ofgem

Manual

Financial model manual – Distribution Price Control Review 5 (DPCR5)

The following is a manual for the financial model used for Distribution Price Control Review 5.

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Audience	DPCR5 stakeholders
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1. About the manual

1.1. Purpose and scope

Ofgem uses financial models to set Price Control revenues for each price control period for each class of regulated entity. This document describes the model used for calculating revenues for the electricity Distribution Network Operators (DNOs) for Price Control Review 5 (DPCR5). This manual accompanies the model and explains:

- The structure, scope and boundaries of the model;,
- rationale used in the calculations;
- how key policy decision are applied in the model, and;
- the reasons taken for Ofgem's approach.

This manual applies to model version 'Financial issues – DPCR5 20091204 (Final Proposals for DNOs).xls'

http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/DPCR5/Documents1/Financial%20issues%20-%20DPCR5%2020091204%20(Final%20Proposals%20for%20DNOs).xls

For the avoidance of doubt, nothing in this manual represents a policy stance taken by Ofgem and the relevant price control documentation should be sought to confirm Ofgem policies.

1.2. Intended audience

The intended audience for this manual is users of the DPCR5 financial model:

- DPCR5 modellers;
- regulatory review staff;
- auditors;
- DNOs, and;
- Other interested stakeholders.

The manual is also intended to assist those using the model as the foundation for future Ofgem reviews of gas and electricity distribution and transmission networks, subject to the outcome of our RPI-X@20 review of the regulatory framework.

1.3. Changes to the manual since the previous version

Section	Change
2.8 – Running the model – The difference between Live sheets and the Results sheets	Explains how changes to the assumptions flow through to the results sheets
3.7 – IQI matrix	Explain the purpose of the addition of the IQI matrix
4.3 – Revenue profiling	Describes the approach to revenue profiling in the financial model
4.4 – Using profiled revenues	Explains how to use profiled revenues during calculation of DNO results

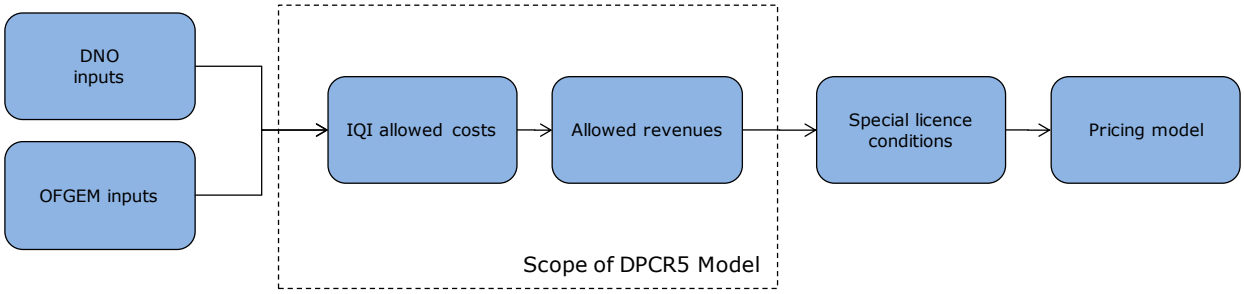
2. About the model

2.1. Purpose

The purpose of the model is to calculate the allowed revenue for the 14 DNOs for 2010-15, and to confirm that an efficiently run and appropriately geared DNO can finance its activities. The actual revenue that each DNO collects over this period will be adjusted for changes in the retail price index (RPI) and may further be affected by DNOs' performance under the various price control incentive schemes. The allowed revenues for each DNO are an amount sufficient to cover the costs of safely and efficiently running its network and investing for future needs, including an adequate return to the providers of both debt and equity finance. This model is also intended to be the foundation for future Ofgem price reviews, initially Transmission Price Control Review 5.

2.2. Scope

The model calculates price control revenues and financial ratios for each of the 14 DNOs. The model focuses on the DPCR5 period – 1st April 2010 to 31st March 2015 – but contains forecasts up to 31st March 2020 and, as the model has been developed from the DPCR4 model, it also contains historical information for prior periods. The model requires DNO and Ofgem inputs and the final version of this model will input into the Revenue Regulatory Instructions and Guidance. As such, the scope of the model is as follows:



Special Licence conditions
The DNOs' right to recover revenues up to the values determined by the financial model is embodied in modifications to the special licence conditions of the electricity distribution licences. These conditions also provide for changes to allowed revenue for RPI and for incentive adjustments.

