HM TREASURY

Quantitative assessment:

user guide

December 2011

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Contents

1 User Guide

Background

1.1 The accompanying spreadsheet should normally be used as part of the quantitative Value for Money assessment of privately financed PPP and PFI projects, in line with the Value for Money Assessment Guidance November 2006 (the "Main Guidance") and the results presented as part of the business cases submitted to the relevant central government department (and in most cases, subsequently to HM Treasury) for approval. Infrastructure UK (IUK) at HM Treasury hold the master copy and are responsible for commissioning updates or changes to the spreadsheet. No amendments should be made to the spreadsheet by any other party without express approval from IUK.

1.2 A standard recommended spreadsheet for the VfM assessment has been developed to meet the following objectives:

- ensure that a simple approach is taken, reflecting the early point at which this analysis takes place;
- focus Procuring Authorities' minds on the underlying assumptions and the interplay with qualitative judgement and move the analysis away from a single pass/fail point estimate. See Section 1.22 of the Main Guidance;
- reduce costs and ensure ownership of the decision lies with the Authority and not their advisers;
- introduce consistency across the public sector and improve the underlying evidence base.

1.3 There are certain assumptions which are hardwired into the model which the Authority should not seek to amend, for example the model assumes that the Employment cost per employee is equal for the conventional procurement, in line with Government policy that PFI should not be pursued at the expense of employee terms and conditions (see Section 1.14) of the main guidance.

Introduction

1.4 This user guide serves as an instruction manual for using the accompanying PFI Quantitative Evaluation Spreadsheet (the "Spreadsheet"). The Spreadsheet has been developed as a tool to assist Procuring Authorities undertake a quantitative analysis to support the VfM decision as to whether to use PFI or conventional procurement[1].

1.5 The two procurement methods are:

- The Conventional Procurement Option – ('CP' in the model). Procurement through conventional approaches that use public funding (for example, letting a design and build contract for the construction of an asset, and then letting annual operating and maintenance contracts for the ongoing maintenance of that asset);
- The PFI Option – Procurement under the Private Finance Initiative ("PFI"), which is a specific procurement methodology through which the public sector lets a design, build, finance and operate contract to the private sector for the construction and whole life maintenance of an asset and/or associated service.[2]

1.6 The spreadsheet has been designed specifically to aid Procuring Authorities in their choice between procurement routes, it therefore:

- does not give an affordability envelope;
- does not provide the basis for bid evaluation or reference model;
- does not provide a pass/fail point estimate for deciding between PFI or conventional procurement.

1.7 The watchword in developing this tool has been simplicity. The user will, therefore, not find many of the aspects that they would have expected to see in a conventional public sector comparator. Whilst greater complexity could be introduced, the simplicity reflects the level of inherent uncertainty to which any quantitative spreadsheet is subject when used at an early stage of project development, in this case investment and project assessment stages. Equally, it highlights the fact that quantitative analysis is only one element of the VfM assessment and should be used *only* in conjunction with the qualitative assessment which is completed in parallel. The pursuit of further degrees of accuracy is likely to detract from the underlying qualitative and quantitative reasons that make a given procurement route value for money.

1.8 The Guide is divided into the following two core sections:

1 Spreadsheet Usage

2 Spreadsheet Inputs

1.9 The Spreadsheet Usage section includes an overview of how the Spreadsheet should be operated and the results from it interpreted. The spreadsheet input cells contain references to the appropriate section in this guide. The Spreadsheet Inputs section of the Guide explains the nature of the input variables and the role that each plays in the Spreadsheet. It also provides Procuring Authorities with advice on how they might test or tailor values to the particular

[1] The Spreadsheet is based on a straightforward investment project whereby an amount of capital investment is required, either up-front or over a lengthy period, and this investment then requires both ongoing maintenance and periodic life-cycle upkeep. In addition, services that are ancillary to the provision of the physical asset, such as catering and cleaning, can be modelled as part of the overall package.

[2] Whilst there are many different forms of PFI, the Spreadsheet presumes a straightforward arrangement whereby a private sector partner is asked to provide a long term, fixed price, output-based service, involving single-point responsibility of delivery for a package of services. The private sector partner commits capital which it puts at risk to the quality of the performance of the services it delivers.

circumstances of the project they are assessing, either through discussions with their sponsoring Departments or by reference to evidence bases maintained elsewhere. Creating and maintaining solid evidence bases is key to sound decision making in VfM appraisal.

1.10 The advice included in the main body of the Guide is deliberately not project or sector-specific. To provide further assistance, the worked example in Section B of this guide simulates how the Spreadsheet could be used, and its results fairly interpreted, for a grouped schools procurement. It does not however, place the outputs in the context of the qualitative VfM assessment, nor does it put forward suggested defaults. The Procuring Authority should use the best available evidence and appropriate judgement when deciding which values best reflect the programme or project.

Spreadsheet Usage

Introduction

1.11 In this section the Guide explains how the Spreadsheet can be used to test various VfM propositions. The Spreadsheet assists users by including dialogue boxes for active cells. These boxes describe the information required to run the Spreadsheet and present the relevant references to the User Guide.

1.12 Running different versions of the Spreadsheet to improve the user's understanding of the impact of changing given input variables provides useful decision-support to Procuring Authorities. Whilst this Guide encourages Procuring Authorities to tailor certain inputs and scenarios of the Spreadsheet for the particular project or programme being assessed, its usefulness will not be significantly improved by increasing its level of complexity. Amendments to the functionality of the spreadsheet should therefore be avoided

1.13 The Spreadsheet is used at both the programme and project stages of VfM appraisal. When used to support programme-based decisions, a Department will need to consider a "representative" project on which modelling can be undertaken. Where projects in a programme are not homogeneous, Departments may need to construct a number of such "representations" and then model each before supportable conclusions can be drawn for the programme.

1.14 The Spreadsheet assumes that the project satisfies a long-term service requirement for a public body (the "Procuring Authority"). As such, it should prove to be a useful tool for a large number of investment projects being considered by public sector Procuring Authorities. Where a project is less standard than that upon which the Spreadsheet has been based (for example, a joint venture), the Spreadsheet is unlikely to be a suitable method of analysis. In these circumstances, it may be appropriate for a Procuring Authority to develop a bespoke spreadsheet to test VfM in discussion with HM Treasury. However, even for such spreadsheets, the principles upon which the Spreadsheet is based will continue to be relevant.

1.15 The Spreadsheet is deliberately set up in a way that requires Departments and Procuring Authorities to collect, collate, extrapolate and disseminate information about the effect that different procurement routes have on the quality, cost and timeliness of an asset and/or associated services. The creation of a robust and well-populated database is essential if future procurement decisions are to be properly evidence-based. Where the evidence base is not currently well developed, public bodies are required to improve it so as to ensure that the results obtained from using the Spreadsheet properly reflect all available experience.

1.16 Tables 1.A-1.D below set out the headings of each input cell for the spreadsheet with a description of the input required and a reference to a more detailed explanation later in the guide.

Table 1.A: General Input Cells

Variables	Description	Factors to consider
Timings	• The contract period is restricted to intervals between 6 and 40 years • The Spreadsheet allows the user to consider a situation where service begins prior to the end of the major capital expenditure period. The percentage of the unitary charge paid in this short period should be entered in the Unitary Charge box, cell M13	In the event that the start of operations is phased, with the unitary charge payable during the period prior to the end of the construction period, increasing over time, then the average share of the full unitary charge payable during the semi operational period will need to be determined separately, before being entered into cell M13
CapEx Escalator	This escalator increases the projected level of Capital Expenditure during the main construction period at the start of the Contract.	See 1.44 - 1.45
OpEx Escalators	The OpEx (employment) escalator is applied to all wage related costs, whilst the OpEx (non employment) escalator is applied to all non wage operating expenditure, lifecycle costs and Third party income.	Non employment OpEx will be equal to the GDP deflator. The OpEx (Employment) escalator should reflect the projected increase in salary and wage costs. 1.46 - 1.47
Unitary Charge Escalator	Applied to the unitary charge in full and shown as the percentage of the OpEx (non employment) escalator	1.48 and section 3.2 of HMT Application Note: Interest Rate & Inflation Risks in PFI Contracts[3]
Nominal Discount rate	This is based on the Green Book real discount rate of 3.5% and GDP Deflator assumption of 2.5%. It is a hard-wired input	1.49 - 1.51

[3] http://www.hm-treasury.gov.uk/ppp_finance_guidance.htm

Table 1.B: Costs

Variable	Description	Factors to consider
Initial CapEx	Expenditure incurred in procuring the asset. It does not cover expenditure required to maintain the asset	1.81 - 1.84
OB Pre	This represents the optimism bias between Outline Business Case and Contract signature. There is a demonstrated systematic tendency for project appraisers to be optimistic. The OB Pre is assumed to be the same for both procurement options. Accordingly for each conventional procurement OB pre input variable, the Spreadsheet will automatically generate an OB Pre input with the same value for the PFI option.	1.55 - 1.62 Table A1.F 1.79 - 1.80
OB Post	This represents the optimism bias post contract signature and as such applies only to the conventional procurement option. Change notices which effect the cost of the PFI option are captured later under "flexibility"	1.55 - 1.61 1.63 - 1.79
Lifecycle costs at each LC date Life cycle intervals	The investment incurred, on an ongoing and/or periodic basis during the course of the contract period, to maintain the asset so that it remains fit for its intended purpose. The lifecycle interval for the PFI option is hard-wired as an annual cost	1.85 - 1.92
OpEx • Non Employment • Employment per person • Employee number	Represents the costs incurred by the authority in operating the asset and or running the services that are included within the scope. Expenditure which falls outside of the scope, for example, clinical staff costs, are excluded. The Spreadsheet is hard-wired to ensure that the employment cost per person is equal for both the PFI and the conventional procurement option.	1.93 - 1.99 The cost per person will necessarily be an average from past schemes as it is not clear that the employment profile will be known at this early stage in the procurement.
Transaction costs (Private sector & Public Sector)	Theses represent the costs incurred by (i) the private sector (hard-wired into the Spreadsheet) and (ii) the public sector, in reaching contractual agreement. The PFI costs have a minimum level of £750k as the relationship is not necessarily linear. This minimum level does not apply to the conventional procurement option.	1.105 - 1.107

Table 1.C: Other factors

Variable	Description	Factors to consider
Third Party Income	This represents any income stream which may result from the procurement which will reduce the unitary charge	1.108 - 1.109 If there is more than one source these should be aggregated offline before entering a single input into the spreadsheet
Flexibility • Scope change year • Probability factor • Level of scope change • Premium flexibility factor	• The year in which a major scope change is most likely- this should be the same for the PFI and conventional procurement option so the PFI cell updates automatically • The probability factor represents the user's best assessment of the likelihood of change. Again the PFI cell is hard wired to update automatically when the number is entered for the conventional procurement option • The level of the scope change should be entered as a percentage of the initial capital expenditure. Afgain the PFI cell updates automatically • The premium is only applied to the PFI option as this is the charge to enter into a change notice. It is assumed that for the conventional procurement that the work will be competitively tendered	1.110 - 1.118
Indirect VFM Factors	The Green book requires public bodies to identify both costs and the benefits which arise from public investment and to monetise where possible intangible benefits. These should be entered into the spreadsheet here in NPV terms.	1.121 - 1.128
Tax	An estimate is made to reflect the additional tax take that accrues to government under the PFI option in line with the Green Book	1.129 - A.132 Details of how to apply/ calculate this adjustment can be found at www.hm-treasury.gov.uk/greenbook

Table 1.D: PFI Funding

Variable	Description	Factors to consider
Gearing	This represents the share of the total financing requirement which is funded by debt	1.145
Sterling swap rate Swap credit spread Bank margin	Consult Infrastructure UK if you are unsure which figures to use here.	See table A1.J
Percentage Capital Contribution	Percentage of Capex that is planned to be paid by the procuring authority as a capital contribution at completion of construction	1.150 See Technical Update 2010 at http://www.hm-treasury.gov.uk/ppp_standardised_contracts.htm

Operating the Spreadsheet & Outputs

1.17 The Spreadsheet is based on Procuring Authorities determining the correct input variables' values and then computing the impact of these, alongside the Spreadsheet's fixed inputs, to create the outputs. The Spreadsheet contains 6 sheets:

- an Instruction Sheet" with initial instructions,
- an Input Assumptions Sheet into which all input variables should be entered. The reasons for the input choices and the sources of information should be entered into this sheet,
- an Input Summary Sheet which can be printed and which shows both the variable inputs and the default "hardwired" assumptions. Users should not enter data into this sheet
- an Output – Indifference Sheet which contains the main outputs, switches to test the effects of changing key inputs, sand a graph showing how changing key inputs affects VfM
- Output – Stashed Scenarios where several scenarios can be saved, and
- a sheet to print all relevant tables and graphs .

