SO17199; DCLG Energy Performance of Buildings – Software Validation

Appendix B – Service Description

Purpose

The Department for Communities and Local Government (the department) wishes to appoint a contractor (the service operator) to manage the non-domestic software validation service (validation service) for a period of 12 months up to 31 March 2017.

The service operator appointed to manage the ongoing validation service must ensure that third party non-domestic software applications (software applications), submitted for validation, deliver acceptable results for calculating, and the means of expressing, the energy performance of buildings.

Background

Buildings are responsible for almost 40 per cent of the UK's energy consumption and carbon emissions. The Department for Communities and Local Government (the department) has an important part to play in reducing energy consumption and improving the energy efficiency of buildings.

The department is responsible for implementing the requirements of the EU directive on the energy performance of buildings (Directive 2002/91/EC). Implementation of the directive into law was completed on 1 October 2008. The principle underlying the directive and the regulations is to make energy efficiency a transparent process when they are constructed, sold or rented out, when they are occupied by public authorities or to demonstrate the operational efficiency of air conditioning systems over 12kW. Recommendations on how to improve energy efficiency for these types or buildings or systems are also produced.

The department is responsible for implementing the requirements of the Energy Performance of Buildings Directive (the directive). Article 3 of the directive requires the department to have a national calculation methodology (NCM) for calculating the energy performance of buildings. The directive is implemented via the Energy Performance of Buildings (England and Wales) Regulations 2012 (as amended) for public buildings and non-domestic buildings on sale or rent and regulations 29 to 33 of the Building Regulations 2010 for buildings on construction. In addition, by virtue of Regulation 24 of the Building Regulations 2010 (SI 2010/2214) the Secretary of State for the Department for Communities and Local Government approves a NCM for;

i. calculating whether a building meets the minimum energy performance requirements of the Building Regulations 2010, and

ii. calculating and expressing the asset rating as required by regulation 9(1)(a) and the operational rating as required by regulation 15(a) of the Energy Performance of Building (England and Wales) Regulations 2012 (as amended)

The department maintains a core version of the NCM for the purpose of

maintaining a benchmark against which all other software applications are tested and validated. All software applications must undergo independent evaluation and testing to ensure that it is 'fit for purpose' and correctly replicates (within prescribed limits) the outputs generated by the government's own core software before it can be approved for use for these purposes.

Information packs and test case models for each type of software application are used for testing and validation purposes. The process for testing and validating software applications is currently managed through a contract that expires on 31 March 2016.

The software applications that implement the NCM and calculate the energy performance of a building must be approved by the Secretary of State before they can be used by energy assessors for generating Energy Performance Certificates (EPCs) and Display Energy Certificates (DECs). Software applications that are used to produce inspection reports for air conditioning systems over 12kW must also be validated prior to approval for use. While the software for producing Air Conditioning Inspection Reports (ACIRs) is not an NCM, it must still be approved by the Secretary of State before it can be used to generate the inspection reports.

The software applications used by energy assessors to produce EPCs, DECs and ACIRs are also used to lodge those reports on to a national register. The reports are required for statutory purposes when a building is constructed, sold or rented out, for public buildings with a floor area greater than 250m^2 and for air conditioning systems with an effective rated output greater than 12kW. Only software applications approved by the Secretary of State can be used for these purposes.

Objectives

To provide a validation service that applies the testing and validation standards in a consistent and equitable manner and to accredit software applications developed by third party software providers (software providers) to ensure;

a. Simplified Building Energy Model (SBEM) for level 3 and level 4 non-domestic buildings are consistent in their use with the relevant NCM and to make recommendations for approval of software applications to the department

b. Dynamic Simulation Models (DSMs) for more complex level 5 non-domestic buildings are consistent in their use with the relevant NCM and to make recommendations for approval of software applications to the department

c. Method for Calculating the Operational Ratings (MCOR) and for generating Display Energy Certificates for buildings occupied by public authorities are consistent in their use with the relevant NCM and to

make recommendations for approval of software applications to the department

d. Software applications for air conditioning inspection reports (ACIRs) generate the reports to the specification and standard specified by the department and to make recommendations for approval of software applications to the department

e. Outputs generated by software applications, such as EPCs, DECs and ACIRs, are 'fit for purpose' and correctly replicate (within prescribed limits) the outputs generated by the government's own core software

f. Software providers operate and work to an appropriate quality standard

Outputs/deliverables

To provide a validation service that ensures the testing and validation standards to approve software applications are applied in a consistent and equitable manner. The validation service provider is required to;

a. Maintain and develop software testing procedures, test case models and supporting documentation for each type of software version (the current versions of test cases will be made available to the successful contractor).