Pricing Model
The pricing model calculates charges which are scaled to allow recovery of total demand revenue from individual customers.

2.3. Inputs

The inputs to the financial model are provided by DNOs and by Ofgem's price control review team. The Formula Inputs sheet contains inputs which are, broadly speaking, common to all DNOs. Data relates to:-

Title	Source
Retail Prices Index	HMG / Ofgem
Weighted Average Cost of Capital	Ofgem
RAV asset lives	DPCR4
DGen incentive payment rates	DPCR4
Tax rates	HMG
Writing down allowances	HMG
Deferred tax discounting period	DPCR4
Deferred tax discounting rate	Central Networks 28/11/08
Allocation to RAV rules	Ofgem
Common dividend assumption	DPCR4
DNO cost inputs	Combined FBPQ / Ofgem view

Explanation of sources

HMG	Governmental data and legislation
Ofgem	Determined by Ofgem's analysis and policy development
DPCR4	Elements of the previous price control settlement (DPCR4) that are still relevant for the determination of DPCR5 revenues, or assumptions carried forward from DPCR4 pending final policy decision (for example the WACC components)
FBPQ	Data provided by the DNOs in their Forecast Business Plan Questionnaires

2.4. Outputs

The key outputs from the model are:

- Base price control revenue for each DNO;
- Revenue change over the DPCR5 period as a percentage of previous revenues, and;
- Selected financial ratios for each DNO

2.5. The DPCR5 model has evolved from the DPCR4 model

Changes from DPCR4 are mechanical in nature. 5 year profiling of Allowed Revenue through the Price Control period has been replaced by year on year calculation followed by profiling options as deployed in the Gas Distribution Gas Price Control (GDPCR). This allows the tax allowance to be solved algebraically (as with GDPCR) rather than by iteration (as in DPCR4).

Previous Ofgem models have involved a set of 'live calculation' sheets and a macro which took the input data from each company in turn into the live calculation area and then pasted the results to output areas which could easily be printed. In DPCR4 the calculation process involved solving the tax allowance calculation iteratively using a macro.

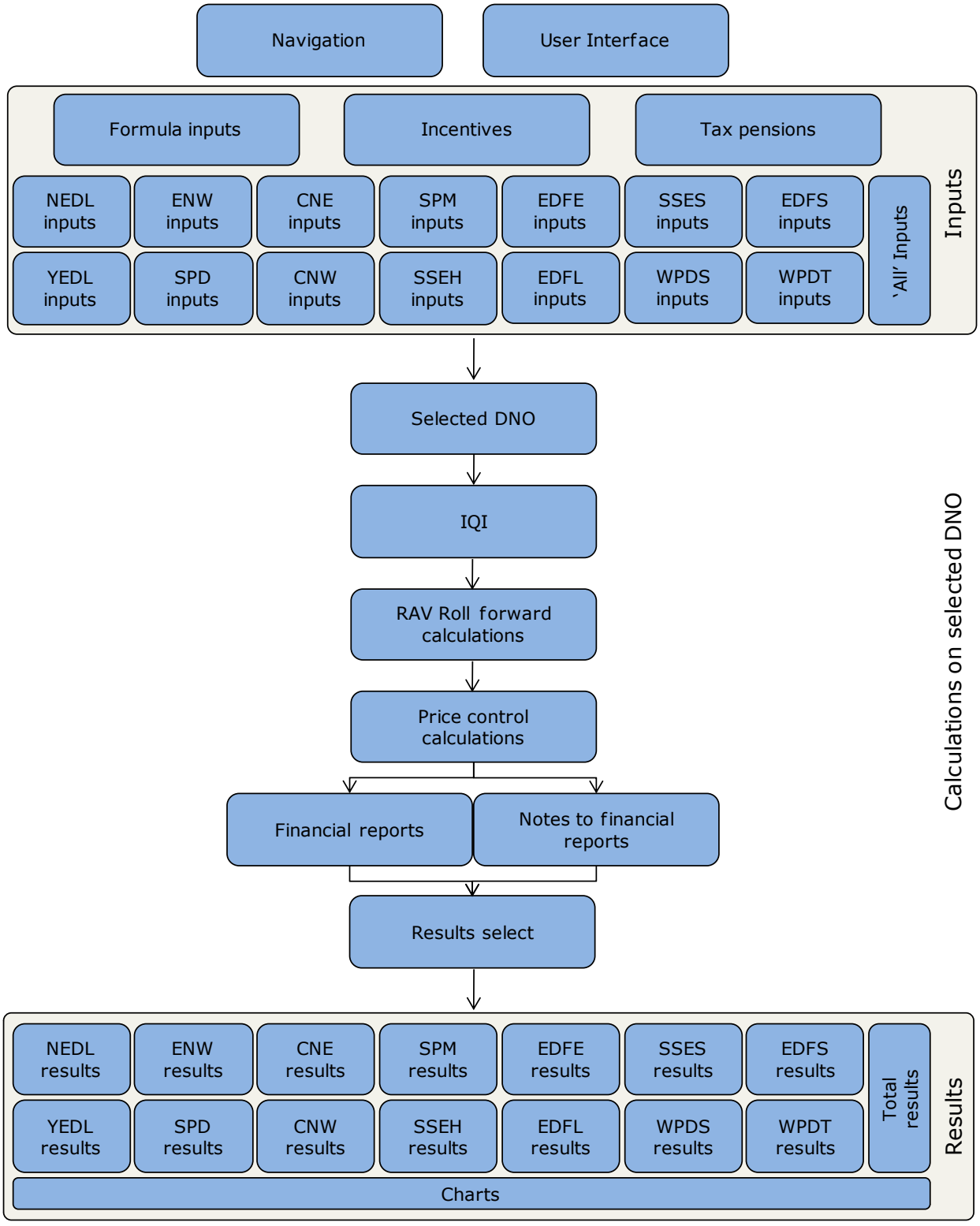
This approach has been replicated in DPCR5, with the exclusion of the tax calculation which is solved without the use of an iterative macro. The avoidance of the macro, instead solving algebraically, has the benefit of additional transparency and traceability at the expense of greater model size. The 14 company model run by Ofgem can be reduced to sets of 1, 2, or