General

1.18 Outputs are derived by running the Spreadsheet. The Spreadsheet is run by clicking on the relevant Pre Tax Target IRR Switch to the right of the Output Box in the Output-Indifference sheet. Meaningful outputs will only be achieved once all of the input variables in the Input sheet have been determined and entered into the Spreadsheet.

Inputs

1.19 Procuring Authorities should insert Input values for each of the coloured inputs in the Input-Assumptions sheet. With the exception of the "Indirect VfM Factors", all other Input values should be expressed at current prices and need not be computed separately to the Quantitative Evaluation Spreadsheet. Guidance on how to complete many of the Input values is provided in

dialogue boxes that appear when users place the cursor over the relevant cell and more detailed explanations can be found as part of this Guide.

1.20 Each cell for entering input variables is coloured pale amber. All input values should have a rationale and source entered into the adjacent column. No inputs should be made in the "Input-Summary" sheet.

Scenarios

1.21 The "Active Scenario" status cell contained in the Output Box denotes which scenario is currently being tested. The scenario simply designates which test is currently being performed by the user. A discrete test is undertaken when a particular IRR Switch value is chosen and a particular series of Indifference Point Switches (which are located to the right of the Output Box) are set.

Error messages

1.22 The user should enter all input variables before running the Spreadsheet. Failure to introduce reasonable values for all input values may cause the Spreadsheet to generate erroneous outputs. In the event that #DIV/0!s, #NUM!s or other error messages appear in the IRR section of the Output Box, revise the input values and click on the "IRR Stabiliser" switch. Similarly, in the event that there is non-convergence when testing the Indifference Points (this may arise if very large Indifference Point values are used causing "######" to appear in the Indifference Points section of the Output Box) then, having revised the Input Values, click on the "IP Stabiliser" switch.

1.23 In the unlikely event that error messages appear which are not cleared when pressing the stabiliser switches (having verified that all input values are appropriate) the "Default UC Factor" in the Output sheet may be adjusted either upwards or downwards until the errors messages are removed and the Spreadsheet re-run. Under no circumstances should the Unitary Charge Balancer value be manually changed.

1.24 Each time that the Spreadsheet is run, the user should check that the "Check Box" shows that the debt service is being fully recovered, the pre-tax return equals the target and total cashflows are zero (i.e. that the cells read either "TRUE" or N/A (Not Applicable) – which may be the case for the Pre Tax IRR Target check when an indifference switch is used).

Equity IRR

1.25 The Equity IRR value shows the rate of return on investment that providers of equity capital would earn under the PFI Option. The relevant IRR Switch enables Procuring Authorities to complete some limited sensitivity analysis. When a particular IRR Switch is activated by clicking on it, the Unitary Charge is adjusted such that the Pre Tax Target IRR is achieved. Since tax specific cashflows are not included in the Spreadsheet, Procuring Authorities should use a Target Equity IRR which corresponds to the pre-tax equity IRR evidenced in previous project models inclusive of tax. This will ensure that the Unitary Charge in the Spreadsheet is computed on a post tax basis.

1.26 Once a switch is run the results can be saved in the Output sheet by pressing the "Stash Output" switch. Alternatively the whole output sheet can be saved as a new spreadsheet in the same workbook by simply pressing the "Copy Output Sheet" switch, and a detailed record of the outputs under different scenarios maintained.

Project IRR

1.27 The Project IRR value shows the rate of return on the Total Project Cashflows for the PFI Option. Total Project Cashflows are defined as total income accruing to the PFI Partner (i.e. Third

Party Income and the Unitary Charge) less costs incurred by it (i.e. Capital Expenditure, Operating Expenditure, Lifecycle Costs, Residual Costs and Transaction Costs). The PFI Partner uses Total Project Cashflows to service and repay all debt and to fund all dividend distributions. The Project IRR represents the implicit weighted average cost of capital for the project being assessed and will vary depending on which Target IRR is being tested.

Indicative PFI VfM

1.28 The "Indicative PFI VfM" figure in the Output sheet shows the extent to which, based on the chosen Pre Tax Target IRR, the net present value of the PFI Option is better (if the figure is positive) or worse (if the figure is negative) than the net present value of the Conventional Procurement Option. However, this provides just a single estimate under a particular set of assumptions. Conclusions drawn from the quantitative VfM analysis must be supported by examining the results of the Spreadsheet when run using different assumptions, and must be placed in context of the confidence the user has in the underlying inputs.

1.29 The net present value of the Conventional Procurement Option (the "CP Cost") is defined as the discounted sum of the Whole Life Costs, of Third Party Income, of the Transaction Costs, the tax adjustment value, of the costs of any assumed scope change and any Indirect VfM factors. The net present value of the PFI Option (the "PFI Cost") is defined as the discounted sum of the Unitary Charge, Public Sector Transaction Costs, of the costs of any assumed scope change and any Indirect VfM factors.

1.30 If the Indicative PFI VfM value in the Output sheet is greater than zero then, based on the assumptions used and in the absence of either sensitivity analysis or the qualitative analysis, Procuring Authorities might conclude that the PFI Option is more likely to provide VfM than conventional procurement. However, this would be premature and would not constitute justification for choosing (or rejecting) the PFI Option. Given the uncertainty associated with the values ascribed to different inputs at this stage, the Spreadsheet seeks to test further the results of the analysis so far completed.

1.31 The Unadjusted Annual Unitary Charge is also shown in the Output Box. This differs from the unitary charge to the extent that it does not take into account the public sector transaction costs, indirect VfM factors and the flexibility factor premium. Whilst these are relevant to the VfM decision they would not typically feature as part of the PFI Unitary Charge. It is important that Procuring Authorities separately develop a shadow bid model and do not use the Unadjusted Annual Unitary Charge to assess affordability.

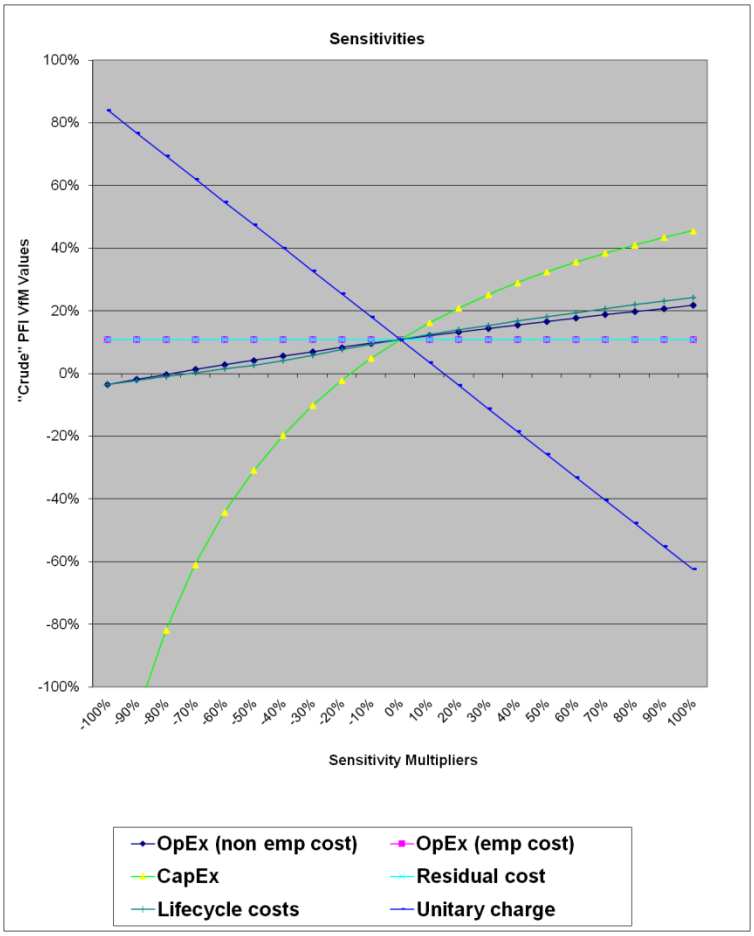
Indifference Points

1.32 The Spreadsheet uses Indifference Points to demonstrate the level of change required in the value of individual inputs to erode to zero the net present value difference between the PFI Option and the Conventional Procurement Option, thus making the procurer indifferent between the two routes. Procuring Authorities need to deploy and interpret Indifference Point analysis carefully as it can impact their final decision.

1.33 The two graphs (see example in Chart 1.A) on the Output sheet plot how far changes in each Conventional Procurement input variable impact on the VfM. Where an input line crosses 0, the user would be indifferent between the conventional procurement and PFI. It makes the crude assumption that changes to input variables apply only to one of the procurement methods (PFI for the Unitary Charge curve, and conventional procurement for all other curves represented in the graphs), but not to both at the same time. So, for example, an increase in Capital Expenditure tested through Indifference Point analysis is assumed to occur only to the option that, unadjusted, is demonstrating better VfM. The Spreadsheet implicitly assumes that such an increase is wholly avoided by the option which, unadjusted, shows poorer VfM. The

graphs should give the user a feel for how sensitive the Spreadsheet is to each variable and therefore which assumptions they may wish to focus on.

Chart 1.A: Example of the Sensitivities Graph



1.34 The Conventional Procurement Indifference Points in the Output sheet focus on those input variables that drive the VfM of the Conventional Procurement Option. Conversely, the PFI Indifference Point shows the level of change required in the Unitary Charge (and the resultant Return on Equity and Return on Total Project Cashflows) to erode the difference in the net present value of the two procurement methods to zero. In effect, this identifies the rate of return that would need to be required by equity capital providers to make Procuring Authorities financially indifferent between the two procurement methods that they could use. The Indifference Point of each input variable is tested by clicking the relevant Indifference Switch in the Output Sheet, or by reading it from the graph as it calculates the power at which the variable crosses zero. The Indifference Point Value for the relevant variable is shown in column L. The outputs from the IRR and IP switches can be saved using the "Stash Output" and "Copy Output sheet" buttons. Running the indifference switches will however alter the graphs.

1.35 The main focus of the indifference point analysis is, for the Conventional Procurement Option, Capital Expenditure and, for the PFI option, the Unitary Charge. Changes to other cash flows, such as Operating Costs and Transaction Costs, usually result in only marginal changes in the VfM if sensitivity analysis remains within plausible limits. The Spreadsheet does, however, enable Procuring Authorities to test combinations of changes in assumed cash flows. It does this by first, inviting Procuring Authorities to introduce changes to second-order costs such as Operating Expenditure and Transaction Costs using the " Conventional Procurement Sensitivity

Multipliers" and then, having taken account of these changes, providing the Indifference Point for Capital Expenditure in the Conventional Procurement Option and Unitary Charges in the PFI Option. The multipliers in the "Conventional Procurement Sensitivity Multipliers" box in the Output sheet are used to enable modelling which focuses on the Spreadsheet's two primary decision-support variables, which are assumed to be Capital Expenditure and Unitary Charge.

