SCOTTISH FUTURES TRUST

Quantitative Benefit Methodology

July 2012

SFT's Quantitative Benefit Methodology

Introduction

In order to recognise SFTs benefits, a methodology is required to measure the value of benefits delivered. The majority of benefits driven through SFT activities occur in the future; the long-term nature of infrastructure investment and procurement makes this so. Benefits are also driven in-year; such as savings from avoided costs.

This Annex sets out the methodology adopted. The methodology is based on; (i) identifying the benefit; (ii) calculating a value for the benefit; (iii) applying a confidence factor depending on the stage of development of the initiative; and (iv) applying a sharing mechanism to take into account the partnership working that is involved in delivering the benefit. A sensitivity is then run to determine the most likely and upper and lower bands. Finally there is an undertaking, the same as initially set out in SFT's corporate plan, to update this measurement each year as initiatives develop. Thus, for example, when assessing the 2011/12 benefits, the development work carried out on TIF after the 2010/11 year end will allow a higher confidence factor this year than last, representing the significant progress that has been made in having one TIF scheme now approved and two approved in principle.

Identification

The identification of benefits delivered has been an ongoing process undertaken by all staff throughout the year. The SFT team has focused on the delivery of benefits as a private company would focus on the delivery of profit and shareholder value; it has guided SFT's priorities allowing a focus to be kept on activities that will drive the greatest value. In many instances, activities undertaken have delivered qualitative benefits that staffs have been able to describe, and which have been of significant value to partner organisations. Section 5 of the main report summarises some of the qualitative benefits delivered by SFT's work.

For each quantifiable benefit identified, a proforma has been completed to record the details of the benefit and its quantification including any assumptions made. The last page of this Annex shows the format of the proforma used. In the case of benefits with complex valuations, or where further backup of assumptions made is required, a document has also been completed with this detailed information, Annex 1 shows a list of the further backup documentation and Annex 3 has a detailed listing of the benefits.

The quantification from each proforma is then taken into a calculation spreadsheet, where the overall benefit for SFT is quantified using the methodology explained.

Valuation

Long-term benefits have been measured by identifying future cash flow benefits and discounting them back (using the standard government discount rate of 3.5%) to a present value for the year in which the benefits are being reported. Benefits are then attributed to 2009/10 or subsequent years by identifying the percentage of the present value which relates to the work completed in the particular year. For example, a 25 year long project which takes 2 years to procure may have a future cash flow benefit resulting from SFT work over the 25 year life of the project. If SFT activities are split equally during the two year procurement period, 50% of the present value of the future cash flow benefit will be recognised in procurement year 1 and the remaining 50% in procurement year 2.

The valuation of future benefits necessarily involves a series of assumptions around the future financial impact of the interventions made by SFT. These assumptions are fully detailed in the supporting documentation detailed in Annex 2 and published on our website. However, as infrastructure investment represents a series of unique projects that are each only ever undertaken once, the counterfactual of an identical project or programme without SFT intervention will never occur. An element of assumption, backed up with appropriate evidence, will always be required in valuing benefits delivered.

Confidence Factors

SFT has limited resources, and a remit to deliver substantial benefits. We assess all of our potential activities and generally only deploy our resources towards those that have a good chance of delivering a tangible benefit. Through the year, we have had to turn down areas of activity suggested to us by partner organisations because of resource limitations and a need to focus on areas which we believe can deliver maximum benefit.

Notwithstanding the above, confidence factors have been applied to each benefit recognising that some of our interventions during the year have some way to go before benefits are delivered, and others require support and input from third parties outside our control in order to deliver. The table below outlines a description of each confidence factor and the associated percentage of benefit recognised. The minimum confidence level of 55% used, representing 'moderate' confidence reflects this prioritisation of our work away from activities that have a lower chance of delivering tangible benefits:

Confidence Factor	Confidence Factor Description	% of Benefit Recognised
A – Certain	Benefit has already been delivered	100%
B – Very Good	Firm, deliverable plans are in place and being progressed for delivery of benefit, but stages remain to be completed	90%
C – Good		
D – Moderate	Plans are in place to deliver the benefit but some third party commitment remains outstanding and/or significant stages remain outstanding to deliver the anticipated benefit	75%
	Deliverable benefit identified with discussions ongoing with third party(ies) to put firm plans in place for delivery	55%