3 licences appropriate to each group of companies so that the increase in size of the models run by DNOs will be minimised.

The Gas Distribution Gas Price Control model is available on Ofgem's website via the following link

http://www.ofgem.gov.uk/Networks/**Gas**Distr/GDPCR7-13/Documents1/Copy of GDPCR main control **model** FINAL PROPOSALS for publication.xls

2.6. Schematic



2.7. Description of sheets used in the model

Worksheet	Description
Navigation	Default opening page, which can be used to navigate through the model
User Interface	Sheet which is used to control global settings for the model. The key feature of the User Interface is the control box for the 'RunallDNOs' macro. The 'RunallDNOs' macro takes the 'live' results calculated for the selected DNO, and pastes them into the relevant DNO's results sheet. Within the macro, this is then repeated for all DNOs. This macro is triggered by pressing the 'Run all DNOs' button. The second key feature of the User Interface page is the select DNO drop-down list. This list controls which DNO is selected for calculations in the live sheets (see 'Calculations in Selected DNO' in schematic). The drop-down list controls the 'DNO_Number' range, which is hidden underneath the drop-down list.
Formula Inputs	Global assumptions to be used in calculations
DNO Inputs (*NEDL, YEDL*, etc…)	Input sheet for each DNO which stores the data used in the calculations. These DNO input sheets collate information from multiple external spreadsheets
Tax and pensions	Multiple calculations take place in this sheet. These calculations include the annualised tax clawback, ESQCR (Tree cutting and Areas of Outstanding Natural Beauty) allowances and the pensions deficits.
Incentives	Policy decisions relating to DNOs are applied here
Select	Load the selected DNO's input sheet. The user can change the selected DNO through the User Interface sheet, or automatically cycle through using the 'Run all DNOs' control in the User Interface sheet
IQI	Sheet for applying IQI policies for the selected DNO
Price control calcs select	In this sheet the base price control revenue is calculated for the selected DNO
RAV roll forward select	Calculates the annual Regulated Asset Value for the selected DNO
Financial reports (Nominal) select	Calculates nominal financial reports for the selected DNO
Notes to the financial reports select	Calculates detailed nominal financial reports for the selected DNO
Results Select	Summary results for the selected DNO. Includes financeability measures.
DNO Results (*Results Select NEDL, Results Select YEDL*, etc…)	A replica of the select results for each DNO. These results pages have been hard pasted to capture the results for each DNO. The 'Run for all DNOs' macro automates this results process for all DNOs.

2.8. Running the model – The difference between Live sheets and the Results sheets

The inputs to the financial model are provided by DNOs and by Ofgem's price control review team. Should a user of model wish to test variation in these inputs, for example by changing a key assumption in the Formula Inputs sheet, the Results sheet for each DNO will not change. This is because the Results sheets are a static copy of the Results_Select sheet.