VfM Conclusion

1.36 Prior to drawing any conclusions from the quantitative VfM analysis, Procuring Authorities should take account of the sensitivity of the indicative PFI VfM value to changes in key input variables. Equally, they should bear in mind that the Indifference Point analysis tests the sensitivity of VfM to changes that affect either one or other of the procurement methods but not both at the same time. This will be particularly important where there is significant uncertainty around the validity of certain inputs. Where there is a high level of uncertainty around inputs, or outputs are highly sensitive to the input variables, it is appropriate to accord greater weight to the qualitative assessment or to invest more time and money in establishing higher confidence in the most critical assumptions. Procuring authorities should in any event undertake appropriate sensitivity analysis.

1.37 Sponsoring Departments should work to assist Procuring Authorities by establishing certain benchmark tolerances for Indifference Points which, if relatively easily breached, might suggest that further analytical support should be provided to the Indicative PFI VfM value determined by the Spreadsheet. Table 1.E identifies the default benchmark tolerances for Capital Expenditure and the Unitary Charge that might, in the absence of sector-specific information, be used in this way. The results should then be placed in the context of the qualitative analysis even where they lie significantly outside the given tolerance. The Authority should also ensure that all the underlying assumptions and scenarios are documented as set out in Section 5, Documentation Checklist, of the main guidance.

Table 1.E: Example Benchmark Tolerances

Value driver	Example Benchmark Tolerance
Capital Expenditure	-5%
Unitary Charge	+3%
Source:	

SPREADSHEET INPUTS

General

1.38 In this section the input variables which Procuring Authorities will need to introduce into the Spreadsheet or programme to assess their particular projects are identified. Input variables fall into two categories:

- Input Values are those variables, such as Capital Expenditure, Operating Expenditure and the Contract Period, that are inevitably project programme specific. The Spreadsheet assumes no value for such variables and Procuring Authorities will need to input relevant information to enable the Spreadsheet to run;
- Hardwired Default Values are highlighted in grey on the spreadsheet, neither the sponsoring department or the Procuring Authority should alter these inputs.

1.39 Procuring Authorities should ensure that all input variables (i.e. Input Values and Default Values) are appropriate to the circumstances of each project or programme they assess. For inputs sourced from third party advisors, it will be important for Procuring Authorities to

understand the form in which the data is provided (e.g. nominal/real) and relevant assumptions (e.g. level of contingency) in order to avoid possible distortions (e.g. double counting).

Escalation

1.40 Escalation leads to estimated values increasing over time, often at different rates. Given that costs, income and benefits do not arise instantaneously, the Spreadsheet needs to take account of the effect of "escalation", particularly where this escalation represents a real terms increase in the value of all or some of the Spreadsheet inputs (i.e. the expected increase exceeds retail price inflation). Different input variables are subject to different pressures and should, where appropriate, be escalated by different indices.

1.41 The Green Book requires costs and benefits to be expressed in consistent price terms[4], either in real (i.e. constant price) or nominal (money-of-the-day) terms. The Spreadsheet presumes that prices are modelled in nominal terms, although it can, if necessary, be amended to operate on a constant price basis. If Procuring Authorities require the discounted cash flow analysis to be undertaken on a real terms basis, then a number of adjustments will need to be made to certain Input and Default Values. In particular, Procuring Authorities will need to ensure that escalators used in the Spreadsheet are stated in terms that are consistent with the remainder of the discounted cash flow analysis.

1.42 All periods in the Spreadsheet are annualised. The length of the Contract Period and the Construction End Year are both Input Values to be determined by the Procuring Authority, as these will vary from project to project. The Spreadsheet is sufficiently flexible to enable Procuring Authorities to examine the VfM of projects that have prolonged construction periods (such as for street lighting or roads maintenance projects) and/or where the Unitary Charge is expected to commence in advance of the Construction End Year, although where there are more than two phases this will have to be smoothed before it is entered into the spreadsheet.

1.43 The Spreadsheet allows for four different escalators, namely:

- The "CapEx Escalator";
- The "OpEx (employment) Escalator";
- The OpEx (non employment) Escalator
- The "Unitary Charge Escalator";

CapEx Escalator

1.44 The projected level of Capital Expenditure required to complete a project is increased annually by the CapEx Escalator for the years in which Capital Expenditure is incurred. A number of Departments already have in place their own tailor-made CapEx Escalators (for example, MIPs is used for construction projects by the Department of Health). Where available, these indices should be used to determine the CapEx Escalator for relevant projects.

1.45 In the absence of Departmental indices, Procuring Authorities should determine an appropriate index to apply to Capital Expenditure. A large number of indices are available and perhaps one of the best known is the Buildings Costs Indexation Service ("BCIS"), compiled by the Royal Institute of Chartered Surveyors ("RICS"). Information on the BCIS can be found at www.bcis.co.uk. When using escalators Procuring Authorities should be careful to choose an index that is appropriate to the particular project being assessed. BCIS's All-in Tender Price Index

[4] See Section 5.42 of The Green Book (www.hm-treasury.gov.uk/greenbook)

is, for example, just one of a number of indices maintained by the RICS and itself is broken down further on a sector-by-sector basis.

OpEx Escalators

1.46 An OpEx Escalator is applied to all Operating Expenditure, Lifecycle Costs and Third Party Income. The Spreadsheet enables Procuring Authorities to apply different escalators to salary and wage costs (through the OpEx (employment) Escalator) and to other running costs (through the OpEx (non employment) Escalator). In the Spreadsheet the OpEx (non-employment) Escalator should be equal to the current GDP Deflator [5].

1.47 The separation of these two indices in the Spreadsheet recognises that Procuring Authorities may wish to apply a different escalator to total wage and salary costs than the GDP Deflator value. A number of wage rate indices are in common use in both the public and private sectors. For example, the Office of National Statistics (ONS) provides, and updates monthly, its UK Average Earnings Index. The ONS breaks down the UK statistics into different categories and sub-categories, including the manufacturing, services and public sectors. Other more bespoke indices are available, often collated by relevant professional and trade associations. Procuring Authorities should apply such indices with some care as typically they reflect increases in wage rates, whilst the Spreadsheet seeks to index wage costs. In certain circumstances, Procuring Authorities may need to adjust the headline rates for expected efficiency or productivity gains.

Unitary Charge Escalator

1.48 The Unitary Charge Escalator is applied to the Unitary Charge only. In PFI contracts, the Unitary Charge typically escalates, either wholly or in part, by reference to the Retail Price Index ("RPI"). The Spreadsheet enables Procuring Authorities to determine the extent to which the Unitary Charge is wholly or partially escalated by the OpEx (non employment) escalator. In determining what proportion of the OpEx (non employment) escalator should be used to escalate the Unitary Charge, Procuring Authorities should be guided by relevant sector-specific experience and provide, as part of their project assessment, appropriate supporting evidence.

Discount Rate

1.49 The Spreadsheet is a predictive tool that relies on estimates of future cash flows. Economic decision-making is, however, a present-day activity and therefore a method is needed to return estimated and uncertain future economic cash flows to present day value. This is achieved by discounted cash flow analysis.

1.50 Discounted cash flow analysis can be conducted in real or nominal terms. In either case, it is critical that the rate by which future cash flows are discounted is consistent with the price basis on which cash flows are stated. If, on the one hand, all current and future cash flows are stated in real terms (i.e. today's prices), then the discount rate used to return these cash flows to present-day values should be 3.5%, as required by the Green Book[6]. If, on the other hand, current and future cash flows are stated in nominal (i.e. money-of-the-day) terms (as is the case in the Spreadsheet), then the real discount rate should be adjusted by the GDP Deflator value. In the Spreadsheet this is fixed at 2.5%. Accordingly the nominal discount rate is shown in the Input sheet as a hard-wired variable of 6.09%.

1.51 Procuring Authorities use the Spreadsheet by inputting values in either nominal or real terms. Where cash flows are expressed in real terms, Procuring Authorities will need to ensure

[5] The GDP Deflator can be found at www.hm-treasury.gov.uk/economic_data_and_tools/gdp_deflators/data_gdp_fig.cfm

[6] The Green book includes a declining schedule of discount rates for periods over 30years. As noted in the PFI VfM Assessment Guidance November 2006, currently it is envisaged that the overall cap on contract lengths will be a maximum of 30 years with shorter contract lengths in some sectors reflecting the different service requirements in each sector – departments will need to demonstrate that projects in excess of 30 years can offer VfM.

that all relevant Input and Default Values (including escalators) are stated on a consistent price basis.

Modelling the Whole Life Costs proposition

1.52 The Spreadsheet divides Whole Life Costs into five components. These are:

- Capital Expenditure (including equipment);
- Investment in Lifecycle Costs;
- Operating Expenditure (comprising the cost of buildings and grounds maintenance and ancillary services, such as catering and cleaning, as well as overheads and insurance);
- Residual Cost;
- Transaction Costs.

1.53 Input Values for each Whole Life Costs component under the two procurement methods should be based on a combination of project-specific costings and on sector-specific experience. Procuring Authorities may even derive some value from reviewing the evidence base assembled by Departments other than their sponsoring Departments, particularly where projects share a number of common characteristics, such as, for example, accommodation schemes.

1.54 If, under the PFI Option, outturn Whole Life Costs data is not yet readily available, then estimates used by Procuring Authorities might be informed by studying, where permitted, related costs included within successful bids received by other public sector bodies on either outsourcing or other broadly similar PFI projects. Cost data is likely to be more readily available for conventional procurement, either from records on current and projected budgets held by the Procuring Authority or from data maintained by appropriate Departmental Estates Agencies.

Optimism Bias

1.55 The Spreadsheet needs to account for the impact of uncertainty, which leads to Optimism Bias. There is a demonstrated and systematic tendency for project appraisers to be optimistic. Many project parameters are affected by optimism[7]. For example, appraisers tend to overstate benefits and understate the timings and level of both capital and operating costs. To redress this tendency, the new Green Book requires appraisers to make explicit adjustments for this bias.

1.56 One underlying cause of Optimism Bias is uncertainty. As appraisers are uncertain about the future, they naturally tend to ignore the objectives, requirements and risks that they cannot envisage. However, experience suggests that new objectives, requirements and risks do typically emerge during the course of a project and therefore this tendency should be expected and planned for. Certainty will tend to be lower at the Outline Business Case (OBC) stage than at the Full Business Case (FBC) stage. Equally, certainty tends to increase progressively through the tender submission to the construction stages of a project. In general, therefore, Optimism Bias is greater earlier on in a project's development.

1.57 Optimism Bias can also be influenced by the methods chosen by Procuring Authorities to manage project risks, particularly those deployed following the completion of the OBC. One of the most significant of these risk management strategies is method of procurement and, subsequently, from the different contractual arrangements that arise.

[7] See Section 5.61 to 5.64 of The Green Book (www.hm-treasury.gov.uk/greenbook)

1.58 The distinction between Optimism Bias arising from, on the one hand, uncertainty and, on the other, methods chosen to manage that uncertainty, is important for the purposes of the Spreadsheet. Whilst, for example, uncertainty in relation to project scope or to the Procuring Authority's service requirements can lead to significant levels of Optimism Bias, there is currently little, if any, evidence to suggest that either conventional or PFI-type procurement methods deal any more or less efficiently with this type of Optimism Bias. There is however, better evidence that the allocation of risks achieved under a PFI contract, once awarded, reduces the impact on the Procuring Authority of those uncertainties that remain inherent in a project, when compared with the contractual arrangements that typically result from the Conventional Procurement Option.