Sharing

SFT works in partnership with a number of parties across the public sector to deliver better value for money. The great majority of the benefit that we deliver could not be realised without the commitment and parallel activities of these other parties. Accordingly the measurement of benefits has been shared with other parties. Typically benefits have been measured using one of the following sharing mechanisms:

Sharing Mechanism	% of Benefit Attributable to:		
	SFT	**Partner** (e.g. SG or LA)	**Partner 2** (e.g. SG or LA)
1	100%	–	–
2	50%	50%	–
3	33.3%	33.3%	33.3%

By sharing benefits with other parties in our calculation methodology, we are rightly only attributing to SFT a proportion of the benefits accruing from the activities in which we are involved with others. The percentage splits are at a high level, recognising the sharing but not at this stage attempting to quantify any proportionally differing input of the various participants into the benefit delivered.

Range and Sensitivity

The measurement methodology recognises that the majority of SFT's activities drive benefits in the future. It is acknowledged that even given the confidence factors and discounting applied, the certainty of benefits delivered several years into the future is lower. It is therefore common practice in economic forecasting to ignore effects more than a set period into the future for sensitivity analysis. It is also possible to undertake sensitivity analysis on the confidence factors applied.

In order to understand the potential range of benefits delivered in terms of upper, lower and most likely, the following sensitivities have been undertaken:

Sensitivity	Future Benefits Recognised	Confidence Factor
Upper Benefit Range (Scenario 1)	All future benefits recognised	Evaluated confidence factor used
Most Likely Benefit (Scenario 2)	Future benefits capped at 10 years	Evaluated confidence factor used
Lower Benefit Range (Scenario 3)	Future benefits capped at 10 years	Reduce confidence factors by 20%
Most Likely Benefit – Variant (Scenario 4)	Future benefits capped at 10 years (except for benefits where there is a rationale to support the forecast benefit extending beyond 10 years) eg a contractual arrangement	Evaluated confidence factor used

This range and sensitivity analysis incorporates the effect known as "optimism bias" where estimators can tend towards being overly optimistic in their assessment of future outcomes. Uncertainty over events further into the future, and allowance for this optimism bias have led to lower estimates for the most likely, and lower level of benefits that might be delivered. It should be noted however that the upper and lower estimates do not represent mathematically an absolute maximum and minimum, they should perhaps be seen statistically as 10th and 90th centiles of certainty.

All reporting in this main document is based on the **Most Likely** scenario (Scenario 2).

Validation Methodology and Benefit Quantification

SFT undertakes Key Stage Reviews of complex procurements at critical decision points through the business case and procurement process. This section of SFT's Benefit Methodology sets out how SFT quantifies the benefits to a capital project of ongoing external validation as delivered by the SFT through Key Stage Reviews. Such a quantification, for any individual project, or generically for all projects subject to external validation, is challenging for the following reasons:

- Major complex procurements such as those validated by SFT are only ever undertaken once. There is never a "counterfactual" or un-validated project similar in all other respects against which to compare the outturn;
- The National Audit Office is currently completing a study into project validation and we understand that it is not going to quantify the benefits of external validation in that report; and
- The outcome of a validation review, where recommendations are acted upon, is most likely to be a substantial reduction in the aggregate probability of adverse events or poor performance impacting on outturn rather than a change being made that has an individually identifiable impact on a specific project cost line.

The approach taken in quantifying the benefit in outturn cost across a series of projects subject to external validation is therefore to:

- List a range of Validation Outcomes that could lead to improvements in project processes and outcomes;
- Consider the likely impact of such Validation Outcomes to the Optimism Bias associated with the project according to HM Treasury Green Book guidance[4]

1. Validation Outcomes

SFT undertakes Key Stage Review (KSR) as part on an external validation of major capital investment projects during the intensive commercial, financial and technical stages of a project between Outline Business Case (OBC) completion and award of the main delivery contract(s). Typical recommendations would refer to:

- Project governance arrangements and links to organisational governance;
- Skills and experience of key project team members;
- Resourcing of client side project team;
- Adequacy of the Business Case;
- Clarity of needs identification;
- Challenge of affordability and value for money assumptions;
- Commercial structure of the proposed procurement;
- Adequacy of cost and risk estimation at various project stages;
- Adequacy of technical specification at various project stages;
- Level of outstanding technical, commercial and financial issues at various stages through a procurement process; and
- Derogations from standard project commercial documentation.

