
- an apportionment of the Ofgem capex allowance in line with an agreed percentage apportionment for each year of the price control period (NG & SHETL)

4.1.5 RAV inputs

9. The RAV calculation in the model tracks all RAV asset purchase costs, RAV disposals and calculates depreciation based on the asset regulatory life. It also requires an opening balance of accumulated expenditure and associated regulatory depreciation for the start of the modelling period.

10. Since the model groups the assets by asset life, the opening positions are required for both pre and post-vesting assets, or in the case of gas, pre and post 2002 purchased assets.

4.1.6 Capex inputs

11. Historic capex is used to derive opening RAV balances on cost and depreciation for the "Accelerated depreciation" option in electricity transmission. This data, along with associated disposals, is input in Nominal (ie money of the day) terms.

12. Recent historic data (1999/00 onwards for SHETL & SPTL, 2000/01 onwards for NGET and 2002/03 onwards for NGGT) is sourced from Ofgem's capex team, as this has been agreed with the licensees as part of the price control process. Data for earlier years has been sourced from previous price control models.

13. Data on projected capex is supplied by Ofgem's capex team in 2004/05 prices. This data has been adjusted to account for other capex initiatives, eg BETTA, PLUGS and TSS RAV transfers in electricity

4.1.7 Pensions inputs

14. The transmission licensees provided Ofgem with operating costs, which included pension costs. Ofgem has a separate work group on pensions, so pension costs were stripped from the base operating costs and subjected to separate analysis by this work group.

15. This model uses data provided by Ofgem's expert analysis. The pension costs are broken into two components; an ongoing element and a deficit annuity funding element. The data is on a nominal price basis.

4.2 Sector specific incentive schemes

4.2.1 TIRG (Electricity only)

16. Transmission Investment in Renewable Generation (TIRG) is a scheme devised by Ofgem and the electricity transmission licensees to facilitate the investments necessary for certain network reinforcements. This was done during the current price control period.

17. The transmission licences have been amended to specify the investment amounts allowed for each project for each licensee, along with the rate of return and the notional investment profile.

18. Whereas TIRG does not constitute part of the 2007-12 price control settlement, the investment amounts are sufficient to have a significant impact on the financial resources of the companies, in particular the two Scottish companies. Accordingly, the model has an option to include TIRG cost & revenue streams and evaluate their impact on the company's financial ratios.

19. The company-specific TIRG data comes from each licensee's TIRG licence condition, and is in real 04/05 prices. In one instance (SHETL), part of this data has been time shifted at the request of the licensee, as it has been subjected to unanticipated delay at the planning consent stage.

4.2.2 Revenue drivers (Electricity only)

20. Due to the inherent uncertainty around an amount of the electricity capex plans of the licensees, revenue drivers were introduced into the price control mechanism. The idea is that if a licensee receives firm user commitment signals for investment that is in excess of the baseline allowances, the revenue driver provides a means of automatically adjusting the licensee's allowances to allow for the investment to proceed and without the need for a reopener of the control.

21. The inputs for this mechanism are the incremental MW of capacity accommodated by the extra capex, and the target local and deep reinforcement costs associated with this capacity (in £m, 04/05 real).

4.2.3 Entry & exit revenue drivers (Gas only)

22. In line with the logic behind electricity revenue drivers, there are separate revenue drivers for gas entry and exit.

23. Gas entry uses a scenario of possible capacity requirement(s) at a number of entry points to the gas transmission system, and allies this with a cost/capacity matrix for each entry point. There is also a generic profile of project expenditure for this type of project, which determines the project spend in a given year.

24. Gas exit uses a scenario of possible projects at a number of exit points to the gas transmission system, and allies this with a cost matrix for each entry point project. There is also a generic profile of project expenditure for this type of project, which determines the project spend in a given year.

4.3 Common input data

4.3.1 Dates

25. The model uses some common date variables:

- StartDate, which represents the end point of the first year of the model. This is used by the formulae in row 3 of all calculation sheets to determine the "year ending" value.
- PCStart, which represents the formula year value for the start year of the 2007-12 price control
- PCPeriod, which represents the length in years of the price control period.
- DateSwitch, which represents the formula year after which the values on the calculation sheets are calculated rather than being input values.

4.3.2 Retail Price Indices and inflation data/assumptions

26. The input sheet contains a number of values relating to inflation and cost indexation:

- RPI (Retail Price Index), which is the arithmetic average of the change from month to month in the prices of goods and services purchased by most households in the United Kingdom. This is obtained from the Office of National Statistics' website (www.statistics.gov.uk)
- PrevRPI, which is the previous year's RPI
- BaseRPI, which is the RPI of the year selected in the Base Year selection list
- Convert, which is the conversion factor from the Base Year to that year's prices
- Inflation, which gives Ofgem's expected inflation assumption going forward
- Compound, which gives the year-on-year inflation
- CompIndex, which gives the compound inflation since the start of the modelling period
- FBPQ_Convert, which gives the conversion factor between the cost base for the Forward Business Plan Questionnaire (FBPQ) data and the given year

4.3.3 Text labels

27. The input sheet has three common text label variables:

- NominalLabel, which is used to identify calculations that are in Nominal terms
- RealLabel, which is used to identify calculations that are in Real terms. This incorporates the selected value of the Base Year.
- TaxWarning, which alerts the user that the tax computation has not been run or has not reached a stable value less than the error threshold.

4.3.4 Cost of capital components

28. The input sheet includes values for the individual elements of the cost of capital (using the Capital Asset Pricing Model [CAPM]), along with calculations for the resulting pre and post-tax weighted average cost of capital (WACC).

29. The historic values for these components have been taken from published price control documentation, while the prospective values reflect Ofgem's proposals for the price control (rolled forward across all future time periods within the model).

30. The individual components are:

- RFR, the risk free rate
- DP, the debt premium
- ERP, the equity risk premium
- Beta, the equity beta value
- Gearing, the notional gearing level assumed by Ofgem
- CorpTax, the assumed corporation tax rate

31. The pre-tax cost of capital, PreTaxCoC, is calculated as Gearing * (RFR + DP) + (1 – Gearing) * (RFR + Beta * ERP)/(1 – CorpTax)

32. The post-tax cost of capital is calculated as PreTaxCoC * (1 – CorpTax)

33. The values assumed for the components in the price control are:

- RFR = 2.5%
- DP = 1.25%
- ERP = 4.5%
- Beta = 1
- Gearing = 60%

4.3.5 Tax writing down allowances

34. The input sheet includes tax writing down allowances (WDA) for the following capital allocation pools:

- IB_WDA (Industrial buildings), 4%
- LL_WDA (Long-life assets), 6%
- DRE_WDA (Deferred revenue expenditure), 100%
- PP_WDA (Plant pool), 25%
- REF_WDA (Refurbishment), 3%

4.3.6 Dividend assumption

35. The model contains a variable, Dividend, which relates to the dividend yield on the equity portion of the NominalRAV and the consequential dividend distributions. The value assumed in the model is 3.8%. This is applied to the equity portion of the previous year's equity portion of the NominalRAV, in order to avoid circularity of referencing.

5.0 Calculation sheets

1. The model uses the data in the Input sheet to drive the calculations in other sections of the model. These dependent sheets are listed below.
2. P&L – the profit and loss account, in both Nominal (ie money of the day) and Real price terms
3. BS – the balance sheet in both Nominal and Real price terms
4. CF – the cash flow statement in both Nominal and Real price terms
5. Depn – calculation of both the accounting depreciation and capital allowances for normal capex additions (ie, excluding TIRG for electricity and revenue driven investment in both electricity and gas)
6. RealRAV – calculation of the Regulatory Asset Value (RAV) arising from normal capex additions, in Real price terms
7. NominalRAV – calculation of the Regulatory Asset Value (RAV) arising from normal capex additions, in Nominal price terms
8. Notes – calculation of a number of items for the main accounting statements, including:
    a. Tangible assets
    b. Pensions costs
    c. Amount subject to current tax
    d. Corporation tax charge
    e. Tax creditors
    f. Deferred tax
    g. Debtor and creditor balances
    h. Net debt and annual interest charge
    i. RAV, gearing and equity required to stay below target gearing level
9. RevDriver – calculation of the revenues arising from the implementation of revenue drivers under given scenarios. This applies to electricity transmission licensees only.
10. EntryRevDriver, ExitRevDriver - calculation of the revenues arising from the implementation of gas entry and exit revenue drivers under given scenarios. This applies to gas transmission licensees only.
11. Ratios – calculation of a number of key financial ratios to assist in assessing the longer-term financeability of licensees
12. PostTaxRev – calculation of the post-tax revenue for the licensees, in conjunction with a VBA module which implements a goal-seek solution for tax
13. TIRG – calculation of revenues arising from the TIRG (Transmission Investment in Renewable Generation) mechanism. This applies to electricity transmission licensees only.
14. The specific calculations on each of these sheets are itemised in the following sections. Note that the formulae come from the electricity model, and as such, the row references may vary slightly from the equivalent gas references. Where there is a difference in the formula logic between the two models, this will be highlighted and given separate explanation.

5.1 P&L – the profit and loss account

1. The Profit & Loss account gives a view of the regulatory accounting profit/loss for the year. Starting with revenues for a given year, it deducts operating costs, interest payments on borrowings, tax and dividends to arrive at a profit/loss figure for the year. The following paragraphs detail the formulae used to implement this, and their underlying logic, on a line-by-line basis.

2. **Turnover**

   =IF(E$4=DateSwitch,Turnover,
   IF(E$4<PCStart,(D8+D12)*RPI/PrevRPI,PostTaxRev!E63))

3. Logic – if the year equals 0, get input value from Turnover range, else if year is before start of price control period, Turnover= (previous year turnover + other opex adjustments) indexed for RPI increases, otherwise, get value from PostTaxRev sheet. The "other opex adjustments" arises in electricity because of the transfer of duties from the Scottish TO's to NGET as a result of BETTA means that the 2004/05 turnover will overstate the subsequent years' turnover unless this adjustment is made.

4. **Controllable operating costs**

   =IF(ContOpex=0,D9*RPI/PrevRPI,ContOpex)

5. Logic – if the value in the ContOpex range is 0, then index the previous year's value by RPI increase, else use the ContOpex value

6. **Non controllable operating costs**

   =IF(NonContOpex=0,D10*RPI/PrevRPI,NonContOpex)

7. Logic – if the value in the NonContOpex range is 0, then index the previous year's value by RPI increase, else use the NonContOpex value

8. **Pension costs (ongoing)**

   =-Notes!E19

9. Logic – see Notes section for further details

10. **Other opex**

    =Input!E53

11. Logic – this relates to a one-off adjustment to operating costs as a result of transfer of duties from the Scottish TO's to NGET as a result of BETTA.

12. **Depreciation**

    =AccDepn

13. Logic – this picks up the accounting depreciation total for normal capex additions from the Depn worksheet

14. **Operating profit**

    =SUM(E8:E13)

15. Logic – Operating profit is the sum of turnover less (operating costs + depreciation). The operating cost elements and depreciation all have negative signs.

16. **Exceptional items**

    =IF(E$4>DateSwitch,0,-Input!E57)

17. Logic – For all formula years other than year 0, exceptional items are 0; for year 0, any relevant exceptional items are read from the input sheet.

18. **Pension deficit reduction adjustment**

    =-Notes!E31

19. Logic – see Notes section for further details

20. **Other one-off revenues**
    =IF(E$4>DateSwitch,0,-Input!E58)

21. Logic - For all formula years other than year 0, one-off items are 0; for year 0, any relevant one-off items are read from the input sheet.

22. **Profit before interest and tax** (PBIT)
    =SUM(E14:E17)

23. Logic – PBIT is the operating profit less any exceptional or one-off items

24. **Interest received**
    =IF(E$4>DateSwitch,Notes!E84,Input!E55)

25. Logic - For all formula years other than year 0, the interest received is obtained from the relevant cell in the Notes worksheet; for year 0, it is given on the input sheet

26. **TIRG construction revenue (pre-tax)** (Electricity only)
    =IF(TIRG_Option=1,IF(TIRG!E14>0,TIRG!E14*RPI/BaseRPI*(1-CorpTax),TIRG!E11*RPI/BaseRPI*VWACC),0)

27. Logic – If TIRG is selected, then if the construction allowance is greater than 0 (ie there is TIRG in the construction phase), then the extra interest at the TPCR rate is approximated by 70% of the actual construction allowance, indexed in nominal terms; otherwise, it is the TIRG RAV times the Vanilla WACC, indexed up for inflation. If TIRG is not selected, TIRG offsetting revenues are 0.

28. **Interest payable**
    =IF(E$4>DateSwitch,Notes!E141,Input!E56)

29. Logic - For all formula years other than year 0, the interest payable is obtained from the relevant cell in the Notes worksheet; for year 0, it is given on the input sheet

30. **Profit before tax** (PBT)
    =SUM(E18:E21)

31. Logic – PBT is PBIT less net interest

32. **Current tax**
    =IF(E$4>DateSwitch,-PLCorpTax,Input!E60)

33. Logic - For all formula years other than year 0, the current tax is obtained from the PLCorpTax range in the Notes worksheet; for year 0, it is given on the input sheet

34. **Deferred tax**
    =IF(E$4>DateSwitch,-PLDefTax_GAAP,Input!E61)

35. Logic - For all formula years other than year 0, the deferred tax is obtained from the PLDefTax_GAAP range in the Notes worksheet; for year 0, it is given on the input sheet

36. **Profit after tax** (PAT)
    =SUM(E22:E24)

37. Logic – PAT is PBT less taxes

38. **TIRG revenue (post-tax)** *(Electricity only)*
    =IF(TIRG_Option=1,(TIRG!E17*RPI/BaseRPI-E20)*(1-CorpTax),0)

39. Logic – The TIRG switch (the TIRG_Option range) can take one of two values; 1 or 2. If TIRG_Option=1, then TIRG revenues are included in the

revenue stream calculations. Since TIRG has been conducted on a pre-tax basis, and the TIRG revenue calculations are done on a real price basis, the revenue to be included is the TIRG worksheet revenue value for that year, indexed by inflation from the base year, but with deductions for any revenues that have been used to offset additional interest (see 26 above) and for tax at the assumed corporation tax rate (ie the net revenue). Otherwise, the TIRG revenue impact is 0.