1.59 Evidence is based on two features of the PFI Option:

- The level of project development completed prior to the completion of the FBC tends to be greater under the PFI Option than under conventional procurement. The transfer of significant performance risk to the private sector and, in particular, the involvement of third-party funders, typically leads Procuring Authorities and PFI partners to reach much more detailed levels of design and service definition and encourages third parties to complete a much greater level of technical due diligence before contracts are entered into. Confidence in estimates made at the FBC stage for PFI procurements tends therefore, to be higher than is typically found in conventional procurements.
- The level of risks transferred from the Procuring Authority to the contractor under the PFI Option exceeds that typically achieved under conventional procurement methods with third party funders usually demonstrating a harder budget constraint.

1.60 As the Spreadsheet needs to be able to account for any difference between the two procurement methods, sponsoring Departments are encouraged to build and add to evidence for optimism bias in their sectors, as well as including cross-sectoral information where appropriate.

Accounting for Optimism Bias in the Spreadsheet

1.61 In accounting for Optimism Bias, the Spreadsheet differentiates between two key stages of the investment decision process, namely before and after contract award. The Spreadsheet therefore, reflects Optimism Bias through a Pre-FBC Optimism Bias Factor and a Post-FBC Optimism Bias Factor.

The Pre-FBC Optimism Bias Factor

1.62 The Pre-FBC Optimism Bias Factor represents the increase in the estimated costs or the shortfall in the income or benefits of a project between OBC and FBC. A view of the level of the Pre-FBC Optimism Bias Factor seen typically can be obtained by a Procuring Authority studying changes between estimates recorded in the OBCs and FBCs of broadly similar projects previously approved, either by it or by its sponsoring Department

The Post-FBC Optimism Bias Factor

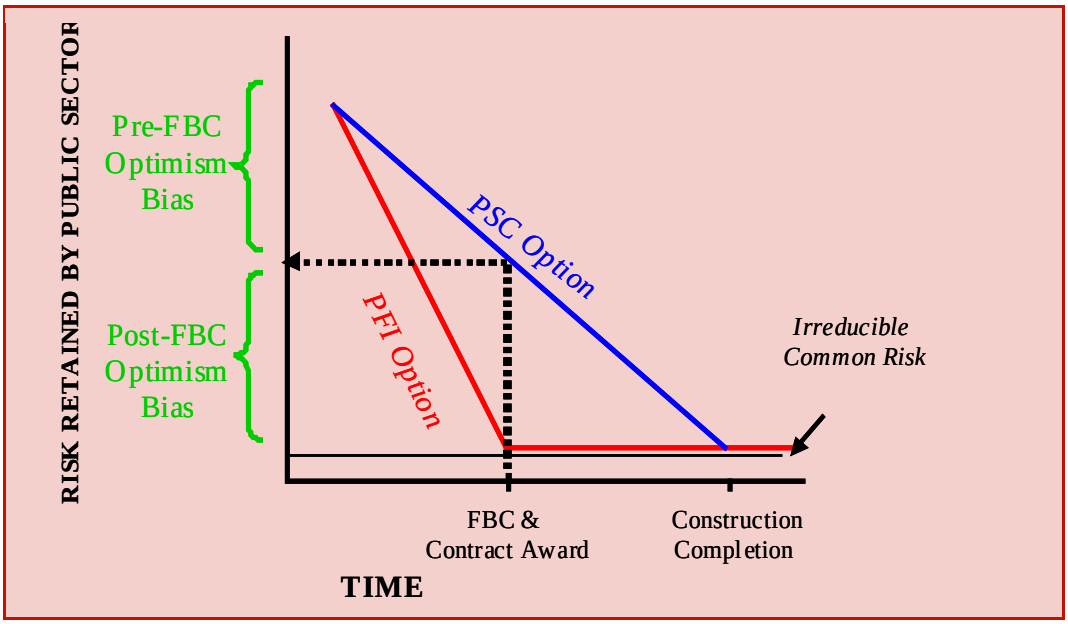
1.63 The Post-FBC Optimism Bias Factor represents the increase in the estimated costs or the shortfall in the income or benefits between the completion of detailed costs and benefits estimates (as they appear in the FBC) and the completion of the associated asset. A view of the level of the Post-FBC Optimism Bias Factor can be obtained by a Procuring Authority studying

the amount that the actual costs incurred once the asset is complete exceed the costs, as set out in the FBC[8].

1.64 The Spreadsheet deals with the two types of Optimism Bias through input variables in Columns E, F and I of the Input Sheet. Post-FBC Optimism Bias is expected to differ between the two procurement methods.

1.65 Chart 1.B identifies and characterises the two elements of the Risk Management Proposition reflected in the Spreadsheet.

Chart 1.B: The Risk Management Proposition – Potential Profile



Conventional Procurement Option

1.66 For the Conventional Procurement Option, the Post-FBC Optimism Bias Factor reflects, in the main[9], the variance that is often seen between FBC estimates of costs, income and benefits and actual outturn costs, the economic value of delays incurred by Procuring Authorities by the time the construction element of the project has been completed and the shortfall in benefits achieved by the project, perhaps through late delivery of the asset.

1.67 The testable risk management proposition here postulates that this variance emerges for Procuring Authorities because, first, estimates completed by the Procuring Authority at the FBC stage are completed at a lower level of confidence than under PFI and, second, that the contractual arrangements that result from conventional procurement typically insulate the Procuring Authority less well from the impact of risks that crystallise following contract award than those achieved under PFI.

[8] When extrapolating Optimism Bias from such studies though, care should be taken to remove from the analysis the effect of any post-FBC change in scope, thereby distilling only the increase due to under-estimating costs or over-estimating the value of benefits.

[9] For certain Procuring Authorities the Post-FBC Optimism Bias Factor may also include the variance in project costs seen between the estimated costs of the project (as they appear in the FBC under conventional procurement) and the tender prices actually received by the Procuring Authority's following competitive tender, if the tender exercise is run after the FBC has been completed. This will not be the case for Procuring Authorities where conventionally procured FBCs typically coincide with contract award.

1.68 A Procuring Authority might be able to argue that the Post-FBC Optimism Bias Factor for the Conventional Procurement Option is similar to that for the PFI Option if it can demonstrate that:

- it routinely achieves the same, very high levels of confidence in its cost/benefits estimates for conventionally funded projects as is seen under PFI; and
- the contractual arrangements it normally enters into following conventional procurement provide a similar level of protection to the impact of unexpected costs and/or shortfall in benefits to that achieved (and paid for) under PFI.

1.69 A Procuring Authority may be able demonstrate this in part by, for example, showing that it typically conducts a more detailed level of investigation than is normal in the sector, or by showing that it tends to complete more design definition or that it undertakes more comprehensive trials, pilots or simulations than is usual. It might also argue that it expects to benefit from experience gained by learning from other projects.

1.70 Such arguments might substantiate a lower level of Post-FBC Optimism Bias than is typical across the sector for the Conventional Procurement Option and this should be directly observable from studying other projects completed by the Procuring Authority. However, given that the input-based nature of a typical conventional procurement means that the contractual incentives are less well aligned with the production of the benefits required than they are under PFI, it will be more difficult for Procuring Authorities to argue that the differential can be totally eroded.

PFI Option

1.71 The Spreadsheet is set up in such a way that enables Procuring Authorities to test the proposition that PFI manages risks which typically emerge after the FBC stage more efficiently than is achieved through conventional procurement. This proposition relies on two testable factors. First, that more detailed (and more widely validated) project definition and development is completed at the FBC stage for the PFI Option. This is also reflected in the Spreadsheet through higher Transaction Costs for the PFI Option. Second, that, having reached contractual close, the PFI Option may deal more effectively, from the public sector's point of view, both with the risks that emerge and crystallise thereafter and, through contractual mechanisms that are more tightly calibrated with outputs, increases the probability that the benefits required from the project will be secured.

1.72 The Spreadsheet introduces a Default Value for the Post-FBC Optimism Bias Factor for the PFI Option of zero. This suggests that Post-FBC Optimism Bias for the PFI Option has fallen to the irreducible level (i.e. that which is common to all methods of procurement and which therefore, is not valued in the Spreadsheet). In other words, the Procuring Authority has very high levels of confidence that the costs and/or benefits required of the investment will be achieved or alternatively, it is confident that the contractual mechanisms are sufficiently strong to reduce, or even prevent altogether, payments being made by the Procuring Authority if specified benefits are not being produced. Both these propositions can be tested by studying comparable PFI projects and, particularly, those where the Operational Period has commenced.

Box 1.A: Optimism Bias

Costs						
Whole Life	*PSC*	*OB Pre (%)*	*OB Post (%)*		*PFI*	*OB Pre (%)*
Initial CapEx (£'000)	65,250	10%	30%		71,775	10%
Lifecycle costs at each LC date (£'000)	6,525	10%	30%		1,076	10%
Lifecycle intervals (yrs)	10	NA	NA		1	NA
OpEx (non employment)(p.a.) (£'000)	1,075	10%	20%		1,183	10%
OpEx (employment per person) (p.a.) (£'000)	20	NA	NA		20	NA
OpEx (employee number)	25	NA	NA		20	NA
Transaction						
Public sector (£'000)	2,000	10%	10%		1,500	10%
Private sector (£'000)	0	0%	0%		1,077	10%

1.73 The levels of Pre and Post-FBC Optimism Bias Factors will inevitably vary from sector to sector and from project to project. Optimism Bias values should be determined for all projects. Zero Optimism Bias is not appropriate and the Spreadsheet does not allow the user to insert 0% Optimism Bias values. Any estimates used should be informed by sector-specific experience and draw on cross-departmental experience where appropriate, but should be updated on a project specific basis. Through their Estates Agencies, a number of sponsoring Departments already maintain good records both of the movement in estimated costs of projects between the OBC and FBC stages and, particularly for conventionally procured projects, of subsequent changes to outturn costs (i.e. between the FBC and the completion of the relevant asset). Where information is not readily available Departments should determine what steps need to be taken to assemble a solid evidence base upon which to draw their sector-specific conclusions on Optimism Bias.

1.74 In 2002 HM Treasury commissioned Mott McDonald[10] to conduct a cross-sector review analysing the variance between the estimated costs of large publicly funded projects at OBC stage and the outturn costs incurred, once the relevant assets had been completed. This report can provide Procuring Authorities with a useful platform upon which to base plausible planning assumptions for Optimism Bias, particularly for larger projects.

1.75 Equally though, Procuring Authorities may, from their own experience, already have a good understanding of the levels of Pre-FBC and Post-FBC Optimism Bias that typically affects projects similar to the one being assessed. The Spreadsheet provides Procuring Authorities with the scope to introduce their own estimates of Optimism Bias.

Accounting for Post-Construction Optimism Bias in the Spreadsheet

1.76 Optimism Bias introduced into the Spreadsheet through the Pre-FBC Optimism Bias Factor and the Post-FBC Optimism Bias Factor focuses primarily on the difference between estimated and outturn costs only up to the point when an asset and/or service is first commissioned. The evidence currently available to Procuring Authorities, and upon which therefore, estimates will be based, is likely to originate predominantly from studies of the results of conventional and, principally, asset-focused procurements. However, if the Spreadsheet is to properly reflect Optimism Bias, then it is also important for it to recognise the way in which cash flows and/or benefits that arise after this date can be under or overestimated.

[10] Mott MacDonald, Review of Large Public Procurement in the UK, July 2002

1.77 The principal reason for recognising this third type of Optimism Bias is consistency between the two procurement methods. Through the performance-based payment regime for PFI, the Unitary Charge will be priced to guarantee both asset and any associated service performance at the required level. To the extent that the required performance standard is not achieved under PFI, then Procuring Authorities are able to reduce the level of the Unitary Charge paid over. The Spreadsheet accommodates this type of Optimism Bias by introducing an Operating Expenditure Optimism Bias factor.