To understand the impact of changes for a particular DNO, it is necessary to adopt the following approach:

1. Select the desired DNO from the drop-down box in cell 5 of the sheet User Interface. This will ensure that all the calculations apply to the DNO which has been selected
2. Vary the inputs (assumptions, etc.) as required
3. View the results of the changes in the 'Results Select' tab

The output in the Results_Select tab can then be hard pasted ('Paste-Value') into the required DNO's Results page. Alternatively, the model includes two Macros which automates this process. This macro can be activated by simply clicking on either the "Run all DNOs" or the "Run with profiled revenues" box in the User Interface tab.

3. Information Quality Incentive (IQI)

3.1. About the IQI

The IQI is a mechanism for setting price control allowances that provides ex ante incentives for DNOs to submit accurate forecasts of their expected expenditure and provides incentives for efficiency improvements once the price control has been set.

3.2. Purpose of the IQI

The purpose of the IQI is to incentivise the provision of good quality information by the DNOs as part of their business plan submissions, by incentivising the DNOs to submit forecasts of their expected level of expenditure.

3.3. The IQI methodology in DPCR5

The IQI includes network investment, network operating costs and closely associated indirect costs. Under our approach to equalising incentives, these costs are treated in the same way by capitalising a fixed percentage of costs across all these activities into the Regulatory Asset Value. Business support costs are not included in the IQI. They are expensed separately and face stronger incentives than the network costs.

3.4. The "speed" of money

85 per cent of network-related costs are funded as "slow" money over 20 years through the RAV. The remaining 15 per cent of network-related expenditure is funded as "fast" money in the year of expenditure.

3.5. Applying the "speed" of money

The division of expenditure between “fast” and “slow” money is detailed in the summary tables in the IQI sheet, under the “RAV%” columns. Subsequently, the value of “fast” and “slow” money for each cost category is calculated in the IQI sheet, under the “Post IQI - Fast Pot” and “Post IQI - Slow Pot” tables.

3.6. Source of cost forecasts

The division of expenditure between “fast” and “slow” money is detailed in the summary tables in the IQI sheet, under the “RAV%” columns. Subsequently, the value of “fast” and “slow” money for each cost category is calculated in the IQI sheet, under the “Post IQI - Fast Pot” and “Post IQI - Slow Pot” tables.

3.7. IQI Matrix

The IQI sheet includes a copy of the IQI matrix for the selected DNO. This matrix has been included for in order to help the user understand the application of the IQI matrix. The IQI

matrix reflects the calculation of the IQI incentive income for the selected DNO (via the User Interface sheet). It has been included for information purposes only.

For more information on the IQI matrix, see Chapter 21 in "Electricity Distribution Price Control Review Final Proposals - Incentives and Obligations".

http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/DPCR5/Documents1/FP_2_Incentives%20and%20Obligations%20FINAL.pdf

4. Allowed revenue calculations

4.1. Objective of price control

The objective of price control is to set the maximum revenues that each DNO can collect from customers at a level that allows an efficient business to finance its activities.

4.2. Calculation of price control

The base price control revenue is calculated by adding total costs to changes in RAV then subtracting excluded services revenue. Total costs and changes in the RAV are included in the revenue calculation, as these items reflect the costs incurred by the operator to maintain the RAV of the network. This drives the return earned by the DNO. The DNO is being compensated for the maintenance of the network after return is taken into consideration.

Excluded services are those costs which the DNO receive an equivalent compensatory revenue. These excluded services are specifically excluded from the allowed revenue calculations as the DNOs are compensated directly from end customers.

4.3. Revenues are profiled across the price control period

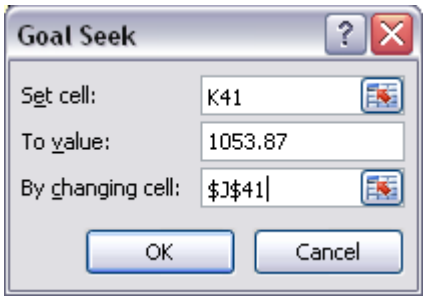
Ofgem has decided to profile the revenues for DPCR5 as a constant percentage for each DNO for each of the five years of DPCR5. This steady change each year reflects the DNOs' requirement for increased investment during the DPCR5 period but avoids issues that could arise from a large step up in the early years or a larger increase in later years

To effect this, prices are calculated in such a way to achieve a constant percentage increase each year, while ensuring the Net Present value of allowed revenues remains constant. In other words, in present value terms, the total revenue will be the same regardless of our decision. The constant percent is referred to as "Constant X" profiling.