40. **Dividends paid**

```
=IF(E$4>DateSwitch,
IF(AND(Notes!D167<100%,E25+BS!E59+BS!D62>
(1-Notes!D167)*(Notes!D165+Notes!E165)/2*Dividend),
-(1-Notes!D167)*(Notes!D165+Notes!E165)/2*Dividend,
IF(AND(Notes!D167<100%,E25>0),-E25,0)),Input!E59)
```

41. Logic – If formula year is less than or equal to 0, then the dividend distribution is given on the input sheet. Otherwise, if the calculated gearing is below 100% and the (PAT + total of balance sheet reserves) is greater than the equity portion of the RAV (ie 1-calculated gearing) times the Average Nominal RAV times the Dividend yield (ie there are sufficient distributable funds to meet the intended dividend), then the intended dividend is paid out. If there are insufficient distributable reserves but there is a positive PAT for the year, then the full PAT is distributed as a dividend. Otherwise, the dividend is 0. Two points to note:

    a. The gearing < 100% criteria is required to ensure that dividend payments do not become positive

    b. The gearing assessment relates to the previous year's closing gearing position, in order to avoid a circularity in the dividend calculation (if done in same year, debt [and therefore gearing] would depend on dividend payments which depend on gearing)

42. **Retained profit or loss for the year**

```
=SUM(E25:E27)
```

43. Logic – The retained profit is the sum of PAT + TIRG revenues (where applicable) less any dividend payments

44. The bottom half of the worksheet replicates the top half, but the figures are all in real prices. All input data items are calculated by multiplying the nominal price equivalent by BaseRPI/RPI, eg the formula for the first year Turnover in real prices uses the nominal turnover value from cell E8:

```
=E8*BaseRPI/RPI
```

45. Summations are calculated using the Excel SUM function, eg PAT in real prices is:

```
=SUM(E45:E47)
```

5.2 BS – the Balance Sheet

1. The balance sheet represents the assets and liabilities of the company at financial year end.
2. **Tangible assets**
   =IF(E$4>DateSwitch,NBVcf,Input!E64)
3. Logic – For all formula years other than year 0, the tangible assets value is obtained from the NBVcf range in the Notes worksheet; for year 0, it is given as an input
4. **Intangible assets**
   =IF(E$4>DateSwitch,D10,Input!E65)
5. Logic - For all formula years other than year 0, the intangible assets value is obtained from the previous year's value (we do not consider the licensees capex allowances to be consumed on intangible assets); for year 0, it is given as an input
6. **Fixed asset investments**
   =IF(E$4>DateSwitch,D11,Input!E66)
7. Logic - For all formula years other than year 0, the fixed asset investments value is obtained from the previous year's value (we do not consider the licensees capex allowances to be consumed on fixed asset investments); for year 0, it is given as an input
8. **Stock**
   =IF(E$4>DateSwitch,D14,Stock)
9. Logic - For all formula years other than year 0, the stock value is obtained from the previous year's value (we do not consider the average stock levels to vary during the control period); for year 0, it is given as an input
10. **Trade Debtors**
    =Notes!E78
11. Logic – see Notes worksheet for further details
12. **Loans due from other group companies**
    =Notes!E86
13. Logic - see Notes worksheet for further details
14. **Other debtors**
    =IF(E$4>DateSwitch,D17,Input!E70)
15. Logic - For all formula years other than year 0, the debtors value is obtained from the previous year's value; for year 0, it is given as an input
16. **Cash at bank**
    =Notes!E149
17. Logic - see Notes worksheet for further details
18. **Investments**
    =IF(E$4>DateSwitch,D19,Input!E72)
19. Logic - For all formula years other than year 0, the investments value is obtained from the previous year's value; for year 0, it is given as an input
20. **Pension surplus**
    =IF(E$4>DateSwitch,D20,Input!E73)

21. Logic - For all formula years other than year 0, the pensions surplus value is obtained from the previous year's value; for year 0, it is given as an input

22. **Cash due to debt issuance for regearing at end 2007**
    =IF(E4=PCStart-1,IF(DebtAdj07<0,-DebtAdj07,0),D21)

23. Logic – If formula year is the one just prior to the start of the price control then if there has been a debt adjustment to bring the gearing up to 60% the resulting cash arising from the debt issuance should be reflected on the balance sheet or the value should be 0. Otherwise, the value used should be the previous year's value.

24. **Other**
    =IF(E$4>DateSwitch,D22,Input!E74)

25. Logic - For all formula years other than year 0, the other creditors value is obtained from the previous year's value; for year 0, it is given as an input

26. **Overdrafts**
    =-Notes!E104

27. Logic - see Notes worksheet for further details

28. **External loans**
    =-Notes!E110

29. Logic - see Notes worksheet for further details

30. **Loans due to other Group companies**
    =-Notes!E116

31. Logic - see Notes worksheet for further details

32. **Trade Creditors**
    =-Notes!E96

33. Logic - see Notes worksheet for further details

34. **Other**
    =IF(E$4>DateSwitch,D32,-Input!E79)

35. Logic - For all formula years other than year 0, the other creditors value is obtained from the previous year's value; for year 0, it is given as an input

36. **Net Current Assets (Liabilities)**
    =E23+E33

37. Logic – Net current assets is defined as current assets less creditors due within one year

38. **Total assets less current liabilities**
    =E12+E35

39. Logic – Total assets less current liabilities is non-current assets plus net current assets

40. **Overdrafts**
    =-Notes!E125

41. Logic - see Notes worksheet for further details

42. **External loans**
    =-Notes!E132

43. Logic - see Notes worksheet for further details

44. **Loans due to other Group companies**
    =-Notes!E138

45. Logic – see Notes worksheet for further details

46. **Other**
    =IF(E$4>DateSwitch,D45,-Input!E83)

47. Logic - For all formula years other than year 0, the other creditors value is obtained from the previous year's value; for year 0, it is given as an input

48. **Deferred tax provision**
    =-Notes!E73

49. Logic - see Notes worksheet for further details

50. **Current tax provision**
    =-Notes!E52

51. Logic - see Notes worksheet for further details

52. **Deferred income provision**
    =IF(E$4>DateSwitch,D51,-Input!E86)

53. Logic – For all formula years other than year 0, the deferred income provision value is obtained from the previous year's value; for year 0, it is given as an input

54. **Pensions deficit**
    =IF(E$4>DateSwitch,IF(Notes!E22<>0,
    -Notes!E22,D52+Notes!E30),-Input!E87)

55. Logic - For all formula years other than year 0, if the value in row 21 of Notes is non-zero, then use this value, else use the previous year's value plus the annual deficit repair value in row 30 of Notes worksheet; for year 0, it is given as an input

56. **Other provisions**
    =IF(E$4>DateSwitch,D53,-Input!E88)

57. Logic - For all formula years other than year 0, the other provisions value is obtained from the previous year's value; for year 0, it is given as an input

58. **Net assets**
    =E37+E46+E54

59. Logic – Net assets is given by Total assets less current liabilities plus creditors due after one year plus provisions

60. **Called up ordinary share capital (including share premium)**
    =IF(E$4>DateSwitch,D59+CF!E44+CF!E45,Input!E94)

61. Logic - For all formula years other than year 0, the called up ordinary share capital value is obtained from the previous year's value plus any within year equity issuances/redemptions; for year 0, it is given as an input

62. **Equity issuance for regearing at end 07**
    =IF(CF!E43>0,CF!E43,BS!D60)

63. Logic – If the value in row 43 of the cash flow statement is greater than zero, then there has been an equity issue to regear back to 60%, so this value is used; otherwise, the previous year's value is taken

64. **Preference shares**
    =IF(E$4>DateSwitch,D61,Input!E95)

65. Logic - For all formula years other than year 0, the preference shares value is obtained from the previous year's value; for year 0, it is given as an input

66. **Profit and Loss Account**
    =IF(E$4>DateSwitch,D62+'P&L'!E28,Input!E96)

67. Logic - For all formula years other than year 0, the P&L account value is obtained from the previous year's value plus the retained profits from the P&L account for the current year; for year 0, it is given as an input

68. **Shareholders equity BETTA adjustment**
    =IF(E$4=1,(IntRAV+ConRAV)*FBPQ_Convert,D63)

69. Logic – In formula year 1, the BETTA adjustments (the transfer of interconnector and connection assets to the TO RAV without any in-year associated capital expenditure) takes place. This is implemented on the bottom part of the balance sheet through a one-off addition in that year; the value added is the sum of the assets in 04/05 real prices, indexed up to nominal prices. For all other years, the value used is the previous year's value.

70. **Pensions deficit reserve**
    =IF(Notes!E21=0,D64,BS!E52-BS!D52)

71. Logic – If the identified deficit amount for that year in the Notes worksheet is 0, then use the previous year's value of pension deficit reserve; if it is non-zero, then the value of the new reserve is the deficit value identified in the Notes worksheet less any previously existing deficit value (ie the incremental amount).

72. **Other Reserves**
    =IF(E$4>DateSwitch,D65,Input!E97)

73. Logic – For all formula years other than year 0, the other reserves value is obtained from the previous year's value; for year 0, it is given as an input

74. **Check for balance with net assets**
    =IF(ABS(E56-E66)>0.5,E56-E66,"")

75. Logic – If the difference in the absolute value of the net assets less capital and reserves is greater than £0.5m, then print this value, else use a null entry

76. The bottom half of the worksheet replicates the top half, but the figures are all in real prices. All input data items are calculated by multiplying the nominal price equivalent by BaseRPI/RPI, eg the formula for the first year Tangible assets in real prices uses the nominal tangible assets value from cell E9:
    =E9*BaseRPI/RPI

77. Summations are calculated using the Excel SUM function, eg Non-current assets in real prices is:
    =SUM(E73:E75)

5.3 CF – the Cash Flow statement worksheet

1. The Cash flow statement represents how the cash generated by the business has been used in the year.

2. **Operating profit**
   =IF(E$4>DateSwitch,OpProfit+'P&L'!E15,"-")

3. Logic – For all model calculation years, operating profit is given by the operating profit in the P&L statement plus exceptional items; for the first year, it is undefined, since the net cash inflow input is used in subsequent calculations.

4. **Depreciation**
   =IF(E$4>DateSwitch,-'P&L'!E13,"-")

5. Logic – For all years other than the base year, the depreciation added back to calculate the net cash inflow is the positive value for the depreciation calculated and used in the P&L. For the base year, the depreciation has not been provided in a suitable manner, so it is left as indeterminate.

6. **Amortisation**
   =IF(E$4>DateSwitch,0,-Input!E126)

7. Logic – For all years other than the base year, amortisation is considered to be 0, since there are no intangibles recognised. For the base year, any amortisation data provided is added back to calculate the net cash inflow.

8. **Profit/(Loss) on disposal of fixed assets**
   =IF(E$4>DateSwitch,0,FADisposal)

9. Logic - For all years other than the base year, there is no anticipatory booking of profit or losses on disposals; for the base year, any data provided is added back to calculate the net cash inflow.

10. **Movements in working capital**
    =IF(E$4>DateSwitch,Notes!E98-Notes!E80,MWCP)

11. Logic - For all years other than the base year, movements in working capital are calculated in the Notes worksheet; for the base year, any data provided is added back to calculate the net cash inflow.

12. **TIRG revenue (post-tax) (Electricity only)**
    ='P&L'!E20+'P&L'!E26

13. Logic – If the TIRG option is switched on, there will be TIRG revenues recognised in the P&L and these will form part of the net cash inflow.

14. **Net cash inflow from operating activities**
    =IF(E$4>DateSwitch,SUM(E9:E14),
    CHOOSE(UserInterface!$B$34,SHETL!E53,SPTL!E53,
    NGET_TO!E53,NGET_SO!E53))

15. Logic – For all years beyond the base year, the net cash inflow is the sum of the individual components; for the base year, it is chosen from the various company input sheets, using the CHOOSE function

16. **Net interest paid**
    =IF(E$4>DateSwitch,Notes!E142-Notes!E85,
    Input!E101+Input!E102)

17. Logic - For all years beyond the base year, the net interest paid is the sum of interest paid less interest received (as calculated in the Notes worksheet); for the base year, these quantities are given as input values

18. **Pension deficit repair**
    =-Notes!E23
19. Logic – See Notes worksheet for explanation
20. **Dividends paid**
    =IF(E$4>DateSwitch,0,Input!E105)
21. Logic - For all years beyond the base year, the dividends paid are considered to be 0; for the base year, this quantity is given as an input value
22. **Net cash flow from ROI & SOF**
    =SUM(E18:E20)
23. Logic – Net cash flow from return on investment and servicing of finance is the sum of the individual components
24. **Tax paid**
    =Notes!E51
25. Logic - See Notes worksheet for explanation
26. **Equity dividends paid**
    =IF(E$4>DateSwitch,'P&L'!E27,Input!E112)
27. Logic - For all years beyond the base year, the equity dividends paid are calculated and displayed on the P&L; for the base year, this quantity is given as an input value
28. **Net cash outflow from acquisitions**
    =IF(E$4>DateSwitch,0,Input!E110+Input!E111)
29. Logic - For all years beyond the base year, there is an assumption of nil acquisitions; for the base year, this quantity is given as an input value
30. **Net capital expenditure (includes capitalised pensions)**
    =IF(E$4>DateSwitch,-NominalRAV!E60,Input!E107)
31. Logic - For all years beyond the base year, the additions to RAV equate to the net capital expenditure (but the sign is negative since it is a cash outflow); for the base year, this quantity is given as an input value
32. **TIRG capital expenditure (Electricity only)**
    =IF(TIRG_Option=1,-TIRG!E10*RPI/BaseRPI,0)
33. Logic – If the TIRG switch is selected to include TIRG investments, then the cash outflow is the additions to the TIRG RAV indexed to nominal prices [the TIRG sheet calculates in real prices], but with a negative sign; otherwise, it is 0
34. **Revenue driver capex (Electricity)**
    =IF(RevDrivers=1,-(INDEX(RD_Scenario,RD_Option*3-1,E$4+1)
    +INDEX(RD_Scenario,RD_Option*3,E$4+1)),0)
35. Logic - If the revenue driver switch is selected to include revenue driven capex, then the cash outflow is the sum of the incremental local and deep connection capex for the selected scenario, but with a negative sign; otherwise, it is 0
36. **Revenue driver capex (Gas)**
    =IF(UserInterface!$B$53=1,-EntryRevDriver!E120,0)
    +IF(UserInterface!$B$59=1,-ExitRevDriver!E75,0)
37. Logic – Depending on whether the respective switches have been activated or not, the gas capex is obtained from the sum of the individual capex elements on each of the entry and exit revenue driver sheets.

38. **Other**
    =IF(E$4>DateSwitch,0,Input!E108+Input!E109)

39. Logic - For all years beyond the base year, there is an assumption of nil "other" capex; for the base year, this quantity is given as an input value

40. **Net cash flow from capex**
    =SUM(E33:E36)

41. Logic – Net cash flow from capex is the sum of the individual capex components

42. **Net cash flow before financing**
    =E15+E21+E24+E27+E30+E37

43. Logic - Net cash flow before financing is the sum of the individual cash flow components

44. **Reduction / (increase) in short-term deposits with banks**
    =IF(E$4>DateSwitch,0,Input!E113)

45. Logic - For all years beyond the base year, reductions/increases in cash are accounted for in the cash balance and net debt calculation in the Notes worksheet; for the base year, this quantity is given as an input value

46. **Equity / (Debt) issuance to regear at start of control period** is a calculated value in the year 06/07 (explicitly in the Excel range "DebtAdj07") which is derived by macro code when the Iterative Tax Calculation" button is activated. At this point, the previous value is cleared, and if the "Regear to 60%" option is selected a new value is inserted. See the Appendix regarding the macro code underlying the button for more detail.

47. **Pre-emptive equity issuance**
    =UserInterface!D22

48. Logic – The input sheet allows the user to input an amount for equity issued during any given year(s) in the price control period, irrespective of the gearing position of the licensee. This row reads in the respective values from this user-input area.