Estimating Pre- and Post-FBC Optimism Bias

1.78 Table 1.F identifies some of the sources of information that Procuring Authorities might use to help them ascertain the levels of the Pre-FBC and Post-FBC Optimism Bias Factors to be used when assessing projects.

Table 1.F: Sources of Information for Optimism Bias Assumptions

Pre-FBC Optimism Bias	Post-FBC Optimism Bias
Analysis of the experience of broadly similar (in nature and size) PFI and conventionally procured projects in the past. Databases and associated information are typically maintained by Departmental Estates Agencies.	Results from risk workshops already conducted by the Procuring Authority in relation to the project currently being assessed and identifying the project-specific risk characteristics and the extent to which these will be transferred to the private sector under either the PFI or conventionally funded procurement.
Analysis of publicly or Departmentally available post-project implementation studies that expose the experience of cost and delay for PFI or conventionally procured projects.	Results from risk workshops conducted by other project teams when planning broadly similar investments to be procured using PFI or conventional funding.
	Analysis of the experience of broadly similar (in nature and size) conventionally procured projects in the past. Databases and associated information are typically maintained by Departmental Estates Agencies. Care should be taken to clean data for any changes in scope that would have been a feature common to both procurement methods.
	Analysis of publicly or Departmentally available post-project implementation studies that expose the experience of cost and delay for PFI or conventionally procured projects.
	The published results of the Mott MacDonald Study.

Risk

1.79 The way in which VfM is to be assessed under new guidance, and in particular the role of pre and post-FBC Optimism Bias, removes the need to risk adjust the Conventional Procurement Option. However, it does not remove the value in Procuring Authorities completing and updating a risk analysis for the project under consideration.

1.80 The purpose of this risk analysis is threefold. First, it identifies all relevant risks that are introduced by the decision to proceed with a project, irrespective of which party has responsibility for managing the risk. Second, it identifies which party is best placed to manage each risk. Some risks will fall exclusively to either the Procuring Authority or to the private sector, whilst others will be best dealt with as a shared risk. Project risk-analysis will seek to fairly allocate risks and the (conventional or PFI) competition and, subsequently, the (conventional or PFI) contractual terms entered into by the contracting parties will need to capture the agreed risk allocation. Third, those risks that are likely to remain with the public sector under the two different options need to be managed and therefore, suitable risk management plans need to be developed by the Procuring Authority. These plans will be different depending on which procurement route is chosen, not least because, under the PFI Option, some of the risks are dealt with by transferring them, through contract, to the private sector.

Capital Expenditure

1.81 Capital Expenditure is the expenditure incurred by Procuring Authorities in acquiring an asset so that, at the outset, it is fit for its intended purpose. It does not cover expenditure required in later years to maintain the asset. This is included in the Spreadsheet as Lifecycle Costs.

1.82 Typically, Capital Expenditure will include, *inter alia*, preliminary costs, basic materials and labour costs, professional fees, a reasonable contingency and VAT. The Input Value of Capital Expenditure will vary from project to project. It will, therefore, need to be determined by the Procuring Authority in the light of appropriate professional advice.

Conventional Procurement Option

1.83 Given that, in the Spreadsheet, Capital Expenditure is subject to Optimism Bias adjustments, the Input Value for Capital Expenditure should be expressed before the application of any contingencies. In addition, as VAT is a transfer payment and therefore, is ignored in discounted cash flow analyses, the Input Value for Capital Expenditure should also be stated in the Spreadsheet before the application of VAT.

PFI Option

1.84 The Input Value for Capital Expenditure for the PFI Option is assumed to be higher than the estimated costs under the Conventional Procurement Option. This reflects the fact that more cost and delay risk is transferred to the private sector under the PFI Option and that, typically, the PFI partner succeeds in passing many of these risks, albeit at a capped level, down to the construction contractor through sub-contract arrangements. The residual risk that remains with the PFI partner is reflected in the return on equity and senior debt required. Procuring Authorities should seek to test or tailor the Value to the requirements of the particular project being assessed. This might be achieved by, for example, Procuring Authorities studying the difference in construction prices per m^2 between conventionally procured assets and/or services and the winning PFI bids for broadly similar projects.

Lifecycle Costs

1.85 Lifecycle Costs represent the investment incurred, on an ongoing and/or periodic basis during the course of the Contract Period, to maintain an asset so that it remains fit for its intended purpose. In theory, Lifecycle Costs should be invested at a rate and frequency that enables an asset to be maintained to the same standard as that achieved on its construction, refurbishment and/or procurement. Where the Contract Period equals the estimated life of the asset (as might be the case, for example, for equipment), then the Lifecycle Costs will represent the level and profile of investment required to assure the quality and functionality of the asset up to the end of the Contract Period. In the Spreadsheet Lifecycle Costs are incurred with effect from the first year following the end of the construction period.

Conventional Procurement Option

1.86 Lifecycle Costs under the Conventional Procurement Option can depend not on need but on the availability and deployment of public capital to support wasting assets. Historically, Lifecycle Costs under the Conventional Procurement Option have been introduced less frequently than have been required and at a level that has not returned an asset to its original quality. This has, in turn, lead to poorer VfM for the public sector.

1.87 The frequency and magnitude of Lifecycle Costs will tend to vary from sector to sector and perhaps, from project to project. The Input Values ascribed to the Spreadsheet should be determined in the light of either project-specific or sector-specific experience. Lifecycle Costs are represented in the Spreadsheet as a percentage of initial Capital Expenditure, after adjusting for Optimism Bias. The quantum of Lifecycle Costs is an Input Value to be determined by Procuring Authorities.

1.88 Table 1.G sets out some of the sources of information that Procuring Authorities might use to help them make judgements on the appropriate level of Lifecycle Costs. The Input Value should be based on past evidence of lifecycle investment for both the PFI and Conventional Procurement option. It should not represent the ideal, but rather the reality.

Table 1.G: Sources of Information for Determining Lifecycle Assumptions

Full "PFI-Type" Lifecycle Costs	Data Collection	Periodic Lifecycle Costs	Data Collection
Analysis of cost experience from bodily similar PFI projects, completed either by the Procuring Authority or by the sponsoring Department or its associated Estates Agency.	Interrogation of databases maintained either by sponsoring Departments or by professional advisers	Traditional level and timing of investment in assets in the sector on the basis of records maintained by, for example, Departmental Estates Agencies (such as NHS Estates and Defence Estates Agency)	Interrogation of databases maintained either by sponsoring Departments or by professional advisers.
Advice provided by external experts relating to the optimum lifecycles and associated costs for particular classes of assets.	Dissemination by sponsoring Departments of lifecycle cost norms achieved in PFI projects.	Traditional level and timing of investment in assets by the Procuring Authority on the basis of records maintained by it.	Judgements of Procuring Authority made on the basis of experience of availability of funding for lifecycle investment for broadly similar categories of assets when conventionally procured.

Particularly for equipment, guidelines published either by manufacturers of by relevant professional or trade associations	Traditional level and timing of investment in assets in the sector on the basis of past experience

1.89 For the Conventional Procurement Option, Procuring Authorities need to determine both the level of Lifecycle Costs investment and how frequently it is to be introduced (for example annually, bi-annually, every ten years etc.). If Procuring Authorities choose to mimic the level and profile of Lifecycle Costs typically achieved under a PFI Option, then, other than Optimism Bias, the Spreadsheet eliminates any VfM difference related to this factor between the two procurement methods. The level of Optimism Bias to be applied to Lifecycle Costs may not differ significantly from the level applying to initial Capital Expenditure.

1.90 If Procuring Authorities choose a less prudent profile, based on their experience of the level of public capital traditionally available to support investment in Lifecycle Costs, then the Spreadsheet introduces an appropriate VfM premium. This premium represents the attritional effect that sub-optimal investment in Lifecycle Costs has on service quality, year-on-year.

1.91 Table A1.H sets out the assumptions used to adjust VfM in the Spreadsheet for the Lifecycle Costs investment profiles chosen by the Procuring Authority. The value of the various hard-wired Lifecycle VfM related assumptions tabulated below have been set at a level such that a "premium" is payable in the event that the frequency and magnitude of the on-going maintenance are less than under PFI, thereby compromising the quality of service.

Table 1.H: Lifecycle Costs VfM Adjustment

	Conventional Procurement Option – Investment in Lifecycle Costs	Conventional Procurement Option – Investment in Lifecycle Costs
Lifecycle Costs	Less than 100% of the net present value of Lifecycle Costs included in the PFI Option	Equal to or greater than 100% of the net present value of Lifecycle Costs included in the PFI Option
Lifecycle Costs VfM Adjustment	Net present value of PFI Option Lifecycle Costs minus net present value of Conventional Procurement Option Lifecycle Costs multiplied by 40%.	Nil

PFI Option

1.92 Under the PFI Option, the Spreadsheet assumes that annual investment in Lifecycle Costs is made. The level of investment in Lifecycle Costs should be based on sector specific experience. Procuring Authorities should seek to test or tailor this Value to the requirements of the project being assessed by examining experience from other PFI schemes for broadly similar projects

Operating Expenditure

1.93 Operating Expenditure represents those costs incurred by the Procuring Authority in operating the asset and/or running the services that are included within the scope of the opportunity to be presented to the private sector if the PFI Option is to be pursued. Expenditure which falls outside the scope of PFI services (for example, clinical staff costs for PFI hospitals) are excluded in the Spreadsheet, as they are assumed to be constant between the two procurement methods. Operating Expenditure typically includes, amongst other things, buildings and grounds

maintenance costs, the costs of providing ancillary services, such as cleaning and catering, overhead costs and insurance. The Spreadsheet enables Operating Expenditure to be incurred before all Capital Expenditure has been incurred. This may be particularly relevant where projects have a prolonged or staged construction profile.

1.94 The Input Value of Operating Expenditure will vary from project to project. It will, therefore, need to be determined by the Procuring Authority in light of appropriate in-house and professional advice. The Spreadsheet enables Procuring Authorities to divide Operating Expenditure between wage and salary (i.e. employment) and other costs. Where there are only a very small number of employees, Procuring Authorities may aggregate the Operating Expenditure. Where this is the approach, the relevant aggregated values should be entered in the OpEx (non employment) input cells, and a value of 0 entered into each OpEx Employment cell. Procuring Authorities should take into account the size of the transaction and the percentage that employment costs represent as a share of total OpEx when determining whether or not this approach is appropriate.

1.95 Operating Expenditure should be set at the level that the Procuring Authority estimates is required to provide a level of service that is common to both the Conventional Procurement Option and the PFI Option.

Conventional Procurement Option

1.96 Operating Expenditure in the Conventional Procurement Option comprises:

- the "unrisked" cost of running a facility and/or service to the standard required by the Procuring Authority; and
- a cost premium to reflect the Optimism Bias that is inherent in the Procuring Authority's estimate of costs incurred and/or service performance achieved.

1.97 It is important that the unrisked Operating Expenditure is subject to Optimism Bias as, under PFI, a strict payment mechanism that underpins the performance requirements will be fully priced by the PFI partner.

PFI Option

1.98 Operating Expenditure in the PFI Option is assumed to be higher than the unrisked Operating Expenditure that appears in the Conventional Procurement Option before the application of the Operating Expenditure Optimism Bias Factor. The higher cost reflects the fact that payments received by the PFI partner will be subject to performance deductions if agreed service standards are not achieved and that the PFI partner will succeed in passing the majority of these risks, albeit at a capped level, down to service providers through sub-contract arrangements.