In the financial model, the mechanics of revenue profiling is enacted in the Results_Select sheet. Calculating the Constant X is a two step process.

- Firstly, the present value of the Allowed revenues is calculated, as of year 1 of the price control period). This value is located in cell K40 is the Results_Select tab.

- next, calculate Constant X percentage (cell J41) such that the present value of the profiled revenues (cell K40) is equivalent to the present value of the unprofiled revenues (cell K41). To calculate this Constant X percentage it is necessary to use the goal seek function in Excel as follows (where the value 1053.87 is the required present value of the revenues).



Both the "Run all DNOs" and the "Run with profiled revenues" box in the User Interface tab will automatically calculate the goal seek of the Constant X percentage.

4.4. Using profiled revenues in the model

In the financial model, the option to use profiled or un-profiled revenues has been left open to the user. The default is to use un-profiled revenues in the model. To use profiled revenues in the model, simply change both the "useprofiledrevenues" and "profilingchoice" flags to equal the value 1. These are located on the "User Interface" tab, in cells J33 and J34 respectively.

Alternatively, simply clicking the macro "Run with revenue profiling" will calculate DNO results using profiled revenues.

4.5. Weighted Average Cost of Capital (WACC)

A WACC approach to the calculation of return is used in the model. WACC is calculated by using a common gearing assumption for debt/equity ratio across all DNOs (65% debt as a proportion of the RAV).

Real returns of 3.6% on debt and real post-tax return of 6.7% on equity are applied to all DNOs. The WACC is also applied as a discount factor across periods when making ex-post adjustments to ensure that DNOs or customers are appropriately recompensed for the mismatch in timing between costs incurred and recovery of those costs through revenues.

5. Regulated Asset Value (RAV) calculation

5.1. What is RAV?

The RAV is a financial construct used in our price control calculations to defer recovery of certain categories of costs, especially expenditure expected to provide benefits over several years. The speed of recovery is determined by the regulatory depreciation rate, and a return is earned on the value of the RAV

5.2. Why is change to RAV so important?

RAV is important as it drives return. We calculate this return by applying the Weighted Average Cost of Capital to RAV, whereby the calculation is the difference in the present value in RAV.

In calculating the allowance for the change in RAV, the change in RAV is forward valued by 6 months.

5.3. Depreciation of the RAV

Our choice of asset lives - i.e. the rate of depreciation of the RAV impacts the speed at which the DNOs can recover the costs added to the RAV. The shorter the asset lives, the faster this recovery occurs and the higher allowed revenues are in the short term due to the higher depreciation allowance. Scottish DNOs are facing a large reduction in their depreciation allowance as their vesting assets become fully depreciated (the so-called depreciation "cliff-face") at the end of 2010-11.

The English & Welsh DNOs faced this cliff-face at previous reviews. This was resolved by accelerating asset lives from those assumed at previous price control reviews for new assets (33 .33 years for English and Welsh DNOs and 38 years for Scottish DNOs) to 20 years with a catch-up for assets already added to the RAV since vesting. The catch up is smoothed over 15 years in equal instalments. This policy was implemented to avoid substantive changes to revenue being experienced by the DNO in the first period after the vesting assets were fully depreciated. We are extending the same treatment to the Scottish DNOs and continuing with this policy in DPCR5 to continue the steady and predictable nature of DNO revenues.

5.4. RAV smoothing

The RAV smoothing factor is calculated in the first year after vesting assets are fully depreciated. In this first year, the difference between

i) RAV with 33.33 year depreciation (38 years in Scotland), and
ii) RAV calculated on an accelerated 20 year depreciation profile.

This difference is then spread equally over 15 years to generate the 15 year smoothing factor

6. Results

6.1. Return

In the Results page of the worksheet, there is a table detailing the movements in the value of RAV for the DNO across the price control period. Changes to RAV form the basis for the return calculation. This Return calculation reflects the return which is allowed on the DNO assets during the year. It is the sum of additions to Regulated Asset Value (RAV) net of depreciation, and the allowance for changes in RAV.

6.2. Regulated Debt and Regulated Equity

The Regulated Asset Value (RAV) can be split into Regulatory Debt and Regulatory Equity using the common 65% debt assumption used across all DNOs. For example, a DNO with a £100m RAV would be assumed to hold £65m in debt and £35m in equity.