In the case of Non-Profit Distributing (NPD) projects with part Government funding, the Project Team is mandated to follow through on recommendations of Key Stage Reviews as a condition of funding. This gives a good deal of certainty that key recommendations of the validation review at stages through the project development will be acted upon by project owners.

[4] *http://www.hm-treasury.gov.uk/data_greenbook_supguidance.htm#Optimism_bias_OB*

2. Benefit Quantification Using Optimism Bias

The HM Treasury methodology for estimating optimism bias states that:

> *"There is a demonstrated, systematic, tendency for project appraisers to be overly optimistic. To redress this tendency appraisers should make explicit, empirically based adjustments to the estimates of a project's costs, benefits, and duration."*

The guidance quantifies contributors to this optimism separately from general project risk contingencies. Each contributor represents a factor that has been demonstrated across a range of completed projects to lead to outcomes (in time or cost) less advantageous than had been predicted at the outset. The implementation of robust external validation will have a significant mitigating effect on a number of these contributors.

HM Treasury Guidance provides an estimate as a percentage of the capital cost of projects for the maximum and minimum level of optimism bias across different types of project (standard and non-standard building projects and standard and non-standard civil engineering projects). Experience across a wide range of projects is that often project teams undertake internal mitigations strategies that reduce the level of optimism bias to approximately half way between the maximum and minimum percentage values from the guidance.

SFT has considered the range of contributing factors to optimism bias listed in the guidance, and the likely impact of external validation in mitigating these factors. The impact on some factors (e.g. 'adequacy of the business case' where a review will provide detailed comment) is likely to be high whereas for others (such as the impact of 'poor intelligence' on ground conditions where a validation exercise will have a passing consideration on processes undertaken) will be significantly lower. Other areas such as the complexity of design are inherent in the project and cannot be impacted at all by validation. Annex 1 of SFT 2009-10 Benefits Statement details our consideration of the impact of validation on individual contributing factors to optimism bias.

Applying the mitigating effect of validation to the likely optimism bias level following project team mitigation gives an overall percentage of capital cost benefit most likely to be attributable to external validation.

Many projects validated by SFT are also subject to other central validation such as Gateway Review, or internal peer review within the procuring organisation. We therefore attribute 33% of the overall benefit of validation to the SFT process.

The following table shows in columns 2 and 3, the upper and lower bounds of likely project optimism bias for different types of project taken from the HM Treasury Guidance. Column 4 shows the likely level of optimism bias following internal project team mitigation. Column 5 is taken from Annex 1 of SFT 2009-10 Benefit Statement and shows the percentage by which validation should reduce the optimism bias in column 4. Column 6 therefore shows the percentage of overall capital cost benefit attributable to external validation, and column 7, the percentage attributable to SFT key stage review validation.

	Optimism Bias % Capital Expenditure		Post internal mitigation	Validation Mitigation	Validation Impact	SFT Validation Impact
	Upper	Lower	50%			
Standard Buildings	24	2	13%	27%	3.5%	1.2%
Non-Standard Buildings	51	4	27.5%	24%	6.6%	2.2%
Standard Civil Engineering	44	3	23.5%	21%	4.9%	1.6%
Non-standard civil engineering	66	6	36%	26%	9.3%	3.1%

TABLE 1

The above level of benefits reflects the full scope of SFT's Key Stage Review validation process. On some projects, SFT will not be involved from the early Outline Business Case stage, or may be asked to undertake a one-off review. In such cases, the potential benefits of the validation input would be reduced. SFT's conservative estimate is that the benefit of validation should be reduced by 25% if a substantially complete scope of reviews has been undertaken, 50% if an incomplete suite of reviews is undertaken, and 75% if only a one-off review is undertaken. The benefit of SFT's external project validation, as a percentage of a project's capital cost is therefore estimated as:

	Full Scope	Substantial scope	Partial	One-off
Standard Buildings	1.2%	0.9%	0.6%	0.3%
Non-Standard Buildings	2.2%	1.6%	1.1%	0.5%
Standard Civil Engineering	1.6%	1.2%	0.8%	0.4%
Non-standard civil engineering	3.1%	2.3%	1.5%	0.8%

TABLE 2

To reflect the fact that SFT has a different level of direct involvement in the actual delivery of individual projects, the validation percentages in Table 2 above are multiplied by the following factors to reflect SFT's role in project delivery.