1.99 In the Spreadsheet, the employment Operating Expenditure is the product of the average annual employment cost per employee and the number of employees. As PFI should not be undertaken at the expense of workers' terms and conditions, the average annual cost per employee is the same under the PFI Option as the Conventional Procurement Option as this is not expected to vary simply on account of the procurement route. The Spreadsheet does not allow differential inputs for the average annual cost per employee to ensure that PFI is never selected as a consequence of lower terms and conditions for employees. However, it is possible that the number of employees may differ under the PFI Option from the Conventional Procurement Option as services may be provided in a different manner and differential efficiencies achieved. Any differential input must be supported by evidence, and accordingly the Spreadsheet allows the user to enter a different figure for each option.

Residual Cost

1.100 The Residual Cost represents the level of investment required at the end of the Contract Period to restore the facility or asset to the standard required to enable the delivery of high quality services. If regular and sufficient investment in Lifecycle Costs is undertaken, then the Residual Cost is assumed to be zero. Also where the Contract Period equals the estimated useful life of an asset, the Residual Cost is assumed to be zero under both procurement methods.

1.101 The Spreadsheet makes certain simplifying assumptions in determining the Residual Cost where investment in Lifecycle Costs is lower than that required under the PFI Option. Table 1.I sets out these assumptions.

Table 1.I: Spreadsheet Assumptions for Residual Cost Values

	Conventional Procurement Option – High Investment in Lifecycle Costs	Conventional Procurement Option – Low Investment in Lifecycle Costs
Net present value of Lifecycle Costs	> 50% of PFI Option	< 50% of PFI Option
Net present value of Residual Cost	35% of initial Capital Expenditure (including Optimism Bias) stated in real terms.	70% of initial Capital Expenditure (including Optimism Bias) stated in real terms.

1.102 The Spreadsheet introduces the value of the Residual Cost as a terminal value in the final year of the Contract Period. In effect, the value of Residual Cost is determined by values introduced elsewhere in the Spreadsheet and therefore, its VfM impact does not require Procurement Authorities to make any other specific assumptions. The value of the various hard-wired Residual Value related assumptions tabulated above have been set at a level such that a "premium" is payable in the event that the periodicity and magnitude of on-going maintenance are inadequate leading to an excessive deterioration in the underlying asset.

Conventional Procurement Option

1.103 There is strong evidence that conventional procurement approaches give rise to inadequate investment in Lifecycle Costs leading, for example, to a gradual deterioration in the standard either of the environment or the functionality of the assets on which service quality depends. In the Spreadsheet, the value of Residual Cost under the Conventional Procurement Option is computed by reference to the Procurement Authority's Lifecycle Costs investment profile.

PFI Option

1.104 The Spreadsheet assumes that the Residual Cost under the PFI Option is zero on the basis that, given the contracted lifecycle maintenance and handback obligations, the project will benefit from timely and sufficient investment in Lifecycle Costs.

Transaction Costs

1.105 Transaction Costs are the costs incurred by the Procuring Authority and the private sector in reaching contractual agreements under the different procurement methods. Given the lack of comparability between the managed and contractual arrangements that would be in place following contract signature, the Spreadsheet ignores any difference that may arise in costs in providing the asset and/or associated service following contractual agreement.

1.106 The Spreadsheet assumes that total Transaction Costs for the PFI Option will be higher than the Conventional Procurement Option Transaction Costs. This reflects higher levels of expenditure both by the public sector ("Public Sector Transaction Costs"), through, for example, the involvement of users in the more rigorous design development process completed prior to contract signature and by the private sector ("Private Sector Transaction Costs") through, for example, the introduction of third-party funders, leading to increased levels of technical and legal due diligence.

1.107 For the PFI Option, both Public Sector and Private Sector Transaction Costs accrue. The Public Sector Transaction Costs of the PFI Partner are subject to a minimum amount of £750,000. This represents the Spreadsheet's assumed minimum level of cost for the public sector when entering into PFI contracts. It reflects the fact that these costs are semi-fixed in nature and will increase only loosely in line with project size. The Spreadsheet also includes Private Sector Transaction Costs for the PFI Option at 1½% of Capital Expenditure. This broadly represents the average level of private sector transaction costs for a number of PFI projects.

Modelling the Third Party Income proposition

1.108 The nature and level of Third Party Income will vary from project to project. If a sufficiently large and homogeneous sample exists, then previous sector experience could be used by Procuring Authorities as a guide to the levels of Third Party Income that might reasonably be assumed under the two different procurement methods. The nature and scope of the activities that will, under the PFI Option, transfer to the private sector should also be taken into account.

1.109 Notwithstanding this, in many instances, the level of Third Party Income estimated by Procuring Authorities will need to be supported by firm, project-specific evidence. The basis of any difference in the estimated level of Third Party Income between the two procurement methods should be explained. It is conceivable, for example, that the level of Third Party Income received by the Procuring Authority under the PFI Option is either greater or more certain than that to be expected under the Conventional Procurement Option as a result, for example, of guarantees received. In the Spreadsheet any Third Party Income to be generated is received from the first year following the end of the construction period.

Modelling the Flexibility proposition

1.110 It is difficult to acquire suitable data to test the Flexibility proposition. Historical data on the frequency of major scope changes in the sector might, for example, be used as a somewhat imprecise guide to the probability of scope changes occurring within the first ten years of the project under consideration. It is even more difficult to use historical data to meaningfully assess the impact of procurement method on the ability of the project to accommodate one or more major scope changes.

1.111 Perhaps the most straightforward way of reflecting scope change in the Spreadsheet is for the Procuring Authority to determine what are the most likely events that would lead to a scope change (for example, greater than expected variability in demand, changes in legislation, European and domestic, changes in technology) and assess the impact of that scope change on capital costs (for example, new legislation might require classrooms to be sound-proofed or the development of new communities might require an expansion of local hospital capacity). In conventional procurement, the capital cost of the scope change would simply be incorporated into the capital costs. In PFI, it would go through the private sector's financing structure and manifest itself in an increase or decrease in the Unitary Charge. It will be important for Procuring Authorities to build up this evidence going forward as more contracts become operational or enter the latter stages of their concessions.

1.112 There is little empirical evidence that the ability of an asset and/or associated service to accommodate change improves or deteriorates depending on the procurement method chosen. Under the PFI Option, a Procuring Authority enters into a long-term, performance-based contract with a single private sector provider. This might, *prima facie*, indicate reduced flexibility on the part of the Procuring Authority. However, under PFI, the performance of the asset and/or associated service being provided is governed by a service and performance specification which can be varied, largely at the discretion of the Procuring Authority. Notwithstanding the protected rights of Procuring Authorities to require their PFI partners to accommodate changes, the reasonable cost of the PFI partner implementing such changes falls to the Procuring Authority. Standard provisions govern how changes should be accommodated in PFI contracts.

1.113 Even at the extreme where, for example, a Procuring Authority decides that an asset and/or associated service has become obsolete before the end of the Contract Period, standard contractual provisions enable Procuring Authorities to terminate the PFI contract. In these circumstances, however, Procuring Authorities are contractually obliged to make a reasonable compensation payment to a PFI partner that has been providing services satisfactorily and in accordance with agreed performance requirements.

1.114 It is not obvious that a conventionally procured asset and/or associated service is any better placed to accommodate discontinuous changes that are required once an asset or service has been commissioned. Under the Conventional Procurement Option, an asset will have been paid for in full at the outset. Its abandonment before the end of its useful life will be an expensive exercise both in marginal cost terms (for example, decommissioning, redundancies etc.) and due to the substantial opportunity costs that crystallise.

1.115 It is certainly plausible that a Procuring Authority's ability to accommodate incremental changes, most particularly in the case of facilities rather than services, is more restricted where that facility is being provided under a PFI contract. In its report "Managing the Relationship to Secure Successful Partnerships in PFI Projects," published in November 2001, the National Audit Office (NAO) found that despite many projects still being in their early stages, 55% of the 121 projects reviewed had made some use of the contractual change procedure.[11] In such circumstances, the competitive position of the Procuring Authority might be judged to be somewhat weakened, although PFI contracts do typically preserve the right of Procuring Authorities to change or enlarge the scope of relevant services through open-tender. However, due to the performance-based payment regime of PFI, the PFI provider will seek to have its legitimate concerns about the potentially damaging impact that other service providers might have on its performance properly addressed in advance of agreeing to any required change.

1.116 The Spreadsheet is able to take account of the estimated impact of a change in scope during the Contract Period for those projects where Capital Expenditure is a significant feature. It does this by enabling Procuring Authorities to model a scope change in any year of the Contract Period.

1.117 Where scope changes are included, Procuring Authorities must estimate the level, likelihood and timing of the change anticipated, in relation to the project being assessed, based on experience of the nature and frequency of such changes on other broadly similar projects. If experience suggests that, for similar projects, scope changes have been frequent, wide-ranging and unpredictable in nature, then this should be taken into account in the qualitative assessment being conducted by Procuring Authorities in parallel with their quantitative analysis.

[11] These changes related to alterations in services covered by the original specification, the introduction of new services, additional building works or design changes and amendments to performance measurement arrangements - (www.nao.gov.uk/publications/nao_reports/01-02/0102375.pdf)

1.118 There is increasingly good evidence, from sources such as the National Audit Office's reports (www.nao.gov.uk), about the level and incidence of variations in PFI contracts. Equally, the Estates Agencies of sponsoring Departments may be a rich source of information on the incidence and scale of scope changes that typically affect conventionally procured projects. Procuring Authorities should have regard to such information when making their assumptions.

Conventional Procurement Option

1.119 A scope change under the Conventional Procurement Option will result in additional costs. The Spreadsheet assumes that the economic impact of a like-for-like scope change will be marginally less costly in the Conventional Procurement Option than it would be under the PFI Option.

PFI Option

1.120 Under the PFI Option, the required scope change is assumed to be undertaken by the Procuring Authority's existing PFI partner. It will therefore give rise to an increase in the Unitary Charge. The Spreadsheet accommodates this by introducing the **Value** that, under the PFI Option, the same scope change as modelled under the Conventional Procurement Option attracts a cost premium flexibility factor of 10% of the costs incurred under the Conventional Procurement Option. This **Value**, which should be tested and tailored to the particular project being assessed by the Procuring Authority, reflects the presumption that PFI is structurally less well-suited to accommodate scope changes because, for example, interface risks arise for which the private sector partner charges a premium or because of the weakened bargaining position of the Procuring Authority. It should also be borne in mind that frequent and significant scope changes introduced in the Spreadsheet will combine to erode the VfM of the PFI Option and will eventually bring into question the viability of a PFI-based solution altogether.

Indirect VfM Factors

1.121 The Spreadsheet allows Procuring Authorities to take account of additional VfM factors that they judge to be appropriate for particular projects (known in the Spreadsheet as "Indirect VfM Factors")[12]. These can have a positive or negative economic impact. If a value is imputed to any of these Indirect VfM Factors in the Spreadsheet, then that value must be explained and substantiated by the Procuring Authority.

1.122 For the purposes of the Spreadsheet, Procuring Authorities should seek to identify and value only those Indirect VfM Factors that are likely to arise differentially under one or other of the two procurement methods being assessed. Indirect VfM Factors that are common in nature and economic effect to both procurement methods can therefore, be ignored in the Spreadsheet.

1.123 The economic impact of the Indirect VfM Factors needs to be derived by the Procuring Authority. They are reflected by the Procuring Authority computing the monetary value of the costs or benefits that arise[13]. The Spreadsheet incorporates the economic impact of Indirect VfM Factors by adding their net present value (which might be positive or negative) as an Input Value to the net present value of the PFI Option. If the impact of a particular Indirect VfM Factor is likely to be protracted over a number of years (perhaps even lasting the whole of the Contract Period), then Procuring Authorities will need to estimate the present value of this benefit or cost stream when inputting a value into the Spreadsheet. The discount rate used should be consistent with that used for the remainder of the discounted cash flow analysis.