6.3. Return on Regulated Debt

The Return on Regulated Debt is a calculation to determine the portion of return which is attributable to debt. The Return on Regulated Debt is calculated simply by multiplying the Regulated Debt by the cost of debt. For this calculation, the applicable cost of debt is before taxation and forward weighted half a year.

6.4. Return on Regulated Equity

The Return on Regulated Equity is derived from the Return on Regulated Debt equitation. The equity return is the residual return after the Return on Debt is accounted for. As such, the equation for Return on Regulatory Equity is as follows

RETURN ON REGULATORY EQUITY = RETURN – RETURN ON REGULATED DEBT

For more information on Return on Regulatory Equity, and a worked example, see Appendix 3 of "Financial Issues Electricity Distribution Price Control Review Final Proposals – Allowed Revenues and Financial Issues".

http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/DPCR5/Documents1/FP_5_Financial%20Issues.pdf

6.5. The use of ratios to test financeability

When setting the revenue allowed by the DNOs, it is the duty of the regulator to ensure the ongoing financial health of the organisations, and their ability to successfully fund their networks in the form of loans.

The financial model is used to demonstrate that the DNOs will achieve "comfortable investment grade" – which is considered to be around BBB+ or A-.

6.6. Ratios used to test DNO financeability

We have tested our financial model for each of the DNOs against three key ratios: Funds From Operations ("FFO")/Interest, Retained Cash Flow ("RCF")/Debt, Debt/RAV. These

ratios are consistent with those used in previous price control reviews, as are the target values of 3, 9 per cent and 70 per cent respectively.

Key ratios	Description
FFO/Interest (X)	Free Funds from Operations as a proportion of Interest
Retained Cash Flow/Net Debt	Retained Cash Flow as a proportion of Net Debt
Net Debt/Closing RAV	Net Debt as a proportion of Regulated Asset Values at the end of the year

6.7. Ratios included for illustrative purposes

Ofgem monitors further financial ratios as part of the price review. The ratios monitored by Ofgem are as follows:

Illustrative ratio	Description
Adjusted FFO/Interest (X)	FFO/Interest adjusted for depreciation
FFO/Net Debt	Free Funds from Operations as a proportion of Net Debt
Retained Cash flow/Total Capex (X)	Retained Cash Flow as a proportion of total capital expenditure
TWDV/RAV	Tax Written Down Value as a proportion of Regulated Asset Value
Tax Charge / PBT	Tax Charge as a proportion of Profit Before Tax
PMICR using RAV depreciation	Post Maintenance Interest Cover Ratio

7. Incentives

7.1. DPCR5 incentives included in the model

Incentives are applied to DNOs to encourage particular behaviour over and above meeting licence obligations and controlling costs. The following incentives are included in the calculation of DNO allowed revenues in DPCR5;

Incentive	Treatment
Distributed generation	Handled using the same mechanism as in DPCR4
Losses reduction	Losses roller arising from DPCR4 outcomes has been included, with an assumption of no payments or penalties under the DPCR5 losses scheme
Information Quality Incentive (IQI)	As calculated by the IQI process on the IQI tab, as explained in Initial Proposals
CAPEX incentive scheme	CAPEX roller arising from DPCR4 outcomes as shown on the RAV roll forward tab
Low Carbon Networks Fund	The impact on customer bills of the Low Carbon Network Fund is included in the model
Innovation Funding Incentive (IFI)	The impact on customer bills of the IFI is included in the model
Customer interruptions / customer minutes lost	Ofgem performance forecasts for DPCR5 have been used
Transmission exit	The inclusion of Transmission Exit charges is intended in the model but not included in this version of the model.

7.2. DPCR5 incentives not included in the model

Incentives are only included in the model if Ofgem can estimate what the impact will be on the DNO, or if the impact on revenues will occur in DPCR6. The following is a list of incentives which are not included in the model as they are expected to be cost neutral but are nevertheless available to DNOs.

- Worst served customers
- Undergrounding of networks through areas of outstanding natural beauty
- Telephony

Appendix A – Glossary of terms used in the model or manual

CICML	Customer Interruptions / Customer Minutes Lost
DNO	Distribution Network Operator
ESCQR	Energy Supply Continuity
FBPQ	Forecast Business Plan Questionnaire
IDNO	Independent Distribution Network Operator
IQI	Information Quality Incentive
PIMCR	Post Interest Maintenance Cover Ratio
RAV	Regulated Asset Value
TOTEX	Total Expenditure