b. Design and develop test schedules and model results

c. Provide software providers with advice about the processes to follow when they submit software applications for validation.

d. Test software applications of SBEM for level 3 and level 4 non-domestic buildings, produce test results for the validated software and make recommendations to the department

e. Test software applications of MCOR for buildings occupied by public authorities, for generating Display Energy Certificates, produce test results for the validated software and make recommendations to the department

f. Test software applications of DSM for more complex level 5 non-domestic buildings, produce test results for the validated software and make recommendations to the department

g. Validate software applications for ACIRs to ensure the software generates the reports to the specified standard and to make recommendations to the department

h. Ensure a good quality validation service by dealing with software

applications submitted for validation promptly and efficiently. **All levels of validation for each type of software application are expected to be carried out/completed within 15 working days.**

i. Make recommendations to the department to approve (or reject) software applications once the software application has been assessed based on evidence provided.

j. Provide a report to the department which summarises the results of the software validation process and shows that the software complies with the requirements set out in the software validation information pack. If software is rejected, the service operator must provide a short report to the software provider which shows the test cases that have failed and other related problems.

k. Provide a mechanism for managing version control of individual approved software packages, for example 'checksum', to ensure only approved versions of the software can be used to enter EPCs, DECs or ACIRs onto the relevant register.

l. As part of the validation process make recommendations to the department for improving procedures and routines for testing and validating software for producing EPCs, DECs and ACIRs, based on practical experience of operating the service once the contract has been let.

m. Provide related advice to the department about the technical content of the validation service (as requested).

n. Maintain a list of validated and approved software.

o. Produce change notices (as requested).

p. Undertake a quality assurance activity of a software type specified by the department, once in the contract life, at a date to be agreed with the department to ensure standards are maintained to the level currently being achieved by software that has undergone testing and validation and report on these activities to the department.

<u>Intellectual Property Rights</u>

The department must maintain ownership of the Intellectual Property Rights of the following:

a. The list of approved software applications, including the software name, version number, date of the initial software validation / approval, date of latest version of validated / approved software, the name of

software supplier for each type of validated / approved software

b. Validation service test case models

c. Validation service process maps

d. The individual test reports for each of type of software that has undertaken the validation process

e. The service operator must provide all documents to the department in an editable format as soon as they are completed. In the case of validation service test case models and process maps they must be ready for the department's approval before a request is made to test and validate the first non-domestic software application

f. The department would retain these rights on updated versions on all documents

Scope

Programme of Work

Your bid should contain details of your proposals to validate software applications for SBEM, DSM, MCOR and ACIR in accordance with a core version of the NCM - the benchmark against which all software applications are tested and validated. The validation service must ensure that software applications are 'fit for purpose' and correctly replicate (within prescribed limits) the outputs generated by the government's own core software before it can be approved for use.

Within the software validation service the different types of validation that must occur consist of the following elements:

- **Full validation** of all new NCM software: new entrant and software which has not previously been approved by the Secretary of State requires a full validation.
- **Revalidation** of NCM software: the re-validation of previously approved software is determined by updates to the calculation specification, lodgement process and / or the reference software. There are three different levels of revalidation; **major**, **minor** and '**bug fixes**' depending on the level of effort required to revalidate the software.
- Major changes to reference NCM software or core specification documents, e.g. the NCM modelling guide, would generate a requirement for all software providers to amend their software to bring it into line with the reference software. This may include changes to minimum energy performance requirements for Part L of the Building Regulations 2010 or changes in the directive. These changes may result in the release of core software with a whole integer version number, e.g. 1.0, 2.0, 3.0, etc.