[12] As set out in Chapter 19 of the Green Book

[13] See Annex 2 The Green Book (www.hm-treasury.gov.uk/greenbook)

Externalities

1.124 The Spreadsheet enables Procuring Authorities to incorporate a number of Indirect VfM Factors. Examples of Indirect VfM Factors that Procuring Authorities might seek to consider and value as part of their project assessment are Externalities and Non-Market Impacts.

1.125 These result when a project produces benefits or costs, either to the Procuring Authority or to the public sector as a whole, that are not directly included in the price of that particular project[14]. Externalities can be positive and negative in economic effect. Examples of project externalities might include:

- changes in operating practices achieved by involving the private sector in the delivery of services, which are then used as an exemplar to inform and influence operating practices where similar services are being provided under conventional arrangements;
- on the one hand, developing or, on the other hand, eroding specialist project and/or procurement management skills through over-reliance on one or other procurement methodologies;
- cultural barriers in an organisation being eroded by introducing a mixed economy of providers with different standards of corporate and individual behaviour.

Non-Market Impacts

1.126 The Green Book requires public bodies to identify both the costs and the benefits that arise from public investment. It also encourages public bodies to monetise as many benefits as possible, including hard-to-value, intangible benefits[15]. In their OBCs, Procuring Authorities will identify and value benefits that arise from the project.

1.127 The Spreadsheet focuses exclusively on those economic cash flows that differ as a result of procurement method used. Therefore, although the Spreadsheet ignores the economic impact of benefits that are similar under both procurement methods, Procuring Authorities should take account of Non-Market Impacts that can be monetised and which are directly associated with the procurement method chosen.

1.128 Where, for example, the scope for innovation in the provision of the required service or project is judged by the Procuring Authority to be high, a case could be made for ascribing a value to innovation for the PFI Option. Although difficult to quantify, valuing innovation may be particularly relevant where:

- the asset and/or associated service modelled for the purposes of determining the Conventional Procurement Option is acknowledged to be based on practices that are conservative;
- good evidence exists that approaches to the delivery of an asset and/or service that differ to those assumed for the Conventional Procurement Option are in common use in related sectors, in other parts of the country or perhaps even, in other countries
- the asset and/or associated service modelled for the purposes of determining the Conventional Procurement Option is subject to obvious physical or service constraints that would not be imposed in the same way on PFI partners (for

[14] Annex 1 of The Green Book (www.hm-treasury.gov.uk/greenbook)
[15] Annex 2 of The Green Book (www.hm-treasury.gov.uk/greenbook)

example, where a PFI partner might be able to offer a significantly different balance between new and refurbished buildings to that in the Conventional Procurement Option).

Tax

1.129 Tax differentials need to be taken into account when evaluating the difference between the two procurement methods. Since tax specific cashflows are not included in the Spreadsheet under the PFI Option, Procuring Authorities should use a Target Equity IRR which, based on actual experience, corresponds to the **pre-tax equity IRR** typically required by bidders. This will ensure that the unitary charge in the Spreadsheet is set at a post tax level.

1.130 Under the PFI Option, tax receipts by the Government will, over the life of the project, inevitably differ from those that arise under conventional procurement. Principally, tax will be payable on the differential profit earned by the private sector which compensates it for the additional level of risk being accepted under PFI. Further tax receipts can be expected to be received by the Government in respect of the returns paid to third-party funders.

1.131 An estimate should therefore be made to reflect the additional tax take that accrues to the Government under the PFI Option. The Spreadsheet does this by computing a "tax adjustment value" which is added to the Conventional Procurement in line with the Green Book. Details of the mechanic for determining the appropriate adjustment are set out in the KPMG Report in the supplementary Green Book guidance entitled "Adjusting for Taxation in PFI vs Conventional Procurement Comparisons", which is accessible from the Green Book website[16]. In the Spreadsheet the tax adjustment value is determined by applying a Conventional Procurement adjustment factor to the Conventional Procurement Whole Life Costs. The Conventional Procurement adjustment factor is an input in the Input sheet. In the Spreadsheet this has a Starting Value of 2%. The user should refer to section 5 of the KPMG report in the supplementary Green Book guidance entitled "Adjusting for Taxation in PFI vs PSC Comparisons". When doing so, Procuring Authorities should note that the simplifying assumption should be made that each project is on revenue account for tax purposes. It should also be noted that the Spreadsheet seeks to capture primary tax effects only. This simplistic approach is in keeping with the overall approach to the quantitative assessment.

1.132 Whilst the treatment of VAT can vary between conventionally procured projects and PFI depending on the type of services being delivered, the Green Book states that "options attracting different VAT rates should be compared as if either the same VAT payments or no VAT payments were made in all cases". For the purpose of the VfM assessment therefore no allowance should be made for any difference in VAT rates between PFI and the Conventional Procurement options. It should be noted that where VAT is not factored in to the VfM assessment, the VAT related impact will need to be reflected into the separate affordability analysis.

The Private Sector's Charge for Managing Risks Under PFI

1.133 Typically, private finance is made available to Procuring Authorities based on a project finance model. Under project finance arrangements, senior debt (either in the form of bank lending or bonds) accounts for a high proportion (often around 90%) of the finance required to fund the capital costs required to procure, create or develop an asset.

1.134 The values used in the Spreadsheet for pricing private finance assumes a distribution of risks between the Procuring Authority and the PFI partner based on standard PFI contractual

[16] www.hm-treasury.gov.uk/greenbook

terms[17]. Deviations from these standard terms under SoPC should not be considered except in exceptional circumstances.

Equity

1.135 Although it can vary from project to project, equity capital typically accounts for around 10% of the funding introduced under a project finance PFI Option. Pure equity may actually account for a much smaller proportion (this is occasionally referred to as "pinhead" equity) as risk-bearing funds are often introduced by the PFI partner as deeply subordinated debt. Given that this type of funding is largely doing the job of equity, the Spreadsheet treats subordinated debt as equity capital. Whilst some larger PFI transactions have seen the introduction of a separate, "mezzanine" layer of private finance, its use is far from widespread. The Spreadsheet therefore makes the simplifying assumption that private finance is introduced into projects either by way of orthodox senior debt or of equity.

1.136 Equity is the capital introduced at the outset of the project and which suffers the first loss should the financial performance of the project (from the PFI partner's perspective) fall below expected levels. As it is the first in line to absorb losses, equity providers demand returns that are commensurate with the risks that they take and which are somewhat higher than those demanded by senior lenders.

1.137 Although it can vary depending on the level of perceived risk in a particular project, (nominal) pre tax equity returns typically range between 13% and 18%. The Spreadsheet can be run using a (nominal) pre tax return on equity of 13%, 15% and 18%. Procuring Authorities can vary the equity return in the Spreadsheet between these three levels by clicking on the relevant IRR Switch. However, conclusions regarding VfM should be made by Procuring Authorities based on the level of equity return that best reflects either sector-specific experience or the particular risk characteristics of the project being assessed.

1.138 Distribution of dividends is the principal way in which equity providers secure the return on their investment. The level of distributions allowed are governed primarily by company law but also by the cover ratio covenants agreed with senior lenders. The Spreadsheet assumes that dividends distributed equate to the free cash flow generated by the project throughout the Contract Period.

1.139 In certain circumstances, additional equity returns can be generated from refinancing. The opportunity for refinancing arises primarily from the change in risk profile as a project progresses from its construction and development phase into its operational phase. Once the operational phase has been reached, a number of the risks that dictated the funding structure at financial close will have been negotiated. A more stable environment now remains, with more predictable cash flows and this presents the PFI partner with the possibility of recalibrating its funding structure so that it better reflects the lower inherent risks that now characterise the project.

1.140 Whilst refinancings are not an unusual feature of PFI projects, they remain the exception rather than the rule. Equally, there is little evidence that prospective PFI partners are placing any reliance on their ability to refinance a project when setting their target rates of return at the time they bid for projects. Furthermore, it is now standard PFI contractual practice that Procuring Authorities share in refinancing gains achieved; see HMT website[18] for further guidance. Given the unpredictable impact of refinancings at a project level, the Spreadsheet assumes that no refinancing takes place.

[17] As described in Standard Form of Project Agreement (http://pfi.ogc.gov.uk/publications)

[18] http://www.hm-treasury.gov.uk/ppp_finance_guidance.htm

Senior Debt

1.141 Senior debt is the cheapest form of long-term private finance and therefore, can prove to be very efficient. However, it is also the least flexible source of funds. The rights of the senior lenders are quite restrictive and can crystallise at a relatively low levels of project stress. The costs of "breaking" the terms on which senior debt is introduced can also be very high.

1.142 Heavy reliance on senior debt suggests that, once completed, the asset and/or associated service is likely to be substantially stable throughout the Contract Period, subject only to occasional, minor changes that can be absorbed easily and without disturbing the rights of senior lenders. Where, however, Procuring Authorities can predict that the nature and scope of the asset and/or service being procured is likely to be subject to frequent and material change (as may be the case with equipment or information and communications technology), then funding provided on the project finance model may not be wholly appropriate.

1.143 The Spreadsheet assumes that senior debt is introduced into the project by way of bank debt. Whilst bonds remain an important source of senior lending for many PFI projects, particularly the very large, the impact that different senior debt structures will have on the VfM appraisal at this stage is likely to be marginal and should be dealt with through sensitivity analysis, if judged necessary, by amending the cost of funding in the "PFI Funding" box and assuming different margins and gearing.

1.144 The Spreadsheet assumes that senior debt is drawn down during the construction period in instalments that match the requirement to fund the project's initial Capital Expenditure and PFI partner's Transaction Costs for the project. Table A1.J sets out the key variables that determine the impact that senior debt has on the Spreadsheet.

Table 1.J: Key Variables for Senior Debt

Variables	Description	Factors Determining VfM Impact
Initial facility size	The quantum and timing of draw-down is a function of Transaction Costs and Capital Expenditure.	This is not an input variable. It is determined by other factors such as the quantum and profile of Capital Expenditure.
Tail for bank debt	The represents the length of time between the final repayment of the term loan and expiry of the Project Agreement.	This is an input variable, expressed in years. The length of this period is a function of senior lender requirements. The longer this period the greater the lender's protection. Authorities should be mindful of maximum debt tenors.
Availability period	Maximum drawdown period.	This is not an input variable and the Spreadsheet assumes that this corresponds to the construction period.
Grace period	This represents the period (if any) after the senior debt has been drawn down but before repayments of principal have commenced. In effect, therefore, it represents a period of interest-only repayments to senior lenders.	This is an input value, expressed in (whole) years. The length of this period is a function of senior lender requirements. Can be zero.