49. **Issue or redeem equity**
    =IF(Notes!D168>EquityIn,Notes!D168,0)

50. Logic – If the amount of equity required to keep within the gearing threshold is greater than the minimum specified equity issuance size (EquityIn) threshold, then use the value as calculated in the Notes worksheet, otherwise set to 0

51. **(Decrease) / Increase in amounts due to Group undertakings**
    =IF(E$4>DateSwitch,0,Input!E116)

52. Logic - For all years beyond the base year, there is an assumption of nil changes in amounts due to Group undertakings; for the base year, this quantity is given as an input value

53. **(Decrease) / Increase in group financing**
    =IF(E$4>DateSwitch,0,Input!E117)

54. Logic - For all years beyond the base year, there is an assumption of nil changes in amounts due to Group financing; for the base year, this quantity is given as an input value

55. **Net cash flow from financing**
    =SUM(E42:E47)

56. Logic - Net cash flow from financing is the sum of the individual cash flow components

57. **Increase/(Decrease) in cash for year**
    =E39+E48

58. Logic – Increase/decrease in cash for year is the sum of net cash flow before financing and net cash flow from financing

59. The bottom half of the worksheet replicates the top half, but the figures are all in real prices. All input data items are calculated by multiplying the nominal price equivalent by BaseRPI/RPI, eg the formula for the first year tax paid in real prices uses the nominal tax paid value from cell E25:
    =E25*BaseRPI/RPI

60. Summations are calculated using the Excel SUM function, eg net cash flow from capex in real prices is:
    =SUM(E82:E85)

5.4 Depn – the accounting depreciation and capital allowance calculation worksheet

1. The Depn sheet is where both the accounting depreciation and capital allowances for baseline capex are calculated. The top rows constitute a summary of the depreciation and capital allowances, while the lower down sections show the detailed calculations for the different categories of assets.
2. **Depreciation expense – Industrial buildings**
   =IF(E$4>DateSwitch,-E54,"-")
3. Logic – For all formula years other than year 0, get value from calculation section further down sheet; for formula year 0, ignore individual category value
4. Depreciation expense – Long-life assets & Depreciation expense – Plant pool have the same form of formula and the same underlying logic
5. **Depreciation expense summary**
   =IF(E$4>DateSwitch,SUM(E10:E12),Input!E54)
6. Logic – For all formula years other than year 0, sum the individual category summary values; for formula year 0, use the input summary value
7. **Net book value – Industrial buildings**
   =E59
8. Logic –Get category net book value from calculation section further down sheet
9. "Net book value – Long life assets" & "Net book value - Plant pool" have the same form of formula and the same underlying logic
10. **Net book value summary**
    =SUM(E16:E18)
11. Logic – Total net book value is the sum of the individual category net book values
12. **Capital allowances - Industrial buildings**
    =E108
13. Logic – Get category capital allowance value from calculation section further down sheet
14. "Capital allowances – Long life assets", "Capital allowances – Plant pool", "Capital allowances – Deferred revenue expenditure" & "Capital allowances – Refurbishment" all have the same form of formula and the same underlying logic
15. **Capital allowances – Summary**
    =SUM(E24:E28)
16. Logic – The total capital allowance is the sum of the individual category capital allowances
17. **Tax write down value – Industrial buildings**
    =E109
18. Logic - Get category tax write down value from calculation section further down sheet
19. All other individual category tax write down values have the same form of formula and underlying logic

20. **Tax write down value summary**
    =SUM(E32:E36)
21. Logic - The total tax write down value is the sum of the individual category write down values
22. The accounting depreciation calculation for each of the three asset categories has the same format and logic; this is described in the following paragraphs, using industrial buildings as an example.
23. The depreciation calculation works by tracking both the accumulated cost of assets (including additions & disposals) and the corresponding accumulated depreciation, and netting both of these off to get a net book value.
24. **Industrial Building Asset life**
    =IB_Life
25. Logic – Industrial building asset life is an input for each company, as are the asset lives for each of the other asset categories
26. **Cost balance brought forward**
    =IF(E$4>DateSwitch,D50,"-")
27. Logic – For all years other than 0, the balance brought forward is the previous year's closing balance; for year 0, it is indeterminate, as the input value relates to the net balance to carry forward to the next year
28. **Additions**
    =IF(IB_capex>0,IB_capex,D47*RPI/PrevRPI)
29. Logic – if the input value in the relevant capex input range is greater than 0, then use this figure; if not (ie there is no value, eg when going past the range of future capex projections), use the previous year's value, indexed by inflation (ie capex is assumed to be constant in real terms)
30. **Disposals (not fully depreciated)**
    =Input!E128
31. Logic – Disposals prior to full depreciation is an input from licensees
32. **Disposals (items fully depreciated)**
    =IF((E$4+1-$E$44)<0,0,IF((E$4+1-$E$44)=0,
    INDEX(IB_accbf,1)-INDEX(IB_capex,1),
    INDEX($E$47:$AO$47,(E$4-$E$44)+1)))
33. Logic – If the formula year +1 is less than the asset life, then none of the assets are fully depreciated, so the total of fully depreciated disposals is 0. If the formula year +1 is equal to the asset life, then the opening balance less the first year additions is assumed to be fully depreciated and so is removed from the cost total. Beyond this year, additions are removed on an annual basis in the same order as they have been acquired.
34. **Balance carried forward**
    =IF(E$4>DateSwitch,E46+E47-E48-E49,IB_accbf)
35. Logic – For all years beyond year 0, balance cf is sum of balance bf plus additions less disposals (both partially and fully depreciated); for year 0, it is the input value
36. **Accumulated depreciation balance brought forward**
    =IF(E$4>DateSwitch,D57,"-")
37. Logic - For all years other than 0, the balance brought forward is the previous year's closing balance; for year 0, it is indeterminate, as the input value relates to the net balance to carry forward to the next year

38. **Depreciation**
    =IF(E$4>DateSwitch,E46/$E$44,"-")

39. Logic - For all years other than 0, the depreciation is the year's opening cost balance divided by the asset life; for year 0, , it is indeterminate, as the input value relates to the net balance to carry forward to the next year

40. **Disposals (not fully depreciated)**
    =Input!E129

41. Logic – The accumulated depreciation on disposals prior to full depreciation is an input from licensees

42. **Disposals (items fully depreciated)**
    =E49

43. Logic – The disposals value matches up to the disposals value in the associated cost section

44. **Balance carried forward**
    =IF(E$4>DateSwitch,E53+E54-E55-E56,IB_depnbf)

45. Logic - For all years beyond year 0, balance cf is sum of balance bf plus depreciation in year less disposals (both partially and fully depreciated); for year 0, it is the input value

46. **Book value**
    =E50-E57

47. Logic – Book value is total cost less accumulated depreciation

48. The capital allowance calculation for each of the five asset categories has essentially the same format and logic; this is described in the following paragraphs, using industrial buildings as an example. Instances where there are differences between the various categories are highlighted.

49. **Depreciation rate tax**
    =IB_WDA

50. Logic – The write down allowances for each of the categories are common to all licensees; these are:

    a. Industrial buildings – 4%

    b. Long-life assets – 6%

    c. Plant pool – 25%

    d. Deferred revenue expenditure – 100%

    e. Refurbishment – 3% on previous year's balance

51. **Balance brought forward**
    =IF(E$4>DateSwitch,D107,Input!E164)

52. Logic - For all years other than 0, the balance brought forward is the previous year's closing balance; for year 0, it is an input value

53. **Revisions**
    =IF(E$4>DateSwitch,0,Input!E165)

54. Logic - For all years other than 0, there are no anticipated revisions; for year 0, it is an input value

55. **Capital additions**
    =IF(Input!E166>0,Input!E166,D106*RPI/PrevRPI)

56. Logic – If the value in the input sheet for that year is positive, then use that value, otherwise use the previous year's value indexed for inflation

57. The capital additions formula for the other categories are as follows:

    a. Long-life assets
    =IF(Input!E170>0,Input!E170,D117*RPI/PrevRPI)

    b. Plant pool
    =IF(Input!E174>0,Input!E174,D127*RPI/PrevRPI)

    c. Deferred revenue expenditure
    =IF(E$4>0,0,Input!E178)

    d. Refurbishment
    =IF(Input!E182>0,Input!E182,D147*RPI/PrevRPI)

58. The logic is essentially the same as for IB's, with the exceptions that the deferred revenue expenditure category is defunct after 2004/05 and refurbishment comes into effect after 2004/05

59. **Tax book value pre-depreciation cf**
    =SUM(E104:E106)

60. Logic – The amount subject to capital allowances is the balance carried forward plus any revisions and additions

61. **Depreciation – tax**
    =IF(E$4>DateSwitch,IF(D110+E105+E106<0.2,0,(D108-(E105+E106)*$E$102)),Input!E167)

62. Logic – For all years other than 0, if the previous year's IB balance for deferred tax purposes plus current year revisions and additions sum to less than £0.2m, then the capital allowance is 0, else the capital allowance is the previous year's allowance less (the sum of within year revisions and additions times the write down allowance); for formula year 0, the value is given as an input.

63. This capital allowance calculation is unique to Industrial Buildings. The other category capital allowance calculations are as follows:

    a. Long-life assets
    =IF(E$4>DateSwitch,-E118*$E$113,Input!E171)

    b. Plant pool
    =IF(E$4>DateSwitch,-E128*$E$123,Input!E175)

    c. Deferred revenue expenditure
    =IF(E$4>0,0,-E138*$E$133)

    d. Refurbishment
    =-D148*$E$143

64. Logic – For long-life assets & plant pool, the first year value is an input, otherwise it is the tax book value pre-depreciation multiplied by the write down allowance for that category. The deferred revenue expenditure category is only valid for formula year 0, while the refurbishment category is valid from formula year 1 onwards and applies to the previous year's balance.

65. **Tax write down value / value carried forward**
    =E107+E108

66. Logic – Value cf is the tax book value plus capital allowances (which are negative)

5.5 RealRAV & NominalRAV – Regulated Asset Value calculation worksheets

1. The Regulated Asset Value (RAV) represents the stock of capital assets upon which the licensees earn a depreciation and regulated return. As such, it is a key component for determining annual revenues.
2. The model has two sheets for calculating the RAV; one in real terms (RealRAV), one in Nominal terms (NominalRAV). Within each of these sheets, there is a summary of the various components of the RAV at the top of the worksheet, with the specific detail underpinning the summary on the lower rows.
3. The RAV comprises different asset groups with differing nominal asset lives. For electricity, these are:
    a. Pre-vesting assets, which relate to the assets that existed at the point of privatisation
    b. Post-vesting assets, which describes the capital items purchased since privatisation
    c. Interconnector assets, which are two cables that cross the Cheviot boundary and connect the English and Scottish transmission systems
    d. Pre-BETTA connections assets, which are assets that were transferred into the ownership of the Transmission System Owner following the implementation of PLUGS
4. For gas, the breakdown is simply assets that existed pre-2002 and those acquired since 2002.
5. Each of these asset categories has a different lifespan over which they earn regulatory depreciation and return. Within electricity, these life spans can even differ between the various licensees.
6. In 2009/10, the pre-vesting assets of NGET and SPTL become fully depreciated. Since this would result in a significant decline in the licensees' annual revenues, Ofgem is proposing to implement an "Accelerated depreciation" mechanism, whereby post 2010 the rate of depreciation of post-vesting assets is increased for NGET and SPTL. Additionally, the accumulated depreciation on the post-vesting assets is recalculated as if the assets were being depreciated at this rate from the point at which they were acquired. The difference between the depreciation paid out to date and the recalculated depreciation balance is distributed to the licensees over a number of years in order to offset the effects of the loss of depreciation from pre-vesting assets. This mechanism comes into effect for SHETL as of 2012/13.
7. Whereas all the electricity assets are depreciated on a straight line-basis, the gas pre-2002 assets are depreciated using a declining balance methodology.
8. The following sections describe the electricity RealRAV calculations, followed by differences between the RealRAV and NominalRAV calculations. Significant differences between electricity and gas methodologies are then highlighted.
9. **Summary – Opening value bf**

    =IF(E$4=0,E25-E31+E50-E57,D14)

10. Logic – If formula year 0, opening balance is opening pre-vesting cost less pre-vesting depreciation plus post-vesting cost less post-vesting depreciation; otherwise, use balance carried forward from end of previous year

11. **Summary – Depreciation**
    =IF(AND(RAVOptions=2,E$4+YearsSinceVesting>=PreVestLife), -(E77+E90+E112+E132),-(E32+E58+E112+E132))

12. Logic – If the "Accelerated depreciation" option is chosen and the pre-vesting assets are fully depreciated, then the depreciation figure is the negative of the sum (accelerated RAV differential + accelerated depreciation + interconnector depreciation + connections depreciation). Otherwise, the depreciation figure is the negative of the sum (pre-vesting asset depreciation + post-vesting asset depreciation + interconnector depreciation + connections depreciation).

13. **Summary – net capex additions**
    =E51+E106+E126

14. Logic – Capex additions is the total of post-vesting additions, interconnector additions and connections additions (there are no pre-vesting additions)

15. **Summary – disposals**
    =IF(AND(RAVOptions=2,E$4+YearsSinceVesting>=PreVestLife), -(E85-E93),-(E27-E34+E53-E60))

16. Logic – disposals only relates to disposals of items not fully depreciated, and so it deducts the net value of these items from the RAV. In this instance, if accelerated depreciation is selected and the pre-vesting RAV is depreciated, then it selects the negative of the net value of the disposed assets from the accelerated depreciation block, otherwise it selects the negative of the net value of the pre and post-vesting assets being disposed with. It is assumed that the interconnector and connection assets will not be disposed of prior to their full regulatory depreciation.

17. **Summary – Closing value carried forward**
    =SUM(E10:E13)

18. Logic – The value cf is the sum of opening position plus depreciation plus additions plus disposals

19. **Average RAV**
    =(E10+E14)/2

20. Logic – Average RAV is (opening balance + closing balance)/2

21. The pre and post-vesting calculations are essentially the same, but the post-vesting has additional complexity in that it has additions and a more complex disposals routine, so the post-vesting calculations are now used to explain this part of the model.

22. **Post-vesting asset life**
    =PostVestLife

23. Logic – Each asset category has a defined asset life (by licensee), which has been designated as an Excel range variable

24. **Net capex additions (post-vesting)**
    =IF(NetCapex>0,NetCapex*BaseRPI/RPI,D45)

25. Logic – If the value in the Netcapex range is greater than 0, then use this value indexed into real prices, otherwise, use the previous year's value (ie

there is an assumption that capex will be rolled forward at current real levels

26. **Capitalised pensions deficit additions**
    =Notes!E25*BaseRPI/RPI

27. Logic – Elements of the pension deficit are capitalised in the Notes worksheet, and these are indexed into real prices for addition to the RAV

28. **Cost – Opening balance bf**
    =IF(E$4=0,PostVestRAV*BaseRPI/RPI,D54)

29. Logic – The initial year opening balance is given as an input in Nominal prices, so this value is indexed into real prices when formula year is 0; otherwise, the opening balance for the year is the closing balance from the previous year

30. **Net capex additions**
    =E45+E46

31. Logic – Capex additions is the sum of the post-vesting capex plus the capitalised element of the pension deficit

32. **Removals from RAV (items fully depreciated)**
    =IF(PostVestLife>E$4+YearsSinceVesting,0,
    INDEX(OldCapex,E$4+YearsSinceVesting+1-PostVestLife)*
    BaseRPI/INDEX(OldRPI,E$4+YearsSinceVesting+1-PostVestLife))

33. Logic – When an item is fully depreciated, it drops out of the RAV (both cost and accumulated depreciation). Regulatory depreciation occurs from the year following an item's entry to the RAV, so the post-vesting capex additions which were added in 1990/91 will have had 40 years of depreciation at the end of 2030/31, so they are removed from the RAV at this point. Consequently, while the years since vesting (ie the number of years between vesting and start year of the model) plus the formula year is less than the post-vesting asset lives, no post-vesting assets will be removed from the RAV. When the formula year plus years since vesting is equal or greater than the post-vesting asset life, the formula uses the index function to obtain the historic capex additions in chronological order and indexes them into real prices for removal from the RAV. The "+1" in the formula is required since the formula years start at year 0, but the index function begins at position 1 of the range.

34. **Disposals from RAV (including transfers)**
    =IF(E$4+YearsSinceVesting<$E$42,PostDisposal*
    PostVestLife/(PostVestLife-E$4-YearsSinceVesting)*Convert,0)

35. Logic – This formula assumes that there will not be any disposals of partly depreciated post-vesting assets past 2030/31(ie the year in which normal removal of post-vesting assets occurs. Disposals prior to that year are given as input in the PostDisposal range, as a net value. The formula grosses up this value by the ratio of the asset life to the number of years of normal service left to derive an estimate of the original cost, andthen indexes this into real prices. This is necessary as the information on disposals does not associate them with the original asset purchase to enable a more accurate cost to be used.