- A minor revalidation for previously approved software is required following minor changes to the reference software or the core documents, e.g. the National Calculation Methodology guidance or where the non-domestic software provider has made a change to the calculation engines in its candidate software. These changes may result in the release of core software with a version number separated by a decimal point, e.g. 1.1, 1.2, 1.3, etc.
- Bug fix revalidations for previously approved software for amendments to the reference software or core documents, e.g. NCM Modelling Guide, relating to the calculation modules, i.e. the administration and / or validation of software 'patches' and 'fixes'. This may include small amendments to reference software for specific purposes, e.g. values associated with a particular technology or a small number of products. These changes may result in a new sub-category version number that does not result in a change to either a whole integer version number or a version number separated by a decimal point, e.g. 1.3(e), 1.3(f), 1.3(f), etc. Bug fixes will rely to an extent on self-validation and must involve the random sampling of test cases submitted by software providers to test that the changes have been done correctly.

The table below provides an indicative number of software validations or revalidations during the 12 month term of the contract. The testing and validation of software applications is a demand led service. The number of software validations required per year is difficult to determine, mainly because changes are also instigated by software providers for commercial reasons. These numbers should not be considered as guaranteed volumes of work. To ensure the department can manage the budget set aside for this work effectively the service operator must not exceed the indicative number of software validations or revalidations without first seeking agreement from the department.

Software type	Full validations	Major revalidation	Minor revalidation	Bug fixes
DSM	1	3	3	3
SBEM Interface	1	7	7	7
MCOR Interface	1	-	7	7
ACIR	1	-	3	3

Your bid must include;

- **estimated costs for undertaking each type of validation within the budget allocation of £65,000 (excluding VAT) in 2016/17, and**
- **an estimate of the number of days required to validate each type of software**

Software validation service

The validation service will be funded by the department for a period of up to 12 months. However, to ensure the department can manage its budget effectively the department has placed a limit on the number of times it will pay for software validation. The decision on whether to agree to any additional submissions of software applications that have failed a validation test is at the discretion of the department.

The department has also placed a limit on the number of times a software provider can use the validation service and on the number of software applications they can submit for testing. This limit includes changes that are driven by the department's own requirements, including changes driven by the requirements of the European Directive or changes to the Building Regulations.

Please provide detailed software validation costs in the pricing matrix (Appendix E of the tender documents)

Validation Process

The expectation is that software providers are required to ensure that the software applications they submit will be fit to pass the validation process first time. If, however, the software fails with a minor defect it should be allowed to be resubmitted for one further validation without further cost to the department. A minor defect would be considered to be one that results in a validation failure, but not to the level of a material defect (described below). Software applications with material defects should be deemed as failed and no further validation allowed without the department's approval.

Material defects would be considered to be where the service provider finds that the software is unworkable or where five or more test cases used in the validation process exceed tolerance levels of the other test parameters used. , Software providers will be expected to plan changes to their software applications in line with the schedule of planned changes to reference software issued from time to time by the department or those acting on behalf of the department. However, software providers will be permitted one additional submission per year that falls outside of the schedule of planned change.

The successful contractor will be required to:

- develop the documentation which describes the methodology and the procedures required for the validation of software applications, including specific process maps for each different type of software application and the different validation processes. The documentation should provide indicative timescales for each validation process and timescales for each step within the process.
- develop fixed validation service costs charged to the department,

separating out individual elements of the validation process where appropriate, for each type of software application and for each validation process to ensure costs are broken down for full validations and for major, minor revalidations and bug fixes initiated by government changes and for changes initiated by software providers.

- develop a communications plan to ensure the software provider is aware of the minimum requirements and procedures when submitting software applications for validation, and any subsequent changes, in a timely manner. For example, as a minimum it is likely to include completion of an application form and a signed statement that the software provider considers the software to be fit for purpose and ready for market deployment (i.e. the software provider does not consider any further development of the software is necessary), together with evidence of compliance with any relevant British or International Standards and copies of fully developed user support documentation, e.g. user guides. The department is open to suggestions as to other minimum requirements that software providers should be asked to meet when submitting software applications for validation.
- provide the department with an exit strategy to allow smooth transition of work under a new contractor
- provide an assessment of any possible changes to the NCM validation service arising from any changes to implementation of the directive on the energy performance of buildings or Building Regulations.