Sterling swap rate	The swap rate corresponds to the gilt rate plus a swap spread. The swap spread represents the cost of converting floating rate debt into a fixed rate. For most bank-funded PFI projects a swap will be put in place in order to transfer interest rate risk.	This is an input variable, expressed in percentage terms. The prevailing swap rates can be found under the "Market Data" section of the Financial Times FT or on Bloomberg / Reuters. The assumed swap rate should be the one that corresponds closest to the average life of the debt, typically, for PFI transactions, the 20 or 25-year swap rate. For the avoidance of doubt, the rate entered here should include the public sector interest rate buffer The swap rate is a financial markets variable, which at any one time, will be the same across all projects of the same average debt life.
Bank Margin	This represents the margin on top of the reference rate (i.e. LIBOR) charged by senior lenders for providing senior debt. In effect, this margin should reflect the ongoing bank fees and cover both the level of perceived risk in the project and the year-on-year fees incurred in administering the loan.	This is an input variable, expressed in basis points. The margin assumed should be determined by sector-specific experience. Procuring Authorities should substantiate the basis of their assumptions. Professional financial advice is likely to be required. Where margins step up over time, use a suitable average.
Swap credit spread	The swap credit spread reflects the lower credit strength of the PFI project company relative to the assumed counterparty credit strength underlying generic swap rate quotes.	This is an input variable, expressed in basis points. An SPV will generally have a rating of in the order of BB / BBB rather than AA. The size of this spread is a function of swap provider requirements.
Upfront Fee	This represents the initial fee charged by lenders for providing the senior debt. It is typically payable on the date of the first draw-down.	This is an input variable, expressed in basis points. The size of this fee is a function of lender requirements.
Commitment Fee	This represents the fee payable to lenders on the amount of senior debt that they have committed to the project but which at, any point in time, has not been drawn down. The Commitment Fee is payable only until all of the senior debt has been drawn down.	This is an input variable, expressed in basis points. The Spreadsheet applies the Commitment Fee converted to a percentage to the amount of senior debt not drawn down at the end of each year during the construction period. The size of this fee is a function of lender requirements. It is often priced as a proportion of bank margin.
Percentage Capital Contribution	This represents the proportion of PFI Capex that is to be paid by way of a capital contribution at completion of construction and not by way of Unitary Charge	This is input as a percentage and would not normally be greater than 30%. If a higher figure is considered appropriate, IUK should be consulted.

Gearing

1.145 The generic Input Value in the Spreadsheet assumes that the finance required to fund a PFI project is introduced in the proportions of 90% debt and 10% equity. This is known as the "gearing ratio" with the "gearing" denoting the level of senior debt in the project. Procuring Authorities may need to vary the gearing ratio used for their particular projects on the basis of sector-specific experience or due to the particular characteristics (such as operational gearing) of their project. Significant variations from the Spreadsheet's generic Input Value of 90% gearing will need to be substantiated by Procuring Authorities.

Internal Rate of Return for Equity Capital

1.146 In computing net present values the Spreadsheet can be used by Procuring Authorities in two different ways. On the one hand, all input variables can be determined and the level of the Unitary Charge over the Contract Period can then be computed. This cash flow can then be discounted at the public sector discount rate (i.e. 3.5% if the cash flows are stated in real terms or 3.5% plus the GDP deflator if they are stated in nominal terms) and adjusted for items that impact on VfM but which are not directly captured in the Unitary Charge (for example, externalities). This represents the net present value of the project under the PFI Option, but is not a cash model and therefore should not be used to calculate affordability.

1.147 Alternatively, the Spreadsheet can be used to identify the level of equity return corresponding to the Unitary Charge payable, such that the net present value of the PFI Option to equal the net present value of the Conventional Procurement Option. This assumes that, other than the return on equity, all other variables in the Spreadsheet (for example, the cost of senior debt) remain unchanged.

1.148 In effect, this second approach identifies the internal rate of return ("IRR") for equity that makes Procuring Authorities financially indifferent about the procurement method they choose and gives an upper boundary for the maximum possible return achievable whilst maintaining indifference. Through this approach, Procuring Authorities are able to compare the equity IRR required to make their particular project VfM with typical equity IRRs being achieved in other broadly similar projects. This should enable Procuring Authorities to draw conclusions as to whether the equity IRR likely to be available from their project, should the PFI Option be pursued, will be sufficient to attract and secure potential PFI partners without the Procuring Authority having to increase the Unitary Charge.

1.149 A large number of PFI projects have now been completed and Departments should be well placed to provide Procuring Authorities with credible assumptions in relation to the level of equity IRRs currently being demanded and these assumptions should now be based on a reasonable sample of different-sized projects. Other sources of relevant information are available to Procuring Authorities and these include Infrastructure UK, the 4Ps (particularly for local authority projects), the professional financial advisory firms, HM Treasury and even PFI sponsors themselves.

Capital Contributions

1.150 Procuring Authorities may wish to part fund projects by way of a capital contribution at the end of construction, in line with guidance (Technical Update 2010). This will have an impact on the quantitative assessment as long term private finance requirements for the project will be reduced. A percentage can be entered which represents the proportion of the PFI Capex that would be funded by way of capital contribution thus reducing the Unitary Charge.

2 Worked Example

GROUPED SCHOOLS PROJECT

Introduction

2.1 This Appendix describes how the Spreadsheet can be used to assess the VfM of the two different procurement methods for a new build grouped schools project with a capital value of {£65.25mn}. A Concession Period of 29 years is assumed for the project and this is broken down between a four year construction period and a 25 year operational period.

Conventional Procurement Option

2.2 A design and build contract is assumed, with a renewable five year "operate and maintain" contract for the facilities management services required.

Escalators

2.3 The Input Values for the escalators used by the Procuring Authority to assess the project are set out in Table 2.A below.

Table 2.A: Input Value for Escalators

Escalator	Rate
CapEx Escalator	4.5%
OpEx (non employment) Escalator	2.5%
OpEx (employment) Escalator	3.5%
Unitary Charge Escalator	50%

Costs

2.4 Under both the Conventional Procurement Option and the PFI Option the costs modelled for which input variables need to be determined by the Procuring Authority include Whole Life Costs and Transaction Costs.

Whole Life Costs

2.5 The Input Values for Whole Life Costs are set out in Table 2.B below.

Table 2.B: Input Values for Whole Life Costs

Cost Type	Conventional Procurement Option Costs	Conventional Procurement Option Rationale	PFI Option Costs	PFI Option Rationale
Capital Expenditure	£{65.25}m	This is lower under the Conventional Procurement Option as less risk is being transferred. The input value is based on an assumed cost of £1,450 per m2, 9 m2 per pupil, 1,000 pupils. Capital Expenditure is incurred in equal amounts during the first two years of the Concession Period.	{71.775}m	This is higher under the PFI Option as more risk is being transferred. The input value is based on an assumed cost of £1,512 per m2, 9 m2 per pupil, 1,000 pupils. Capital Expenditure is incurred in equal amounts during the first two years of the Concession Period.
Lifecycle Costs	£{6.535}m introduced at 10 year intervals}	This is higher under the Conventional Procurement Option. There is limited planned maintenance, with periodic and costly "major maintenance" required to remove the maintenance backlog.	£{1.076}m per annum	This amount corresponds to 1.5% of the initial Capital Expenditure required.
OpEx (non-employment)	£{1.075}m per annum	Input values for annual non-wage Facilities Management Costs are £35 per m2, 9 m2 per pupil for 1,000 pupils.	£{1.183}mm per annum	Annual non-employment OpEx is £35 per m2, 9 m2 per pupil for 1,000 pupils plus a 10% price premium for acceptance of performance risk.
OpEx (employment)	Average cost of £{20}k per employee & {25 }employees		£{20}k per employee & {25} employees	

Transaction Costs

2.6 The Input Values for the public sector Transaction Costs for the Conventional Procurement and the PFI Option are £1.958m and £1.453m respectively, corresponding to 3% and 2% of initial Capital Expenditure. It is assumed that these are fully payable in Spreadsheet Period 1.

2.7 The Input Values for annual Third Party Income is £{0.475} million. This represents 30% of total operational expenditure, as such, broadly reflects experience on other schools projects. The Input Value for annual Third Party Income for the PFI Option is £{0.575} million, 21% higher than under the Conventional Procurement Option.

Pre-FBC and Post-FBC optimism bias

2.8 Pre-FBC Optimism Bias and Post-FBC Optimism Bias assumptions are set out in Table 2.C below. These figures are based on experience from other schools projects.

Table 2.C: Pre and Post FBC Optimism Bias Factors

Cost Type	Pre-FBC Optimism Bias Factor	Post-FBC Optimism Bias Factor
Capital Expenditure	{10}%	{30}%
Lifecycle Costs	{10}%	{30}%
Operational Expenditure	{10}%	{20}%[1]
Transaction Costs	{10}%	{10}%
Third Party Income	{10}%	{10}%

Flexibility

2.9 It is assumed that, for a school, the probability of a major scope change happening at year {10} is {50}%. For the Conventional Procurement Option, the impact corresponds to {50}% of initial Capital Expenditure. For the PFI Option, the impact of the same scope change is assumed to be {10}% greater than under the Conventional Procurement Option.

Indirect VfM Factors

2.10 The extensive involvement of the private sector in the procurement of the five schools is assumed to lead to indirect cost savings to the public sector from innovative approaches to say, better management of vandalism risk on other existing schools which are not part of the project. This benefit is computed to lead to total cost savings, in NPV terms, of £2 million using a nominal discount rate of 6.09%.(3.5% real; 2.5% GDP Deflator).

[1] The size of the relevant Optimism Bias Factor reflects, in part, the extent to which contractors are able to accurately determine probable costs. Significant levels of data facilitate FM cost estimation, thus a relatively low retention factor is applied. Lifecycle costs which are incurred only once every 10 years are more difficult to predict and thus a higher Post-FBC OB Factor is warranted.

Financing

Equity

2.11 Equity Gearing of {90}% is assumed.

Senior Debt

2.12 Input Values for senior debt are set out in Table 2.D below.

Table 2.D: Table

Senior Debt Feature	Input Value
Swap Rate	{5.15}%
Bank Margin	{100}bps
Swap Credit Spread	{0.12}%

2.13 The repayment profile is level debt service (i.e. annuity style with the same total Debt Service per period. (Debt Service = interest plus principal payments)).

Tax

2.14 The flowchart in section 5.3.4 of the KPMG report in the supplementary Green Book guidance entitled "Adjusting for Taxation in PFI vs PSC Comparisons" has been used to determine an Accumulated Tax Factor Conventional Procurement adjustment factor of 6%.

Outputs

2.15 Based on a pre tax target Equity IRR of 18% the Spreadsheet demonstrates an "Indicative" VfM value of 7.85% in favour of the PFI Option. This suggests that, based on the Input Values used, the PFI Option might deliver better VfM than the Conventional Procurement Option for the schools project under consideration. The Indifference Point Analysis is summarised in Table 2.E below.

Table 2.E: Indifference Point Analysis for Schools Project

Switching Point	Values
Capital Expenditure	-11%
Unitary Charge	+9%

2.16 The Indifference Point Analysis shows that, all other things being equal, the Capital Expenditure under the Conventional Procurement Option would need to decrease by 11%, whilst the Capital Expenditure under the PFI Option remains unchanged, for the Procuring Authority to be financially indifferent between the two procurement methods. This lies outside the default benchmark tolerance of 5%.

2.17 The Conventional Procurement Sensitivity Multipliers allow the Procuring Authorities to undertake combined sensitivity Indifference Point testing. For example, if a lower level of CapEx results in a smaller facility and henceforth lower OpEx, the Procuring Authority can test the CapEx Indifference Point whilst assuming a lower level of OpEx. If the lower level of CapEx under the Conventional Procurement CapEx Indifference Point scenario is assumed to give rise to a reduction of 15% in total OpEx, then the OpEx employment & non employment sensitivity multipliers should be set to -15% and the CapEx Indifference Point tested again. The analysis shows that CapEx under the revised Conventional Procurement Option would need to decrease by a lesser extent of 7% for the Procuring Authority to be financially indifferent between the two procurement methods. However this still lies outside the default benchmark tolerance of 5% and should reassure the Procuring Authority that the PFI Option may well deliver VfM.

2.18 The analysis also shows that that, all other things being equal, the Unitary Charge under the PFI Option would need to increase by 6%, whilst all other costs under the Conventional Procurement Option remained unchanged, for the Procuring Authority to be financially indifferent between the two procurement methods. Again, this lies outside the default benchmark tolerance of 3%.

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