36. **Balance cf**
    =E50+E51-E52-E53

37. Logic – The balance carried forward is the sum of the opening balance and additions less removals and disposals

38. **Accumulated depreciation – opening balance bf**
    =IF(E$4=0,PostVestDepn*BaseRPI/RPI,D61)

39. Logic - The initial year opening balance is given as an input in Nominal prices, so this value is indexed into real prices when formula year is 0; otherwise, the opening balance for the year is the closing balance from the previous year

40. **Regulatory depreciation**
    =E50/$E$42

41. Logic- Regulatory depreciation is calculated as the opening balance on cost divided by the asset life, thereby avoiding the depreciation of in-year additions

42. **Removals from RAV (items fully depreciated)**
    =E52

43. Logic – The removals from RAV is the same as those removals in the cost section

44. **Disposals from RAV (including transfers)**
    =E53-PostDisposal*Convert

45. Logic – The depreciation associated with the disposals is the gross value (as calculated in the cost section) less the net value (indexed)

46. **Balance cf**
    =E57+E58-E59-E60

47. Logic – The balance carried forward is the sum of the opening balance and depreciation less removals and disposals

48. **Net value after regulatory depreciation**
    =E54-E61

49. Logic – Net value is the cost less accumulated depreciation

5.5.1 Accelerated depreciation (Electricity only)

50. **Accelerated post-vesting asset life**
    =AccLife

51. Logic - Each asset category has a defined asset life (by licensee), which has been designated as an Excel range variable

52. **Capex additions 90/91 – 03/04**
    =OldCapex*BaseRPI/OldRPI

53. Logic- Historic capex and corresponding year RPI are used to derive historic capex figures in real terms

54. **Accumulated depreciation prior to 04/05**
    =E71*(YearsSinceVesting-E$4-1)/AccLife

55. Logic – The historic capex values are multiplied by the ratio of actual years being depreciated (maximum = years since vesting – 1, minimum = 0) to accelerated life to derive the accumulated depreciation for that asset under an accelerated life

56. Net capex additions & Capitalised pensions deficit additions; formulae and logic as before

57. **Accelerated RAV differential**
    =IF(AND(E$4+YearsSinceVesting>=PreVestLife,

E$4+YearsSinceVesting<PreVestLife+Smooth),
IF(E$4+YearsSinceVesting=PreVestLife,(D63-D96)/Smooth,D77),0)

58. Logic – The AND condition checks to see if the pre-vesting RAV has been depreciated and the formula year is less than "Smooth" years past the cessation of the pre-vesting RAV; if either of these conditions is not met, then there is no RAV differential to distribute for that year. In the year following the cessation of pre-vesting depreciation, the annual accelerated RAV differential is calculated as the difference in net value between the unaccelerated and accelerated RAVs, divided by the period (in years) over which the differential is to be spread. For all subsequent years in the spreading period, the value is the same as the previous year's value. In the NominalRAV calculation,the equivalent to (D63-D96)/Smooth & D77 (ie (D74-D116)/Smooth D93 respectively) are both multiplied by RPI/PrevRPI to reflect indexation from previous years.

59. **Cost - Opening balance bf**
=IF(E$4=0,SUM($E$71:$R$71)-
PostVDisp*PostVestLife/AccLife,D86)

60. Logic – For formula year 0, the opening value is the sum of the pre-04 capex less any post-vesting disposals, scaled up in proportion to the reduced asset life. For all other years, it is the previous year's closing value

61. Net capex additions; formula and logic as previously

62. **Removals from RAV (90/91 – 03/04 capex)**
=IF(OR(AccLife>E$4+YearsSinceVesting,E$4>=AccLife),0,
INDEX(OldCapex,1,E$4+YearsSinceVesting-AccLife+1)*
BaseRPI/INDEX(OldRPI,E$4+YearsSinceVesting-AccLife+1))

63. Logic – If the accelerated life is greater than the current year plus years since vesting, or the formula year is greater than the accelerated life, then there are no pre-04 capex removals. Otherwise, the capex value is obtained from the OldCapex range and indexed for real prices.

64. **Removals from RAV (post 03/04 capex)**
=IF(AccLife>E$4,0,INDEX($E$75:$AK$75,1,
E$4-AccLife+1)+INDEX($E$76:$AK$76,1,E$4-AccLife+1))

65. Logic – If the accelerated life is greater than the current year, then the post-04 capex removals are 0, otherwise they come from the rows of post-vesting capex additions (including capitalised pension deficit additions)

66. Disposals from RAV & Balance cf; formulae and logic as previously

67. **Accumulated depreciation – opening balance bf**
=IF(E$4=0,SUM(E72:R72)-
PostVDispDepn*PostVestLife/AccLife,D94)

68. Logic – For formula year 0, the opening value is the sum of the pre-04 depreciation less any post-vesting disposals, scaled up in proportion to the reduced asset life. For all other years, it is the previous year's closing value

69. All other entries on accelerated depreciation; formulae and logic as previously

70. Entries for the Interconnector and connections are as per post-vesting section, other than additions only occurring in formula year 1. Additionally, as with the pre-vesting assets, since these represent a transfer of existing assets in service, they are depreciated from the year in

which they enter the RAV, and consequently there is no need for the "+1" addition in the removals formula.

5.5.2 Gas calculations

71. The principles underlying the gas RAV calculations are the same as for electricity, but it is generally simpler in gas because there are not so many different categories of RAV pools and there is no accelerated depreciation.

72. With regard to the electricity concept of pre & post-vesting assets, the gas equivalent is pre-2001/02 and post-2001/02. All post-2001/02 assets are depreciated on a straight-line basis, but the pre-2002 assets are depreciated on a declining balance basis, using a 56 year asset life.

73. The regulatory depreciation for pre-2002 assets is calculated as =E25*MAX($E$21-YearsSince2002-E$4,0)/$E$21/($E$21+1)*2

74. Logic – As the formula year increases, the proportion of the opening balance on cost (which remains constant for pre-2002 assets) allotted to depreciation declines, until it eventually reaches 0 and the assets are fully depreciated.

75. Gas also has transfers into the main RAV from both entry and exit revenue driven investment. The additions each year are sourced from the EntryRevDriver and ExitRevDriver sheets respectively, and then depreciated on a straight line basis as per normal. It is assumed that these assets are not disposed of prior to their depreciation.

5.5.3 Comparison with NominalRAV calculations

76. The principles underlying the NominalRAV sheet calculations are the same as for the RealRAV, except that opening balances are inflated and additions (which are in Nominal prices) do not have to be indexed. However, the original cost of removals has to be indexed up by the ratio (RPI of removal year/RPI of addition year) to reflect the effect that inflation has had on the Nominal cost of the asset.

5.6 TIRG calculations (Electricity only)

1. Transmission Investment for Renewable Generation (TIRG) relates to investment in specific electricity transmission infrastructure which was written into licensee's licenses during the course of the current price controls. The licence conditions specify the revenues to be received pursuant to works delivering on specified outputs.
2. Licensees have been set target costs and capex investment profiles on a project specific basis. Licensees receive a construction revenue allowance while the assets are being built (ie a specified cost of capital times the average committed capex for each year), and following commissioning, they receive a depreciation and return allowance for the first five years of use (based on the target capex allowances). After this five year period, the TIRG RAV is reset to incorporate actual (efficiently incurred) costs and it then depreciates as a normal RAV until fully depreciated.
3. TIRG revenues can be incorporated into the main price control model, but only with a view to determining the impact of financeability of a licensee's operations. The mechanism can be included/excluded using a switch on the user interface. The TIRG mechanism was developed on a pre-tax basis, so it is not necessary to calculate specific tax allowances for this element of the model.
4. Inclusion of TIRG has the following impacts:
    a. In the P&L, TIRG construction revenues (gross of tax) are used to offset the additional interest that is due to the additional TIRG capex (so that the tax allowance of the base control is unaffected by TIRG)
    b. The remaining TIRG revenues, net of tax, are incorporated into the P&L and the Cash Flow statements
    c. TIRG capex is included in the cash flow statement
    d. TIRG capex is incorporated into the tangible assets and the RAV used for calculating gearing and financial ratios
5. The TIRG worksheet has a summary of the scheme revenues at the top section, with scheme by scheme detailed calculation sections underneath. This consists of a RAV calculation per scheme, followed by a calculation of the revenues arising. These calculations are illustrated below.
6. **TIRG asset life**
    =TIRGLife
7. Logic – All TIRG assets have a common life. This was originally stated to be 40 years, but the application of accelerated depreciation would reduce this in line with that adopted for normal price controlled assets. This switching behaviour is adopted in the model by use of a formula on the Input sheet for TIRGLife, namely =IF(RAVOptions=2,AccLife,40)
8. Net capex additions (allowed) & Net capex additions (actual) are inputs; formulae and logic as per RealRAV sheet (all TIRG sheet calculations are in Real prices, for harmonisation with the licence condition)
9. **Cost – opening balance bf**
    =IF(AND(SUM($F$25:F25)>0,SUM(A25:E25)=0),SUM($E$26:E26),E32)
10. Logic – The balance bf will normally be the previous year's closing balance; the one exception to this will be when the first five years of use are up, and the actual costs replace the target costs. This is detected by

the condition that the sum of allowed capex is greater than 0 AND the sum of allowed capex for the previous five years is 0, at which point the balance becomes the sum of the actual costs to that point.

11. **Regulatory depreciation**
    =IF(AND(F25=0,SUM(A25:E25)>0),SUM($F$25:F25)/TIRGLife-SUM($E$37:E37)/$E$22,
    IF(AND(F25=0,E41>0),F30/TIRGLife-SUM($E$37:E37)/$E$22,0))

12. Logic – The licensee does not receive any normal regulatory depreciation on capex until all of the project's capex is spent and the project is in active service. However, there is an option in the model to advance depreciation during the construction phase (see next row). During the first five years of use (conditions: allowed year capex =0 and sum of previous five year's capex >0), the annual depreciation is the sum of target capex divided by asset life, less an increment of the total advanced depreciation (total advanced depreciation/asset life). Subsequently, while allowed capex is 0 and the net value is greater than 0, the annual depreciation is opening cost balance bf divided by asset life, less the same increment on advanced depreciation as above; otherwise, depreciation is 0.

13. **Depreciation advancement**
    =IF(AND(TIRG_Adv=1,F36=0,F$4<$E$22),F30/$E$22,0)

14. Logic – If the advanced TIRG depreciation switch is active (TIRG_Adv=1), the normal regulatory depreciation is 0 and the year is less than the asset life (otherwise it proposes depreciation after the asset is fully depreciated), the depreciation advancement is the capex spent to date divided by the asset life, otherwise 0.

15. **Depreciation adjustment after initial five year period**
    =IF(AND(SUM(B25:F25)=0,SUM(A25:E25)>0),
    PCPeriod*(SUM($F$26:F26)-SUM($F$25:F25))/TIRGLife,0)

16. Logic – The one-off depreciation adjustment happens when the sum of the last five years of allowed capex is 0, but the sum of the allowed capex from six to one year previous is greater than 0. The adjustment is the net difference in actual capex and capex allowed, multiplied by the five year period and divided by the asset life.

17. **Construction revenue allowance**
    =IF(F26=0,0,(SUM($E$25:E25)+F25/2-SUM($E$37:F37))*TIRG_CoC)

18. Logic – If no actual capex is spent, then the allowance is zero, otherwise the allowance is the sum of all previous year's capex allowances plus half the current year allowance less any depreciation advanced, all multiplied by the TIRG agreed cost of capital.

19. **Depreciation allowance**
    =F36+F37

20. Logic – the depreciation allowance is the sum of the regular depreciation and any advance of depreciation

21. **Return allowance**
    =IF(AND(F$4>=PCPeriod,F26=0),IF(SUM(A26:E26)>0,
    TIRG_CoC,PreTaxCoC)*(E41+F41)/2,0)

22. Logic – The TIRG assets only derive an allowance when the allowed capex is 0 and the year is greater than 5 (ie investment has already taken place). If the sum of allowed capex at this point is greater than 0, then it is still within the first year period, and so gets the TIRG specific cost of

capital times the average RAV; otherwise, it get the normal price control pre-tax cost of capital times the average RAV.

23. **Total allowance**
    =SUM(F43:F45)

24. Logic – the total allowance is the sum of the construction allowance, the depreciation allowance and the return allowance

5.7 Notes

1. The Notes sheet contains calculations on the following items:
    a. Tangible assets balance
    b. Pensions payments
    c. Current Tax
    d. Deferred Tax
    e. Debtors & Creditors
    f. Net debt
    g. Gearing
2. The following paragraphs detail the calculations and underlying logic of each of these categories of calculation.

5.7.1 Tangible assets

3. **Net book value bf**
    =IF(E$4>DateSwitch,D16,"-")
4. Logic – The formula ensures the b/fwd (opening) book value in the current year will be the c/fwd (closing) book value in previous year. The use of the conditional if statement creates the exception of 2004 /05where a " –" is returned. For 2004/05 no fixed asset computations were made since the values were derived from splits made on the companies statutory / regulatory accounts
5. **Capex additions**
    =NominalRAV!E15
6. Logic – This takes the capex (in nominal terms) from the Nominal RAV sheet.
7. **TIRG additions**
    =IF(TIRG_Option=1,TIRG!E10*RPI/BaseRPI,0)
8. Logic – If the user selects inclusion of TIRG on the input page then additions from the TIRG page will be returned is adjusted for inflation and hence gives a nominal value. If the user selects exclusion of TIRG the value returned is zero.
9. **Revenue driven investment**
    =IF(RevDrivers=1,INDEX(RD_Scenario,RD_Option*
    3-1,E$4+1)+INDEX(RD_Scenario,RD_Option*3,E$4+1),0)
10. Logic – If revenue drivers are active, then this selects the second and third rows of the three rows relating to the revenue driver scenario selected, ie the local and deep reinforcement quantities. Note that due to the lag on the pass-through of revenue driven capex into the RAV, this sum will be different to the amount going into the revenue driven RAV in that year.
11. **Accounting depreciation**
    =IF(E$4>DateSwitch,AccDepn,"-")
12. Logic – see point 3 above
13. **Assets in the course of construction**
    =IF(E$4=DateSwitch,ACC,"-")

14. Logic – see point 3 above

15. **Fixed Asset Disposals**
    =IF(E$4>DateSwitch,"-",FADisposal)

16. Logic – For 2004/05 returns the FADisposal from the accounts. For all other years returns "-".

17. **Tangible assets (NBV cf)**
    =IF(E$4>DateSwitch,SUM(E9:E15),Input!E64)

18. Logic – Sums rows E9 to E15 to derive the c/fwd (closing) book values of Tangible assets to be disclosed on the balance sheet. The conditional IF statement means that for 2004/05 the value returned is given from the input sheet – since for 04/05 the NBV c/f is not computed but taken from splits made from the regulatory/statutory accounts (as per point 3 above).

5.7.2 Pensions costs

19. **General:**

    The price control has derived allowances for the pension costs. This can be spit into two separate items:

    - Ongoing contributions (Contributions the licensee makes to the pension schemes for both defined contribution and defined benefit)
    - Deficit funding allowances (specific allowances given for the funding of pension deficits associated with the licensee's defined benefit schemes)

    The funding of both these remunerated through both opex allowances and capex allowances (and routed to the balance sheet). The allowances produced in TPCR4 are for 5 years only (i.e run until 2012). For years after this they are assumed to be constant (in real terms) with only adjustments for inflation.

    Ongoing allowances

    As indicated above Ofgem have set allowances for ongoing pension contributions. The accounting entries for normal contributions through opex only. Normal contributions through capex have been included in the capex additions.