The validation service must include the following software applications that form part of the methodology for the calculation of the energy performance of buildings:

- Software interfaces / conduits for the Simplified Building Energy Model
- Dynamic Simulation Models
- Software applications for calculating the Operational Rating of public authority buildings

In addition, there is a requirement under the directive for an inspection report to be produced for air conditioning systems over 12kW. While the software application for producing ACIRs is not an NCM, it must still be approved before it can be used to generate inspection reports.

Tolerance Levels

To minimise the risk of software applications producing different results the software submitted for validation must not be recommended for approval by the department unless it produces results that are within the following prescribed tolerance levels.

Software type	Tolerance level
SBEM	+ / - 0%

DSM	+ / - 5 %
OR	+ / - 0%

The software applications that produce air conditioning inspection reports involve no calculation tools which require testing.

Payment

The service operator must send invoices to the department on a monthly basis subject to confirmation from the department that a monthly report has been received and key performance indicators (KPI) and contract management conditions have been met.

The validation work undertaken by the service operator will be charged on a monthly basis on delivery and paid in arrears.

Invoices should be split into different software types, i.e. SBEM, MCOR, DSM and ACIR and different levels of validation (i.e. full validation, major revalidation, minor revalidation, bug fix)

Payments will be processed providing KPIs and contract management conditions are met and validation services are fully itemised including day rates.

Contract management arrangements

The service operator must prepare and send a monthly progress report for the Contract Manager detailing the main aspects of each month's activity.

The following KPIs should be included within the monthly reports:

- A description of the monthly activities undertaken and a breakdown of the costs
- Detailed description of all project activities carried out (with supporting evidence)
- Estimated time and cost associated with activity anticipated to occur in the following month. This is subject to approval from the department's Contract Manager.
- A breakdown of the type of software validated and volume of validations undertaken
- These volumes must include information indicating whether they have passed or failed.
- Highlight any issues which require a decision to be made by the department
- A summary of validations undertaken to date

In addition the service operator must maintain; an Issues log; an updated risk assessment and other information relevant to the project

The monthly progress reports must be submitted to the Contract Manager by the fifteenth day of each month or (where this falls on a non-working day) on the next

working day thereafter.

Deliverables such as reports and guidance must be written in plain English and in a style appropriate for a non-technical audience. Additional deliverables with target dates may be suggested to enable the overall outcome to be strengthened or to have greater take-up, impact and application.

The Department will have the right to audit the validation service and financial information in order to provide assurance that the validation service is efficient, cost effective and provided to the standard required to approve software applications for use.

Contractor validation error: In the event of validation error by the service operator, when validating software applications, any costs in rectifying the error, including investigating the error, revalidation of the third party software and all other associated costs, will be borne at the service operator's expense.

Timescales: Draft validation test cases must be available for validating software applications within one month from the commencement date of the contract.

The service operator must test and validate software applications submitted by software providers and provide the department with the reports and advice on whether software application has passed (or failed) the validation process within 15 working days of the software application being submitted to the service operator for testing and approval.

The department would welcome proposals for alternative Service Level Agreements (SLA), as long as the general principle for ensuring that the software applications submitted for validation and approval will be processed within a reasonable period of time is maintained. This may take account of the complexity of individual software applications, the degree of change required from any previous version of the software produced by the same software provider, the amount of effort needed to carry out relevant validation tests and the need to carry out parallel tests for multiple versions of the same software type. Any alternative SLA, however, must provide the department with a clear indication of how long it will take individual software applications to be evaluated once they have been submitted.

End of contract (optional)

The service operator must produce an exit strategy to allow the seamless transition of this work to another service operator with no disruption to industry (when requested by the department). This must include the key information / tools required to manage the ongoing validation service. The exit strategy must also provide details of the future work requirements to maintain the validation procedures (covering both business critical elements, as well as suggested improvements, required in the next financial year), this must be delivered at least three months before the contract end date.