Separate Delivery Body	SFT's role restricted to independent validation	1.0	e.g. Forth Replacement Crossing
Support Delivery Body	SFT supports delivery and provides validation	0.5	e.g. hub Projects
Self Delivered Project	SFT takes a leading role in delivery and undertakes validation as part of an internal assurance function.	0	NHT Projects

TABLE 3

Whilst SFT does not recognise any financial benefit from the validation of self delivered projects it fully recognises that undertaking such reviews reflects best practice and is a key management tool in helping secure successful outcomes for infrastructure projects. These figures ignore factors not considered in optimism bias such as those listed below and is therefore considered to be a robust minimum value for the benefit of external validation:

- Enhanced competition – brought about through the confidence given to market participants by a trusted validation process, and the commercial fine-tuning possible through external review by commercially experienced parties;

- Tautness of financing terms (if applicable) – delivered through ongoing review and market benchmarking in the final stages of negotiation;

- Reduced procurement cost and timescale – delivered through an external scrutiny process at relatively close intervals during the critical structuring and procurement phases of the project where specification, affordability and value for money issues often lead to delays.

Relevant comparators of VfM delivered by validation include:

- Department of Health review showing: "For the financial year 2006-2007, vfm assessments were carried out on 11 major projects and programmes where a Department of Health Gateway Review had been carried out. A vfm benefit of £173 million was identified which is about 4% of the total whole life costs of the projects of £4.28 billion"[5]

- Office of Government and Commerce Value for money reviews have confirmed that average cost avoidance of 3-5 per cent are being achieved when best practice recommendations from review reports are implemented[6]

- OGC Press Release[7]: Gateway Reviews: the value for money gains from Gateway Reviews in 2003-04 is £730 million. Over 850 reviews have been completed covering in excess of 500 projects and programmes since the process started in February 2001. Gateways are reviews of procurement projects and programmes carried out at key decision points by a team of experienced people, independent of the project team. A total of 119 separate departments, NDPBs and agencies have had a Gateway review of their medium, high-risk or mission critical projects and programmes.

- NAO Report – Improving Public Services Through Better Construction "applying the Gateway Review scrutiny process to construction programmes and projects. Gateway Reviews in particular, have generally assisted clients and their professional advisers in identifying and addressing the risks to, and opportunities for, successful delivery."

OGC "Gateway Reviews for Low Risk Projects" - OGC undertook sixteen pilots on "high risk" projects with an overall value of some £3 billion. These reviews produced added value benefits of 5% for a cost less than 0.1%. The pilot projects demonstrated that the Gateway Review Process can produce significant added value benefits to Departments' projects.

[5] *http://www.dh.gov.uk/en/Aboutus/Procurementandproposals/Projectmanagement/DH_081530*
[6] *http://epress.anu.edu.au/anzsog/imp/mobile_devices/ch17s04.html*
[7] *http://www.ogc.gov.uk/7023_4247.asp*

Benefit Proforma

Benefit Ref:	**Benefit Unique Reference Number (Prefix 'A' – Avoided Cost, B – Additional Investment, 'C' - Funding and Finance, 'D' - Delivery, 'E' – Validation, 'F' & 'G' - Centre of Expertise**
Title:	Benefit Title
Description:	The basis for the benefit as well as a concise description of the benefit. **2009/10 Benefit Quantification & Realisation:** A restatement of the benefit quantification for 09/10 and the forecast period over which the benefit will be realised, revised to take account of changes to any previous assumptions. **2009/10 & 2010/11 Benefit Quantification Realisation:** A summation of the 2009/10 benefit (revised if required) plus any additional activity under the same heading carried out in 2010/11.
Sharing:	The percentage share attributable to SFT to reflect the input of other stakeholders – 100%, 50% or 33.3%.
Confidence:	The confidence factor attached to reflect the likelihood of the estimated benefit being delivered. A – Certain – Benefit has already been delivered. – 100% B – Very Good - Firm, deliverable plans are in place and being progressed for delivery of benefit, but stages remain to be completed – 90% C – Good - Plans are in place to deliver the benefit but some third party commitment remains outstanding and/or significant stages remain outstanding to deliver the anticipated benefit. – 75% D – Moderate - Deliverable benefit identified with discussions ongoing with third party(ies) to put firm plans in place for delivery. – 55% Note: Different years may have different confidence factors
Phasing:	The period in which SFT will undertake the work to deliver the benefits quantified, expressed as a percentage of the work attributable to each year.

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