    - Accounting for Normal Contributions through opex

    As per other within the financial model operating costs Normal contribution for opex are:

    DR Pension Costs (ongoing) – P&L

    CR Trade Creditors – Balance sheet

    - Accounting for Normal Contributions through capex

    Normal contributions funded through capex are treated as capitalised overheads. Within the model the accounting entries are:

    DR Tangible Assets – Balance Sheet

    CR Cash – Balance Sheet

    Deficit funding for Defined Benefit schemes

    Ofgem have agreed to allow a proportion of costs associated with deficits to be funded through the price control. This amount was determined in

the financial issue workstream and is treated as input to the financial model. The accounting entries for this fall into 3 categories:

- Accounting for the opening deficit
- Accounting for deficit funding through opex allowances
- Accounting for deficit funding through capex allowances

- Accounting the Opening Deficit in 2006/07

The accounting treatment within the model is as follows. In the first instance the 04/05 opening balances used in the balance sheet input already identified a funding deficit. The balance sheet should amount should disclose the allowed deficit to be funded through the price control.

Consequently the accounting entries are for the difference[2]:

DR Reserves (Pensions Deficit Reserve) – Balance Sheet

CR Pension Deficit – Balance Sheet

- Accounting for deficit funding through opex allowances

The deficit is then funded on an annuity basis over period of time specified by the user. This leads to the deficit being repaired and the liability reduced from the balance sheet.

The entries are:

DR Pension Deficit – Balance Sheet

CR Annuity Charge – P&L

CR Cash - Balance Sheet

- Accounting for deficit funding through capex allowances

The accounting entries for capex allowances of deficit funding are the same as for opex shown above.

Since allowances for deficit funding for the purposes of the financial model are capitalised there is an additional entry to reflect this.

DR Tangible Fixed Assets – Balance sheet

CR Cash – Balance sheet

20. **Normal costs funded through opex allowance**
    =IF(Input!E225>0,Input!E225,D19*RPI/PrevRPI)
21. Logic – If an allowance exists in row 225 of the input sheet then the model returns the corresponding value. If there is no input then it takes the previous year value and adjusts it for inflation (thereby deriving a nominal figure)
22. **Normal costs funded through capex allowance**
    =IF(Input!E226>0,Input!E226,D20*RPI/PrevRPI)
23. Logic – as per point 22
24. **Attributable non-allowed deficit**
    =Input!$G$227
25. Attributable pension deficit that is not being covered by the price control allowance is given as an input. This is considered as debt by rating agencies and so is incorporated in the net debt calculation.

[2] The difference referred to is Allowed Pension Deficit less 04/05 opening balance

26. **Deficit amount to be funded**

    =Input!$G$228

27. Logic – This is the allowed deficit funded amount given through the price control, and is given as an input to the model

28. **Annuity Funding over _____ years**

    a. ="Annuity funding over "&TEXT(Input!$H$229,0)&" years"

    b. =IF(AND(E$4>=PCStart,E$4<PCStart+Input!$H$229), $G$22*((1+VWACC)*Compound-1)/ (1-1/((1+VWACC)*Compound)^Input!$H$229),0)

    Logic – (a) The annuity funding period is given as an input. The formula allows this period to be inserted into the title.

    Logic – (b) This formula should be broken into 3 parts:

    I). Logic test:

    AND(E$4>=PCStart,E$4<PCStart+Input!$H$229)

    This checks that the year is greater than or equal to the start year of the control and that the year is less than the start year plus the number of years over which the deficit is to be repaid. If the two tests are true then the AND will return a true value, otherwise there will be no deficit payment.

    II). Condition if True

    $G$22*((1+VWACC)*Compound-1)/(1-1/((1+VWACC)*Compound)^Input!$H$229)

    ANNUITY FORMULA

    If the logic test is true then the value returned is the annuity calculation performed on the amount of deficit allowed. The code representing the annuity formula replicates the following:

$$\frac{\left[(1+r)\times i-1\right]}{\left[1-\frac{1}{\left[(1+r)\times i\right]^{n}}\right]}$$

    Where:

    r is the rate of interest

    i is inflation

    n is years

    III) Condition if false – returns the value 0

29. **Annuity amount funded through opex allowance**

    =E23*Input!E232

30. Logic – Determines the annuitised amount funded through opex

31. **Annuity amount funded through capex allowance**
    =E23*Input!E233

32. Logic - Determines the annuitised amount funded through capex

33. **Total over/(under) funding – opex**
    =Input!E230

34. Logic – Any over/under funding amounts are given as an input. Any previous overfunding adds to the pensions allowance in the price control period, but does not receive tax relief in this control period.

35. **Total over/(under) funding – capex**
    =Input!E231

36. Logic - Any over/under funding amounts are given as an input. Any previous overfunding adds to the pensions allowance in the price control period, but does not receive tax relief in this control period.

37. **Total pension funding through opex**
    =E19+E24+E26

38. Logic – Sums the value of the opex allowances for normal contributions and deficit funding

39. **Total pension funding through capex**
    =E20+E25+E27

40. Logic - Sums the value of the capex allowances for normal contributions and deficit funding

41. **Annual deficit reduction through balance sheet**
    =IF(AND(E$4>=PCStart,E$4<PCStart+Input!$H$229), $G$22/Input!$H$229,0)

42. Logic – The logic test of this conditional statement is as per point 28(b) above. If the logic test is true then it divides the deficit amount by the number of years for the annuity and so reduces the deficit on a straight line basis.

43. **Annual deficit reduction through P&L**
    =E23-E30

44. Logic – Takes the difference between the annuitised deficit value and the balance sheet reduction amounts. This reflects the actual payments that would need to be made to the pension scheme on an annual basis in order to eradicate the deficit within the stated time period.

5.7.3 Profit subject to current tax

45. **General**

    This is the first part of the tax computation and derives the profits chargeable to corporation tax.

46. **Profit before tax**
    =PBT

47. Logic – Takes the profit before tax from the P&L sheets

48. **Add Accounting depreciation**
    =-AccDepn

49. Logic – Takes the accounting depreciation and converts it into a positive value.

50. **Add Other taxable items**
    =IF(E$4>DateSwitch,0,TaxAdd)

51. Logic – as per point 3 above

52. **Less deductible items**
    =IF(E$4>DateSwitch,0,TaxDed)

53. Logic – as per point 3above

54. **Less capitalised pensions + change in deficit**
    =-E29-E30

55. Logic – Deducts capitalised pensions and movements in deficit through the balance sheet which for the purposes of the financial model are treated are tax deductible since they are cash expenses.

56. **Less Revenue driver capex capital allowances**
    =IF(RevDrivers=1,RevDriver!E85,0)

57. Logic – Deducts capital allowances associated with Revenue Drivers.

58. **Less Capital allowances**
    =TaxDepn

59. Logic – Deducts capital allowances associated with capex schedules

60. **Amount subject to current tax**
    =SUM(E34:E40)

61. Logic – Derives the Profits chargeable to corporation tax.

5.7.4 Corporation tax charge

62. **General**

    This is the second part of the tax comp

63. **Amt. subject to corp. tax x corp tax rate**
    =IF(E41>0,E41*CorpTax,0)

64. Logic – If the amount chargeable to corporation tax is positive then the corporation tax charge is levied on that amount – otherwise it returns a value of zero

65. **Prior year adjustments**
    =TaxAdj

66. Logic – Takes the tax adjustments entered by the user on the input page

67. **Corporation tax charge**
    =SUM(E44:E45)

68. Logic – Derives the tax payable by the licensee.

5.7.5 Tax creditors

69. This area derives the tax paid in the year and the tax accrued. The model assumes 50% is paid in the year and 50% is accrued for all periods after 2004/05

70. **Balance bf**
    IF(E$4=0,"-",D52)

71. Logic – Ensures the opening value in the year is the closing value of the previous years with the exception of 2004/05 where no value is returned.

72. **Corporation tax liability**
    =IF(E$4>DateSwitch,E46,"-")

73. Logic – Returns the corporation tax liability charge derived above with the exception of 2004/05 where no tax computation is made (information taken as input to the model)

74. **Tax paid**
    =IF(E$4>DateSwitch,-E49-E50/2,Input!E106)

75. Logic – For all years after 2004/05 this the pays 50% of the tax incurred in the year. For 2004/05 it returns a value from the input page.

76. **Balance cf**
    =IF(E$4>DateSwitch,SUM(E49:E51),Input!E85)

77. Logic – For all years after 2004/05 sums relevant rows to determine the closing (C/fwd) tax provision balance. For 2004/05 takes the value set by the user on the input page.

5.7.6 Deferred tax: P&L charge and BS provision - UK GAAP

78. **General**

    The tax derived in P&L / income statement will rarely equate to the charge levied by the tax authorities. Differences can be attributed to the following factors

- timing differences (such as pension liabilities accrued in the financial statements but not allowed for tax until the payments are actually made)
- permanent differences (such as certain types of expenses)

Deferred tax in the model follows the UK GAAP approach and hence models only timing differences. As such it takes the difference between the accounting depreciation and the capital allowances and multiplies it by the corporation tax rate.

Deferred tax charge = (Corp tax chg – Capital Allowance) * 30%

The logic of the IF statements follow the same reasoning as shown in earlier paragraphs above.

79. **Accounting depreciation**
    =E35

80. **Capital allowances**
    =-TaxDepn

81. **P&L charge @tax rate**
    =IF(E$4>DateSwitch,E67*CorpTax,Input!E61)

82. **Deferred tax BS provision bf**
    =IF(E$4=0,"-",D73)

83. **Deferred tax for year**
    =IF(E$4>DateSwitch,E69,Input!E61)

84. **Deferred tax BS provision cf**
    =IF(E$4>DateSwitch,SUM(E71:E72),Input!E84)

5.7.7 Trade Debtors

85. **General**

    The financial model assumes sales are made on credit and that the Trade debtors value is unpaid invoices at year end. The trade debtors are taken as being product of turnover and average debtor days set by the user.

86. **Turnover**
    =IF(E$4>DateSwitch,'P&L'!E8,"-")

87. Logic – as per point 3 above

88. **Debtor days**
    =IF(E$4>DateSwitch,DDays,"-")

89. Logic – as per point 3 above

90. **Year End Receivables (Debtors)**
    =IF(E$4>DateSwitch,E76*E77/(E3-D3),Input!E68)

91. Logic – For all years after 2004/05 performs the calculation of the Debtors value and replicates the formula:

$$Debtors = Sales \times \frac{debtor\_days}{365}$$

92. **Change in Debtors in year**
    =IF(E$4>DateSwitch,E78-D78,"-")

93. Logic – a per point 3 above

5.7.8 Loans due from other Group companies

94. **General**

    This represent loans made by the licensee to other (related) companies with the group. The model assumes that these loans are interest bearing – where interest is defined as the nominal cost of debt.

95. **Opening balance**
    =IF(E$4=0,"-",D86)

96. Logic – as per point 3 above

97. **Interest in Year**
    =IF(E$4>DateSwitch,E83*((1+RFR+DP)*(RPI/PrevRPI)-1),"-")

98. Logic – This formula calculates the interest due to the company where the nominal cost of debt is represented by the code
    (1+RFR+DP)*(RPI/PrevRPI)-1)

99. **Interest received in year**
    =IF(E$4>DateSwitch,E84*Accrual*-1,"-")

100. Logic – The model allows for a proportion of interest due to the licensee to be accrued and carried forward. However, the variable Accrual is set to 1 in the Input sheet, so that all interest is assumed to be paid/received at year end. To avoid circularity in interest and revenue calculations, all interest is calculated on year end balances rather than mid-year averages.

101. **Closing balance**
    =IF(E$4>DateSwitch,SUM(E83:E85),Input!E69)

102. Logic – as per point 3 above

5.7.9 Trade Creditors

103. **General**

    The logic of the Trade Creditors calculations follows those of the Trade Debtors

104. **Operating costs**
    =IF(E$4>DateSwitch,-SUM('P&L'!E9:E13),"-")

105. **Creditor days**
    =IF(E$4>DateSwitch,CDays,"-")

106. **Year End Payables**
    =IF(E$4>DateSwitch,E94*E95/(E$3-D$3),Input!E78)

107. **Change in Creditors in year**
    =IF(E$4>DateSwitch,E96-D96,"-")

5.7.10 Overdrafts

108. **General**

    Although this represents a liability the logic of the calculations closely follows those of Loans due from other Group companies

109. **Opening balance**
    =IF(E$4=0,"-",D104)

110. **Interest in Year**
    =IF(E$4>DateSwitch,E101*((1+RFR+DP)*(RPI/PrevRPI)-1),"-")

111. **Interest paid in year**
    =IF(E$4>DateSwitch,E102*Accrual*-1,"-")

112. **Closing balance**
    =IF(E$4>DateSwitch,SUM(E101:E103),Input!E76)

5.7.11 External Loans

113. **General**

    External loans are those loans payable to parties outside of the group structure. Although this represents a liability the logic of the calculations closely follows those of Loans due from other Group companies

114. **Opening balance**
    =IF(E$4=0,"-",D110)

115. **Interest in Year**
=IF(E$4>DateSwitch,E107*((1+RFR+DP)*(RPI/PrevRPI)-1),"-")

116. **Interest paid in year**
=IF(E$4>DateSwitch,E108*Accrual*-1,"-")

117. **Closing balance**
=IF(E$4>DateSwitch,SUM(E107:E109),Input!E75)

5.7.12 Loans due to other Group companies

118. **General**

"Loans due to other group companies" are those loans payable to other (related) companies inside the group structure. Although this represents a liability the logic of the calculations closely follows those of Loans due from other Group companies

119. **Opening balance**
=IF(E$4=0,"-",D116)

120. **Interest in Year**

=IF(E$4>DateSwitch,E113*((1+RFR+DP)*(RPI/PrevRPI)-1),"-")

121. **Interest paid in year**
=IF(E$4>DateSwitch,E114*Accrual*-1,"-")

122. **Closing balance**
=IF(E$4>DateSwitch,SUM(E113:E115),Input!E77)

5.7.13 Overdrafts >1year – see above

123. **Opening balance**
=IF(E$4=0,"-",D125)

124. **Interest in Year**

=IF(E$4>DateSwitch,E122*((1+RFR+DP)*(RPI/PrevRPI)-1),"-")

125. **Interest paid in year**
=IF(E$4>DateSwitch,E123*Accrual*-1,"-")

126. **Closing balance**
=IF(E$4>DateSwitch,SUM(E122:E124),Input!E80)

5.7.14 External Loans > 1 year - see above

127. **Opening balance**
=IF(E$4=0,"-",D132)

128. **Interest in Year**
=IF(E$4>DateSwitch,E128*((1+RFR+DP)*(RPI/PrevRPI)-1),"-")

129. **Interest paid in year**
=IF(E$4>DateSwitch,E129*Accrual*-1,"-")

130. **Transfers from cash balance**
=E148

131. Logic – see cash balance below

132. **Closing balance**
=IF(E$4>DateSwitch,SUM(E128:E131),Input!E81)

5.7.15 Loans due to other Group companies >1 year – see above

133. **Opening balance**
=IF(E$4=0,"-",D138)

134. **Interest in Year**
=IF(E$4>DateSwitch,E135*((1+RFR+DP)*(RPI/PrevRPI)-1),"-")

135. **Interest Rec'd**
=IF(E$4>DateSwitch,E136*Accrual*-1,"-")

136. **Closing balance**
=IF(E$4>DateSwitch,SUM(E135:E137),Input!E82)

137. **Total interest accrued in year**
=IF(E$4>DateSwitch,
-(E102+E108+E114+E123+E129+E136),Input!E56)

138. **Total interest paid in year**
=IF(E$4>DateSwitch,
E103+E109+E115+E124+E130+E137,Input!E102)

5.7.16 Cash balance

139. **General**

This determines the cash balance to be disclosed on the balance sheet. The cash generated with the year and disclosed in the cashflow statement is computed here with the resulting balance netted off against External loans >1 year. In netting cash against External Loans it reduces the licensee's interest costs as determined within the model when cash is positive. When cash balance is negative it ensures they bear interest. As described in paragraph 100, all interest is calculated on year end balances rather than mid-year averages.

140. **Opening balance**
=IF(E$4=0,"-",D149)

141. Logic – as above

142. **Additions/(deductions) in year**
=IF(E$4>DateSwitch,CF!E51,"-")

143. Logic – Takes the value derived from the cashflow statement for all years after 2004/05

144. **Transfers to long-term external loans**
=IF(E$4>DateSwitch,IF(SUM(E128:E129)>E147,
-E147,-SUM(E128:E129)),"-")

145. Logic – For years after 2004/05 if the cash balance is less than the opening external loan value plus interest then it returns a value to net off against the cash balance. For example if the cash balance is +£10m then a value of -£10m is returned (and vice versa) up to the amount of the external loan. Given the objective of transferring cash balances using the

external loans in this way ensures that positive cash balances are not erroneously creating scenarios where cash is gaining interest at the nominal cost of debt.

146. **Closing balance**
=IF(E$4>DateSwitch,SUM(E147:E148),Input!E71)

5.7.17 Net debt calculation

147. **General**

Net debt within the model is defined as:

Overdrafts	x
External Loans (<1 year)	x
Loans due to Other Group Companies (<1 year)	x
Overdrafts (>1 year)	x
External Loans (>1 year)	x
Loans due to Other Group Companies (> 1 year)	x
Cash	(x)
Net Debt	x

148. **Debt balance c/f (£m, Nominal)**
=IF(E$4>DateSwitch+1,D159,IF(E$4=DateSwitch+1,-(E135+E128+E122+E113+E107+E101)+E145,Input!E118))

149. Logic – For 2004/05 it produces the opening net debt value as per the table above. For all other years it takes the previous years c/fwd value.

150. **(Increase)/Decrease in net debt in year (£m, Nominal)**
=IF(E$4>DateSwitch,E141-E142,-CF!E47)

151. Logic – For all years after 2004/05 it returns the value being the difference between interest paid and accrued.

152. **Movements in deposits (£m, Nominal)**
=Input!E120

153. **Attributable non-allowed deficit**
=-E21

154. Logic – Attributable non-allowed deficit is considered to be debt, so this is added to the make-up of debt

155. **Change in cash from cashflow (£m, Nominal)**
=CF!E51

156. Logic – The change in cash from cashflow adds or decreases to net debt in the year

157. **Other non-cash changes (£m, Nominal)**
=IF(E$4>DateSwitch,0,Input!E122)

158. Logic – The model does not cater for non-cash changes in years subsequent to the start year, where this value constitutes an input

159. **Net debt at year end (£m, Nominal)**
=SUM(E153:E158)

5.7.18 RAV build-up

160. **Closing Nominal RAV**
    =NominalRAV!E17

161. Logic – this represents the closing value of the Nominal RAV

162. **TIRG RAV (Nominal)**
    =IF(TIRG_Option=1,TIRG!E11*FBPQ_Convert,0)

163. Logic – If TIRG is included in the calculations, the TIRG closing RAV is indexed for inflation from 04/05 prices, otherwise the value is zero

164. **Revenue driven RAV**
    =IF(RevDrivers=1,RevDriver!E48,0)

165. Logic – If Revenue driven capex is included in the calculations, the net value of the revenue driven RAV is included in the RAV build-up, otherwise it is zero

166. **Gearing as % of Closing Nominal RAV**
    =IF(E159<0,ABS(E159)/E165,0%)

167. Logic – If the net debt value is negative, then the regulatory gearing level is the absolute level of net debt divided by the total nominal RAV, otherwise it is set at 0% (the gas model states “nm” instead)

168. **Additional equity required to stay below gearing level**
    =IF(E$4<PCStart,0,IF(AND(E167>Gearing,E159<0),
    E165*(E167-Gearing),0))

169. Logic – If the year is before the start of the price control, the gearing level of the company is not relevant for the control, so the additional equity that might be required is not calculated. Otherwise, if the calculated gearing level is above the threshold level (Gearing) and the net debt is less than zero, the additional equity required to return to the threshold level is the (actual gearing –target gearing) * total nominal RAV. If the gearing level is below the threshold, then the equity required is zero.

5.8 Revenue Drivers – Electricity

1. The models each have a sheet for the calculation of revenue-driven investment, ie investment which is sufficiently uncertain to included in the base price control, but for which allowance needs to be made in order to avoid it triggering a reopener
2. The nature of the revenue-driven incentive schemes are very different for both gas and electricity, so they are documented in separate sections
3. Revenue driven investment in the electricity model is dealt with on the RevDriver sheet. This has three sections:

- a summary section, which shows the profile of the capacity and investment for the chosen scenario
- a RAV section, which shows the development of the revenue driven RAV
- a capital allowance section, which calculates the capital allowances arising as a result of the revenue driven investment

4. The impact of the revenue driver is assessed on a post-tax basis, ie the revenue driven investment is fully integrated into the baseline allowance model. When selected to be active, it affects the model output through:

- revenue driven RAV additions are added to the baseline RAV additions in the PostTaxRev calculations
- the revenue driven RAV forms part of the total RAV, thereby affecting both the change in present value of the RAV (in revenue calculations) and the gearing (for financial ratios, etc)
- the target investment levels impact on the cash flow, under the capital expenditure & financial investment heading
- the investment is also added to the Tangible assets balance in the Notes worksheet
- the capital allowances are accounted for in the current tax calculation on the Notes worksheet

5. **Pass-through proportion %**
   =Input!E264
6. Logic – The proportion of pass through on revenue driven capex is an input variable
7. **Assumed asset life (years)**
   =Input!E265
8. Logic – The asset life on revenue driven capex is an input variable
9. **Revenue driver (£m/MW)**
   =Input!E266
10. Logic – The revenue driver value is an input variable
11. **Lag from initial capex to revenue driver activation (years)**
    =Input!E267
12. Logic – The lag period is the time taken for the remainder (ie 1-pass through %) of the capex to be included in the RAV, and is an input value
13. **Scenario header**
    ="Scenario =
    "&TEXT(INDEX(UserInterface!$B$76:$B$80,RD_Option),)

14. Logic – The scenario header is taken from the same range used to populate the scenario selection box on the UserInterface sheet. The index function selects the appropriate entry from the list, using the RD_Option variable to determine the correct entry.

15. **Incremental capacity available (MW)**
    =INDEX(RD_Scenario,RD_Option*3-2,E$4+1)

16. Logic – The data for the revenue driver scenarios is given in the RD_Scenario range. This comprises three lines of information for each scenario; the incremental capacity in MW, the cost of local reinforcement work for that associated capacity and the cost of deep reinforcement work associated with that capacity. The capacity for a given year is obtained using the index function to identify the data input range (RD_Scenario), the row number in this range (the scenario option chosen * 3 [since each scenario comes in a block of 3 rows] -2 [because it is the first row of this block]) and the column number (the formula year +1, since the model uses a base year of 0).

17. **Capex on local reinforcement (£m, Nominal)**
    =INDEX(RD_Scenario,RD_Option*3-1,E$4+1)

18. Logic – As with capacity, but the row number is one greater

19. **Capex on deep reinforcement (£m, Nominal)**
    =INDEX(RD_Scenario,RD_Option*3,E$4+1)

20. Logic - As with capacity, but the row number is two greater

21. **Cumulative incremental capacity available (MW)**
    =IF(E$4<=$E$11,
    SUM(INDEX(RD_Scenario,RD_Option*3-2,1)
    :INDEX(RD_Scenario,RD_Option*3-2,E$4+1)),
    SUM(INDEX(RD_Scenario,RD_Option*3-2,E$4+1)
    :INDEX(RD_Scenario,RD_Option*3-2,E$4+1-$E$11)))

22. Logic – If the formula year is less than or equal to the asset life, then the cumulative incremental capacity available is the sum of the capacities on the relevant row from the first column of RD_Scenario range to the current year. Once the year is greater than the asset life, then the available capacity is the sum of the capacity from the current year over the previous asset life number of years.

23. **Cumulative capex on local reinforcement (£m, Nominal)**
    =IF(E$4<=$E$11,
    SUM(INDEX(RD_Scenario,RD_Option*3-1,1)
    :INDEX(RD_Scenario,RD_Option*3-1,E$4+1)),
    SUM(INDEX(RD_Scenario,RD_Option*3-1,E$4+1)
    :INDEX(RD_Scenario,RD_Option*3-1,E$4+1-$E$11)))

24. Logic - As with capacity, but the row number is one greater

25. **Net capex on deep reinforcement (£m, Nominal)**
    =IF(E$4<=$E$11,
    SUM(INDEX(RD_Scenario,RD_Option*3,1)
    :INDEX(RD_Scenario,RD_Option*3,E$4+1)),
    SUM(INDEX(RD_Scenario,RD_Option*3,E$4+1)
    :INDEX(RD_Scenario,RD_Option*3,E$4+1-$E$11)))

26. Logic - As with capacity, but the row number is two greater

27. **RAV addition on local reinforcement - pass through (£m)**
    =$E$10*E18

28. Logic – The local reinforcement pass-through additions in a given year are that year's capex additions * the pass through element

29. **RAV addition on local reinforcement - revenue driven (£m)**
    =IF(E$4<PCStart,0,(1-$E$10)*$E$12*
    OFFSET(E17,,-$E$13)*RPI/INDEX(RPI,,E$4-$E$13+1))

30. Logic – Prior to the start of the control period, there is no allowance for the revenue driven element to be added to RAV. The revenue driven RAV addition is (1 – pass through portion) * revenue driver * incremental capacity offset by the negative lag, all indexed up to account for the increase in RPI over the intervening lag period

31. **RAV addition on deep reinforcement - pass through (£m)**
    =$E$10*E19

32. Logic - The deep reinforcement pass-through additions in a given year are that year's capex additions * the pass through element

33. **RAV addition on deep reinforcement - revenue driven (£m)**
    =IF(E$4<PCStart,0,(1-$E$10)*
    OFFSET(E19,,-$E$13)*RPI/INDEX(RPI,,E$4-$E$13+1))

34. Logic – As with point 29 above, but using the deep reinforcement costs as the basis for the offset function. There is no deep reinforcement revenue driver in this model, so it effectively models deep reinforcement as a total pass-through, but with a time-lag.

35. **Annual additions to RAV**
    =SUM(E25:E29)

36. Logic – The total additions are the sum of the pass-through elements and the revenue driven elements for a given year.

37. The logic and formulae for the RAV and the capital allowance calculations are the same as those found in the detailed respective sections of the manual

5.9 Revenue drivers – gas entry

1. Revenue driven entry investment in the gas model is dealt with on the EntryRevDriver sheet. This has three sections:

- a project cost and revenue calculation section, which shows the costs and revenues for the chosen scenario
- a RAV section, which shows the development of the revenue driven RAV and the subsequent transfers into the main RAV
- a capital allowance section, which calculates the capital allowances arising as a result of the revenue driven investment

2. The impact of the gas entry revenue driver is assessed on a post-tax basis, ie the revenue driven entry investment is fully integrated into the baseline allowance model. When selected to be active, it affects the model output through:

- the revenue driven RAV forms part of the total RAV, thereby affecting both the change in present value of the RAV (in revenue calculations) and the gearing (for financial ratios, etc)
- the target investment levels impact on the cash flow, under the capital expenditure & financial investment heading
- the investment is also added to the Tangible assets balance in the Notes worksheet
- the capital allowances are accounted for in the current tax calculation on the Notes worksheet

3. The project cost for a given entry point is given by the formula

```
=IF(OR(INDEX(RDScenario,$B9,)=0,SUM($F9:F9)>0),0,
HLOOKUP(SUM(INDEX(RDScenario,$B9,1)
:INDEX(RDScenario,$B9,6)),RevDriver,$B9+1,TRUE)*
SUM(INDEX(RDScenario,$B9,1):INDEX(RDScenario,$B9,6))/100)
```

4. Logic – The range RDScenario gives the projected new entry capacity by entry point by year for the chosen scenario. The range RevDriver gives the cost per kWh for a given capacity. It is assumed that the developer of the pipeline will chose the optimal capacity line to accommodate all capacity signals within the period, at the point from which the first capacity signal is received. For example, if a signal for 200mscmd is received in year one of the control and a further 200mcmsd signal is received in the fourth year, the developer will begin building a line of 400mcmsd at the first year of the price control. If the capacity signal for the chosen year is zero, or the sum of the signals for the previous years is greater than zero, then the capacity build signal for that year is zero (if any of the previous years are greater than zero, any current year build will be accommodate the current year's capacity signal). Otherwise, the correct revenue driver value to use is obtained by summing the capacity across the relevant row of the RDScenario range and using the HLOOKUP function on the RevDriver range, using the entry point identifier to find the correct row reference. This value is multiplied by the capacity total in the row to get the project cost.

5. The associated project cash flows for each project follow a designated four year profile applied to the individual project cost. The formula for assigning a given year's cost is

=IF(SUM(D9:G9)>0,SUM(D9:G9)*
INDEX(CapexProfile,1,FindOffset(G9)),0)

6. Logic – If the sum of the corresponding entry point capex in this year and the previous three years is greater than zero, then the cost in that year is the total cost * the proportion of costs for that year as designated by the profile.

7. The gas entry revenue driver revenue associated with each entry point's project is given by the formula
   =IF(AND(SUM(C37:G37)>0,SUM(H37:K37)=0),
   SUM($G9:H9)*(VWACC/(1-1/(1+VWACC)^PostVestLife)),0)

8. Logic – The revenue driver begins to return revenue from the point at which the construction revenue is in its last year, and it pays an annuity for five years. At the end of these five years, the depreciated value of the investment transfers into the main RAV, with a life of forty years. The criteria for checking whether an annuity payment is due are that the sum of the construction payments relating to that entry point for the previous five years is greater than zero and that the sum of the next four years construction payments are zero (as otherwise, it is not in the last year of the construction period). If these criteria are met, then the annuity payment is made on the sum of the construction costs, discounted at the vanilla WACC over the life of the asset.

9. The RAV calculations are as standard, with the exception of the transfers out of RAV after five years. The **Transfers into TO RAV proper** is given by
   =IF(ISNUMBER(OFFSET(E98,-1,-5)),OFFSET(E98,-1,-5),0)

10. Logic – The net cost of the capex to transfer is the capex in five years previously; this is found using the OFFSET function on the net capex additions row. The ISNUMBER function is used to avoid errors being generated in the early years, where the OFFSET function returns text label entries.

11. **Disposals from RAV (including transfers)**
    =E98

12. Logic – Since the capex is never fully depreciated from this RAV, the only movements out are transfers after the initial five years; this is given by the Transfers into TO RAV proper line.

13. **Depreciation from disposals**
    =E104/9

14. Logic – The depreciation accumulated on the transferred capex is five years out of 45 = 1/9 of the initial cost

15. **Net transfer to TO RAV(@ 40 year life)**
    =E104-E110

16. Logic – the net value of transferred RAV is cost less accumulated depreciation

17. **Total capex outflow**
    =E62*FBPQ_Convert

18. Logic – the nominal value of the capex is the real 04/05 value indexed for inflation

19. **Depreciation**
    =E109*FBPQ_Convert

20. Logic – the nominal value of the depreciation is the real 04/05 value indexed for inflation

21. **Annuity payment**
    =E90*FBPQ_Convert

22. Logic – the nominal value of the annuity payment is the real 04/05 value indexed for inflation

23. **Total revenue inflow**
    =SUM(E122:E123)

24. Logic – the total revenue from the revenue driver is the sum of the depreciation and annuity allowances

25. The remainder of the sheet calculates capital allowances, in line with the methods on the Depn sheet

5.10 Revenue drivers – gas exit

1. Revenue driven exit investment in the gas model is dealt with on the ExitRevDriver sheet. This has three sections:

- a project cost and revenue calculation section, which shows the costs and revenues for the chosen scenario
- a RAV section, which shows the development of the revenue driven RAV and the subsequent transfers into the main RAV
- a capital allowance section, which calculates the capital allowances arising as a result of the revenue driven investment

2. The impact of the gas exit revenue driver is assessed on a post-tax basis, ie the revenue driven entry investment is fully integrated into the baseline allowance model. When selected to be active, it affects the model output through:

- the revenue driven RAV forms part of the total RAV, thereby affecting both the change in present value of the RAV (in revenue calculations) and the gearing (for financial ratios, etc)
- the target investment levels impact on the cash flow, under the capital expenditure & financial investment heading
- the investment is also added to the Tangible assets balance in the Notes worksheet
- the capital allowances are accounted for in the current tax calculation on the Notes worksheet

3. Project cost per exit point is given by
   =VLOOKUP($C9,ExitCosts,3,FALSE)*Input!F355
4. Logic – the projected project cost per exit point is obtained from the ExitCosts range, and this is multiplied by the values in the related Input range (which is a simple matrix of 0's and 1's to signify no go/go respectively) to determine if the project goes ahead in that year.
5. Project cash flow per exit point project is given by
   =H9*FirstYearSpend+G9*SecondYearSpend
6. Logic – The project capex follows a set profile; 20% of the total cost occurs two years prior to activation, the remainder in the year before activation. Any capex requirements for two years time will now require 20% of the indicated total project cost, and requirements signalled for one years time will be spending 80% of the total project cost.
7. Revenue driver revenue per exit point project is given by
   =IF(OR(SUM($F9:F9)=0,SUM(B9:F9)=0),0,
   SUM(B9:F9)*UCACONV*RevIndex/100)
8. Logic – If the sum of the capex requirements to date are zero, or the sum of the capex requirements for the previous five years are zero, then the revenue driver revenue due is zero. Otherwise, the revenue is the sum of the previous five years' capex multiplied by a set annuity factor and further indexed for anticipated increases in construction costs, above the rate of inflation (ie this is still in real 04/05 prices)
9. The RAV calculations are identical to those in the gas entry section; see that for further details.

10. Capex outflows and revenue inflows are as per the gas entry section, with the exception that exit does not have an explicit depreciation element. This is because depreciation has been accounted for in the derivation of the annuity factor.
11. The remainder of the sheet calculates capital allowances, in line with the methods on the Depn sheet

5.11 Ratios

1. The ratios page calculates key financial ratios, using data from the other calculation sheets.
2. **(Funds from operations + Interest) / net interest**
   =(CF!E$15+CF!E$24)/ABS('P&L'!E$19+'P&L'!E$21)
3. Logic – The standard definition of Funds from operations (FFO) is net cash inflow from operations after interest and tax are deducted. However, ratings agencies use the ratio FFO/Interest as net cash inflow from operations after tax is deducted, ie interest is not deducted. To distinguish this FFO from the standard FFO, we have called it (FFO + interest). The numerator inputs come from the cash flow statement, and the denominator is the sum of interest received and interest paid from the P&L.
4. **Funds from operations / net debt**
   =IF(Notes!E$159>=0,"nm",
   (CF!E$15+CF!E18+CF!E$24)/ABS(Notes!E$159))
5. Logic – If net debt is greater than zero, (ie a cash surplus), this ratio is not meaningful; otherwise, the cash flow elements for standard FFO as described above form the numerator, while the absolute value of net debt is the denominator. The gas model does not have the net debt check.
6. **Net debt / Closing RAV**
   =Notes!E167
7. Logic – This copies the value already calculated in Notes worksheet
8. **Equity injection (£m, Nominal)**
   =IF(CF!E43>=0,SUM(CF!E43:E45),SUM(CF!E44:E45))
9. Logic – If regearing requires an equity input, the equity injection amount includes this amount, otherwise the equity input is the sum of pre-emptive input and other normal equity issues/redemptions.
10. **TWDV / Opening RAV** (TWDV= Tax write down value)
    =(Depn!E$104+Depn!E$115+Depn!E$125+Depn!E$135
    +Depn!E$145)/NominalRAV!E$13
11. Logic – this ratio expresses the sum of the opening values of the capital allowance pools as a proportion of the Nominal opening RAV
12. **Tax charge / PBT**
    =ABS('P&L'!E$23/'P&L'!E$22)
13. Logic – this ratio expresses the current tax charge as a proportion of the profit before tax
14. **Retained cash / Total capex**
    =(CF!E$15+CF!E$21+CF!E$24+CF!E$27+CF!E$30)
    /ABS(SUM(CF!E37))
15. Logic – Retained cash is the sum of all cash flows prior to capex and financing; total capex is the sum of base capex, revenue driven capex and TIRG (TIRG applies to electricity only)
16. **Retained cash / Net debt**
    =(CF!E$15+CF!E$21+CF!E$24+CF!E$27+CF!E$30)
    /ABS(Notes!E$159)
17. Logic – This uses retained cash as above and net debt as calculated in the Notes sheet

5.12 PostTaxRev sheet

1. The PostTaxRev sheet uses data from other sheets to calculate the allowed revenues over the price control period(s). There are three main parts to the sheet; input sections for calculation of discounting factors, input sections for determining the allowed revenues and an area used to perform a goal-seek on the tax allowance.
2. The first section uses the cost of capital components to calculate the vanilla weighted cost of capital, which is used in deriving the appropriate discount factors used when doing net present value calculations.
3. **Pre-tax cost of debt**
   =RFR+DP
4. Logic – The cost of debt is the risk-free rate plus the debt premium
5. **Post-tax cost of equity**
   =RFR+ERP*Beta
6. Logic – The cost of equity is the risk-free rate plus beta*equity premium
7. **Gearing**
   =Gearing
8. Logic – This is the target gearing
9. **Vanilla WACC**
   =E7*E9+E8*(1-E9)
10. Logic – The vanilla WACC is the cost of debt*gearing plus the cost of equity*(1 – gearing)
11. The vanilla WACC (VWACC) is used to derive discount factors
12. **Price control revenue** (discount factor)
    =1/(1+H10)^(H4-2.5)
13. Logic – The discount factor for each year's revenue is 1/((1 + VWACC) to the power of formula year -2.5). 2.5 is used because: a)the first formula year of the control period is 3 and b) the revenues are assumed to be received on an even and continuous basis throughout the year, so the year mid-point is taken as the average for discounting
14. **Closing RAV** (discount factor)
    =1/(1+G10)^(G4-2)
15. Logic – The closing RAV is discounted at year end
16. **Revenue Adjustment factor**
    =IF(MOD(H$4-3,5)=0,1,G15*(1+XFactor))
17. Logic – The revenue adjustment relates to the X factor in the RPI +X regulation, where X represents the year-on-year change to revenues following the initial year revenue. If the remainder of (formula year -3)/5 is zero, then the year must be the first of a five year control, so there is no revenue adjustment (ie factor=1). If there is a remainder, then the revenue factor is the previous year's factor multiplied by (1+X)
18. **Revenue index**
    =H13*H15
19. Logic – The end revenue index is the product of the base discounting factor and the revenue adjustment factor

20. **Controllable operating costs**
    =-'P&L'!H9
21. Logic – The controllable costs are given in the P&L; the sign is changed as in this instance, it is a positive part of the revenue allowance
22. **Non-controllable operating costs**
    =-'P&L'!H10
23. Logic – As with controllable costs
24. **Pension costs**
    =Notes!H28
25. Logic – The opex element of pensions is given in the Notes
26. **RAV additions**
    =NominalRAV!H15+IF(RevDrivers=1,RevDriver!H30,0)
27. Logic – RAV additions are given by the base RAV additions plus any revenue driven additions (gas includes the entry and exit revenue driven capex)
28. The next block of entries convert the above cost elements into real prices through multiplying the nominal values by BaseRPI/RPI and then sum the total of the individual components using the SUM function
29. **Present value of price control revenue**
    =H38*H13
30. Logic – The present value of each year's revenue is the sum for that year * the price control revenue discount factor (see 12 above)
31. **Sum of Present values (5 year blocks)**
    =SUM(H39:L39)
32. Logic – The sum of the revenues is the sum of the five individual Present Values
33. **Opening RAV**
    =(RealRAV!H10+IF(RevDrivers=1,
    (RevDriver!H35-RevDriver!H43)*BaseRPI/RPI,0))*G14
34. Logic – The present value of the opening RAV is the sum of the base RAV opening position plus (if revenue drivers are active) the revenue driven cost less accumulated depreciation indexed into real terms, all multiplied by the RAV discount factor
35. **Present value of closing RAV**
    =(ClosingRAV+IF(RevDrivers=1,
    RevDriver!L48*BaseRPI/RPI,0))*L14
36. Logic – AS with opening RAV, except the net value of the closing RAV as calculated on the RAV sheet is used
37. **Difference of opening and closing RAV**
    =H43-L44
38. Logic – Opening PV less closing PV
39. **Total PV over 5 years**
    =L40+L45
40. Logic – The total PV of the costs is the sum of the two 5 year PV calculations
41. Excluded services revenues are revenues which the licensees receive but which are not regulated. Because the costs of these services are included

in the cost components which make up the revenue allowance, their PV is netted off the PV of the costs to show the PV for which the licensee needs to be remunerated. This PV becomes the base for setting revenue allowances during the control period. The logic underlying these calculations is as per the other cost calculations and are not repeated here.

42. **Sum of discounting factors**
    =SUM(H16:L16)

43. Logic – The sum of discounting factors, including the revenue profiling effects, is calculated using the SUM function.

44. **Annual allowance**
    =$L53/$L54 (in first year), =$H56*I15 (subsequent 4 years)

45. Logic – The first year revenue is the sum of the PV of the revenue divided by the sum of the discount factors, in subsequent years the revenue changes in line with the annual revenue adjustment factor

46. Subsequent three lines add back the excluded services revenues, take the PV of the annual revenues and sum them to demonstrate that the PV of the total revenue is in agreement with the total PV of revenue calculated earlier (see point 39)

47. **Total post-tax turnover (Nominal)**
    =H58*RPI/BaseRPI

48. Logic – The revenue is converted to nominal through indexing by RPI/BaseRPI

49. The last section is used for conducting a goal seek on the tax allowance as calculated in the P&L and the tax cost in the revenue allowance. Row 66 gets the tax charge from the nominal P&L, row 67 gets the value of tax cost from the revenue build up (row 27) and row 68 sums rows 66 and 67.

6.0 Output worksheets

1. There are two output sheets in the model; PC_POut (Price control printout) and Output. Each of these will be described in turn.

6.1 PC_POut

2. The format of PC_POut is set to produce price control tables for Ofgem publications. It generally just replicates values from the calculation sheets, but has some inbuilt checks to highlight any unexpected differences from these sheets.

3. **Table header**
   =IF(ABS(SUM(PostTaxRev!H68:L68))>0.005,TaxWarning,RealLabel)

4. Logic – If the sum of the differences between the P&L tax charge and the tax allowance for all five years of the control are greater than £0.005m, then the table displays a warning that the tax calculation needs to be run; otherwise, the solution is deemed to be stable

5. **Licensee label**
   ="Licensee = "&TEXT(CHOOSE(UserInterface!$B$34,"SHETL", "SPTL","NGET TO","___"),)

6. Logic – The licensee is identified by using the user interface menus selections to select the appropriate text from the CHOOSE function

7. All formulae in the RAV calculations, allowed items and revenue sections either take data direct from the PostTaxRev sheet or replicate the formulae used on that sheet to provide data in the appropriate format. The exception is the 06/07 price control revenue formula, which uses a CHOOSE statement to select the 06/07 revenue for the licensee.

8. **IFI revenue (0.4% of line 17)**
   =MAX(H24*0.4%,0.5)

9. Logic – the IFI revenue is 0.4% of the price control revenue, but with a minimum allowance of £0.5m (which includes the pass-through element)

10. **Line 22 header** (electricity only)
    =IF(UserInterface!$B$34=3,"Mini-review reconciliation", "Capex roller incentive")

11. Logic - The Scottish companies' revenues are subject to a capex roller incentive adjustment, whereas NGET is not but has a different revenue adjustment as a result of its one-year rollover control.

6.2 Output sheet

12. The Output sheet collates information from the calculation sheets into various related blocks. It also has a summary table highlighting which options have been selected for the model run. The only independent calculation on this sheet (apart from simple five year summations over the price control period) relate to regulatory depreciation, return and net capex, so only these will be expanded on in this section.

13. **Regulatory Depreciation**
    =RealRAV!E11+IF(TIRG_Option=1,-TIRG!E15,0)
    +IF(RevDrivers=1,-RevDriver!E44*BaseRPI/RPI,0)

14. Logic – Sums the depreciation from the different RAVs if they are active

15. **Return (V WACC*Avg RAV)**

    =-(PostTaxRev!E10*RealRAV!E16+IF(TIRG_Option=1,TIRG!E16,0))

16. Logic – This estimates the return element by multiplying the vanilla WACC by the average RAV (which will include any relevant revenue driven RAV components) and adding the return element of TIRG (which has a different WACC)

17. **Net capex label**

    =IF(TIRG_Option=1,IF(RevDrivers=1,"Net Capex (INCLUDES TIRG & Revenue drivers)","Net Capex (INCLUDES TIRG)"), "Net Capex (EXCLUDES TIRG)")

18. Logic - If TIRG and Revenue drivers are selected, the label will indicate both are included, otherwise, if just TIRG selected, the label indicates TIRG included. Neither selection returns the label “excludes TIRG”

19. **Net Capex (EXCLUDES TIRG)**

    =IF(TIRG_Option=1,IF(RevDrivers=1,RealRAV!E12+TIRG!E10+ (RevDriver!E18+RevDriver!E19)*BaseRPI/RPI, RealRAV!E12+TIRG!E10),RealRAV!E12)

20. Logic – If revenue drivers selected, the local and deep reinforcement components are added and indexed back to 04/05 prices before being added to the base and TIRG components; otherwise, just a straight addition of the relevant components.

Appendix 1: Determining Price Control Income

1.1 Background

1.0 This section describes how price control revenue is determined. It covers the underlying principles and explains how the financial model has calculated it for the Transmission Review.

1.2 Principles for Determining Allowed Revenue

2.0 Ofgem have used different methods for setting allowed revenues with financial models. These are:

- Pre 2001 ("Old Approach")
- Post 2001 ("New Approach")

1.2.1 Old approach to calculating Revenue

3.0 Under previous reviews allowed revenue was calculated as follows

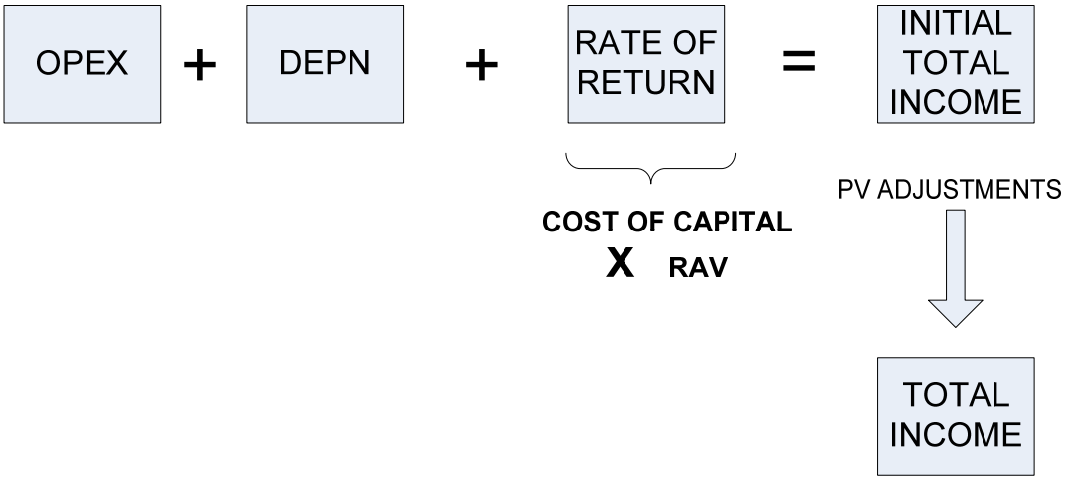

Figure 1 – Old method for calculating Allowed Revenue

a) *Opex – Operating Expenditure*
Operating expenditure are defined as being day to day costs of running the business. Typically they are set on a cash basis.

b) *Depreciation*
This refers to the depreciation on the Regulatory Asset Value

Regulatory Asset Value (RAV)

c) Regulatory Asset Value is the value that OFGEM assigns to the network's asset base. In assigning a value OFGEM will also determine what items will go into the asset base.

Cost Of Capital

d) This is determined as a weighted average of the cost of debt and equity and is set by OFGEM. This was set using:

$$WACC(pre-tax) = K_D\left(\frac{D}{E+D}\right) + \frac{K_E}{1-t}\left(1-\frac{D}{D+E}\right)$$

Where:

Kd is the cost of debt
Ke is the cost of equity
D is debt
E is equity
T is the corporate tax rate

Its important to note that within this there is an implicit allowance for tax.

4.0 The old method was used for DPCR[3] 3 in 1999 and for the Transco Price Control in 2001 but was changed for DPCR4. The reason behind this was the change in regulation policy to make a specific allowance for tax.

1.2.2 New Approach to calculating Revenue

5.0 In DCPR4 a new approach was established. This is outlined below:

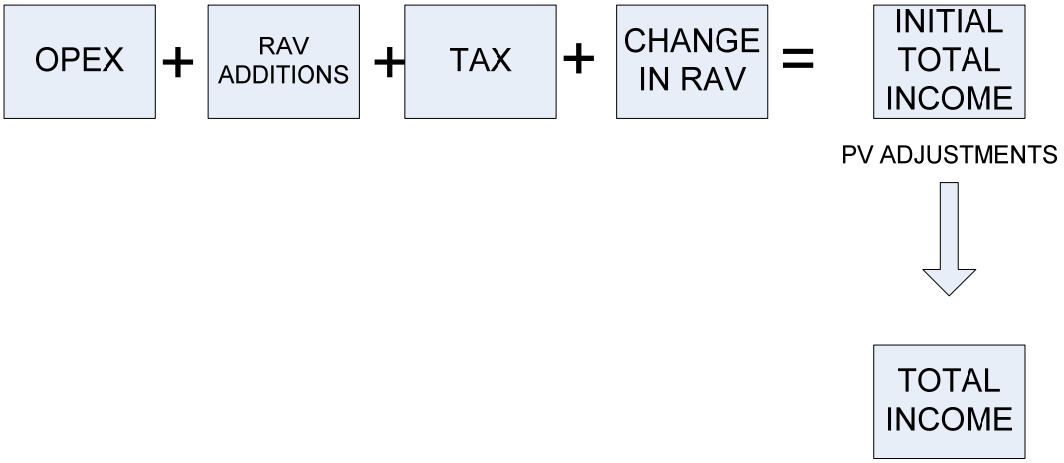

Figure 2 – New method for calculating Allowed Revenue

a) *RAV Additions*
Refers to Capex additions

b) *Tax*
Refers to the explicit allowance set for tax (see below)

Change in RAV

[3] DPCR – Distribution Price Control Review. DPCR3 finished in 1999 (running from 2000 – 2005), DPCR 4 finished in 2004 (running from 2005 2010)

c) This represents the difference between the opening RAV in the first year of the price control period and the closing RAV in the last year of the price control period.

6.3 Revised cost of Capital

6.0 As the tax is now given as a specific allowance the cost capital is now calculated in its "Vanilla" form – shown below:

$$WACC(vanilla) = K_D\left(\frac{D}{D+E}\right) + K_E\left(1-\frac{D}{D+E}\right)$$

7.0 From the formula it can be seen that no adjustments have been made for tax

6.4 Allowed Revenue calculations within the model

8.0 The TPCR financial model calculates allowed revenue consistent with DPCR4 and hence uses the new method. The calculations for allowed revenue are contained within the PostTaxRev worksheet. As indicated in figure 2 the revenue is determined in part by inputs calculated elsewhere within the model.

9.0 The chart below outlines the process and shows the flows of information through to the PostTaxRev worksheet.

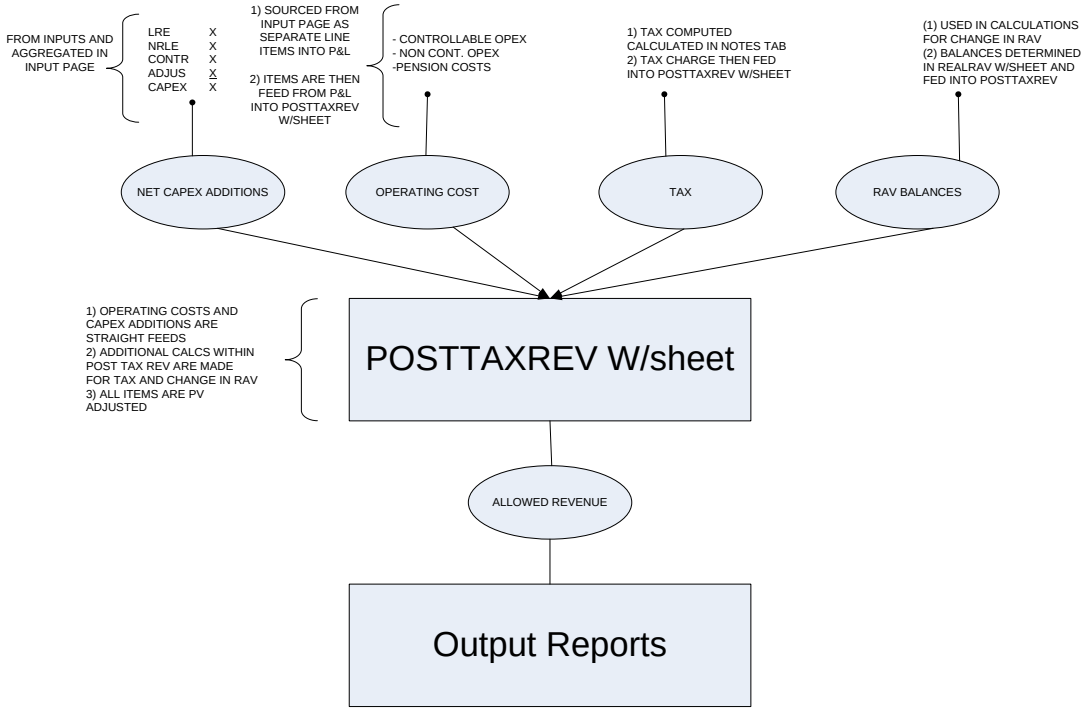

Figure 3 –Information flows for PostTaxRev Workhseet

10.0 The layout of the PostTaxRev Worksheet is given below

Year ending 31 March	2005	2006	2007	2008	2009	2010	2011	2012
Formula year	0	1	2	3	4	5	6	7
Vanilla Weighted Average Cost of Capital ('Vanilla WACC')								
Pre-tax cost of debt	4.45%	4.45%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%
Post-tax cost of equity	6.25%	6.25%	7.03%	7.00%	7.00%	7.00%	7.00%	7.00%
Gearing	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Vanilla WACC	5.17%	5.17%	5.06%	5.05%	5.05%	5.05%	5.05%	5.05%
Discounting factors								
Price control revenue				0.976	0.929	0.884	0.842	0.801
Closing RAV			1.000	0.952	0.906	0.863	0.821	0.782
Revenue Adjustment factor				1.000	1.020	1.040	1.061	1.082
Revenue index				0.976	0.947	0.920	0.893	0.867
All prices are £m in Nominal terms								
Price control revenue								
Controllable operating costs				177.6	175.4	174.0	178.4	184.0
Non-controllable operating costs				109.7	112.4	115.1	117.9	121.0
Pension costs				41.6	41.9	42.5	43.6	44.1
RAV additions				649.4	581.6	660.7	764.8	811.3
Tax allowance				108.8	116.6	125.1	128.0	128.8
				1,087.2	1,028.0	1,117.4	1,232.6	1,289.2
All prices are £m in 2004/05 terms								
Price control revenue								
Controllable operating costs				164.4	158.3	153.0	153.0	153.7
Non-controllable operating costs				101.6	101.4	101.2	101.0	101.1
Pension costs				38.5	37.8	37.4	37.3	36.9
RAV additions				601.3	524.9	581.1	655.6	677.9
Tax allowance				100.8	105.2	110.0	109.7	107.6
				1,006.6	927.7	982.8	1,056.7	1,077.2
Present value of price control revenue				982.1	861.6	868.9	889.3	863.0
Sum of Present values (5 year blocks)								4,465.0
Change in RAV								
Opening RAV				5,415.6				
Present value of closing RAV								5,041.1
Difference of opening and closing RAV								374.5
Total PV over 5 years								**4,839.5**
Excluded services revenues				58.4	64.3	71.9	75.8	76.1
Present value of excluded services revenues				57.0	59.7	63.6	63.8	61.0
Sum of excluded services Present values (5 year blocks)								305.0
Total PV over 5 years								4,534.5
Sum of discounting factors								4.60
Annual revenue allowance				985.1	1,004.8	1,024.9	1,045.4	1,066.3
Excluded services revenues				58.4	64.3	71.9	75.8	76.1
Total revenue				1,043.5	1,069.1	1,096.8	1,121.2	1,142.4
PV of allowance + excluded services				1018.1	992.9	969.7	943.6	915.2
Sum over 5 years								**4839.5**
Check with 5 year total								
Total post-tax turnover (Nominal)				1,127.0	1,184.7	1,247.0	1,307.8	1,367.2
Area used for Goal seek solution								
Tax charge from P&L (real)				-100.8	-105.2	-110.0	-109.7	-107.6
Tax allowance in post-tax control				100.8	105.2	110.0	109.7	107.6
Difference				-0.0	-0.0	0.0	-0.0	-0.0

Vanilla WACC

11.0 This is computed consistent with the formula given in 6.0 above

Net Capex additions and Operating Costs (Controllable, Non Controllable and Pensions)

12.0 These items have flowed though from the input pages and are only adjusted for inflation issues.

Tax

13.0 The tax charge is determined within the Notes worksheet. However the tax allowance for the purposes of setting revenue is determined the PostTaxRev worksheet. Inherent in setting tax allowances the problem of circularity arises – tax is dependent of revenue and revenue is dependent upon tax.

14.0 To resolve this problem Ofgem have used Excel's goal seek function to control iterations within the circular reference and hence generate a solution. In doing this the goal seek function has been automated through the use of a macro. The visual basic code for the macro is given below:

```
Sub TGS()
'
' Macro for iterative tax calc:
' Clears allowed tax (Nominal) in row 27, then
' does goal-seek on difference between P&L tax charge (real)
' and tax allowance using resultant annual revenue allowance

Dim i As Integer 'Numer of columns on which to perform goal seek
Dim j As Integer 'Number of iterations to repeat goal seek on columns

   Application.Calculation = xlCalculationAutomatic
   Application.ScreenUpdating = False

   Range("DebtAdj07").Clear 'Clear any previous debt adjustments made specifically for
regearing to 60%

   If Range("GearOption").Value = 1 Then 'Regear closing 07 position to 60% Net
Debt/RAV
      With Range("DebtAdj07")
         .Value = -(Range("EndRAV07").Value * 0.6 + Range("EndDebt07").Value)
         .NumberFormat = "#,##0.0_);[Red]-#,##0.0_);-??_)"
      End With
   End If

   Worksheets("PostTaxRev").Activate
   Range("TaxSolution").Clear
   For j = 1 To 10
      Range("GoalSeekStart").Select
         For i = 1 To 30
                ActiveCell.GoalSeek Goal:=0, ChangingCell:=ActiveCell.Offset(-41, 0)
                ActiveCell.Offset(0, 1).Select
         Next i
   Next j
   Range("TaxSolution").NumberFormat = "0.0"
   Worksheets("PC_POut").Activate
   Range("a1").Select
   Application.ScreenUpdating = True

End Sub
```

15.0 In effect the code creates a loop which allows the goal seek to repeat itself 9 times to generate a solution.

16.0 Once a solution has been generated a value is returned to Row 27 (from Column H onwards)

PV Adjustments

17.0 Row 40 sums the values, in real terms, for:

- All operating costs

- Net capex additions
- Tax allowances

18.0 Important to the use of the PV terms is the Formula Year along row 4. It should be further noted that the start of the Price control year (2008) has a formula year of 3.

19.0 The value given in Row 40 has to then be adjusted for PV considerations. Within the PostTaxRev worksheet the PV factors are contained within Rows 13 – 16.

Row	Description	Formula
13	Price Control Revenue	=1/(1+H10)^(H4-2.5)
14	Closing RAV	=1/(1+H10)^(H4-2)
15	Revenue Adjustment factor	=IF(MOD(H$4-3,5)=0,1,G15*(1+XFactor))
16	Revenue Index	=H13*H15

- Price Control Revenue is a present value calculation. When discounting at the start of a price control Ofgem uses 0.5 (as opposed 1) as the period since this is viewed by the regulator as an average of the year. Since the formula year in row 4 starts at three the value 2.5 is hard coded to ensure the formula works as:

  1/(1+H10)^(0.5)

- The closing RAV is also a present Value calculation. Although the formula is copied consistently across the row only cell L14 (and other equivalent cells being the last year of a price control) are used within the calculations – specifically the Change in RAV. Since this is a closing RAV, for the first year it should be discounted to the power of 1 and as such 2 has been hard coded into the formula. Hence the formula should work as:

  1/(1+H10)^(1)

- The Revenue Adjustment factor takes into account the X profiling (see below). This uses the Mod function which returns a remainder value. For example take Mod(21,4) – 4 divides into 20 five times with a remainder 1. Hence 1 is the value returned.
  Using the mod function if the year allows a value of 1 to be returned for each starting year of a price control period

- The Revenue Index brings together row 13 and 15 which is then used for PV calcs.

Change in the RAV

20.0 As mentioned above the change in the RAV takes the difference between the opening value of the RAV in the first year of the TPCR and closing value of the last.

21.0 The brought forward value of the 2008 RAV is not PV adjusted since it is an opening value. The closing value is discounted using the factor in row 14

Revenue Profiling and the X factor

22.0 The X factor is set by the user on the input page. This represents the adjustment to revenue for a price control period and is set by the regulator. It can be negative (representing expected efficiency gains and hence a reduction in revenue) or positive.

Determining Price Controlled Revenue

23.0 Row 39 adjusts the sum of the allowances in Row 38 by the PV factors in Row 12. Cell L40 (last year of the first price control) sums this for period.

24.0 Cell L47 then adds this to the change in the RAV to derive a total allowance for the 5 years of the price control which have been adjusted for PV considerations but not for X profiling From this total, the sum of the PV of excluded services is deducted to derive the PV of the price controlled revenue for the period.

25.0 For the X profiling the sum of the discount figures given in row 16 for 5 years is taken in cell L54. The annual allowance is then derived by dividing L53 by the cell L54. The remaining rows demonstrate that the sum of the present values of the revenues when excluded services are added back is consistent with the value derived before excluded services were deducted.