THE GREEN DEAL ASSESSMENT TOOL FOR NON DOMESTIC BUILDINGS

Version 5.0.c

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USER MANUAL

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1. INTRODUCTION

The Energy Bill introduced to Parliament on 8 December 2010 includes provision for the new 'Green Deal'. The Government is establishing a framework to enable private firms to offer consumers energy efficiency improvements to their homes, community spaces and businesses at no upfront cost, and to recoup payments through a charge in instalments on the energy bill.

The role of the Green Deal provider is to offer a Green Deal plan to customers, which enables them to finance work recommended by an accredited adviser and undertaken by an accredited installer. One of the prerequisites for a Green Deal plan will be for the consumer to have a property assessment by an accredited adviser. The adviser would visit to assess the energy performance of the property and advise on the relevant opportunities for energy efficiency improvements. They might also make recommendations on energy-saving behaviour. Advisers will draw from a list of measures which have been approved for the Green Deal. The Secretary of State will stipulate in secondary legislation the criteria a measure must meet to be eligible for Green Deal finance. A corresponding list of products, materials and specification standards will be contained in a publicly available Code of Practice and updated regularly to enable a dynamic market in technological improvement. The products will be those with the potential to improve energy efficiency in a property. The assessment will confirm whether they are suitable for the property in question.

The Green Deal is focused on energy efficiency measures which meet the golden rule, that is, the expected financial savings must be greater than the repayment costs attached to the energy bill.

The Green Deal Assessment tool for Non Domestic buildings allows accredited advisers to calculate the effect of the implementation of measures and changes to non domestic buildings and to produce an assessment of the most cost efficient measures for recommendation under a Green Deal package.

2. APPROACH AND STRUCTURE OF THE TOOL

The Green Deal Assessment (GDA) tool for non domestic buildings is based on the SBEM software. It has been developed as an extension to this tool, adding the new functionality required for the Green Deal Assessment to the existing software which enables assessors to produce Part L compliance checks and Energy Performance Certificates.

2.1. Scenarios

The Green Deal Assessment output produced by the tool is based on the comparison of a current building's performance (the Actual as Managed building) with the same building as could be potentially managed (the Actual as Potentially Managed building) and with the same building after a

set of energy efficiency measures has been introduced to it (the GD Asset and Management Improved building).

The original building is recorded as the Baseline. A management score is assigned to the building as currently managed. This score identifies the way in which the building is currently managed according to different criteria such as operation of HVAC systems and lighting, or overall building systems management and training of users. An additional management score is then assigned to the tool to identify the potential improvements which could be made to the operation and management of the current building. The tool then provides the kWh/m^2/year for each end use for the as currently managed building and the potentially management improved building, as well as the associated operational savings.

Once this baseline has been established, scenarios can be created where different physical measures may be introduced to the building to assess their impact. Several different scenario cases can be created. Within each, different sets of measures can be introduced and the effect of each of these assessed and recorded. For each measure in a given scenario (e.g. better lighting or heating), the tool provides the kWh/m^2/year for each end use achieved. This is defined as the GD Asset and Management Improved building. The tool then also provides the associated asset and operational savings when comparing the performance of this improved building with the baseline building.

More than one measure can be introduced for a given building, in which case, the tool assesses these in a cumulative manner. Therefore, if a second measure is introduced for a given scenario in addition to a first measure already assessed, the results obtained for the second measure will reflect those of the first and the second measure together on the overall building performance.

2.2. Tailoring

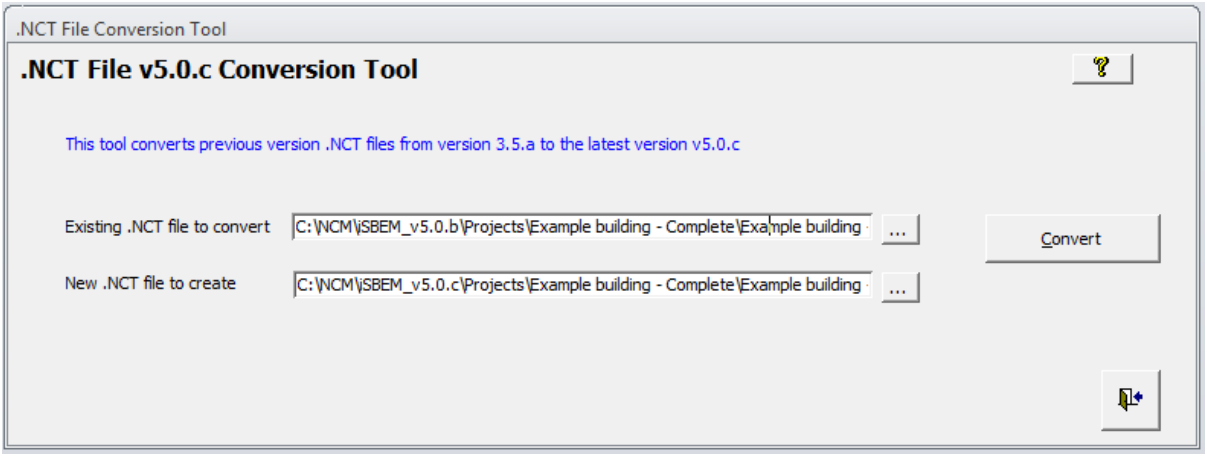
In addition to enabling the assessment of the impact of different measures to the current building, tailoring of some of the parameters which describe the current building can be also undertaken to enable a closer definition of the current building to its actual operating regime. This means that changes to the default values assigned to different activities within each building type can be produced by assessors when better and more specific information is available about the current building. Tailoring changes the values of parameters such as occupancy density, the fresh air flow rate, occupancy daily schedules, etc for the activity areas in the building. It is equivalent to the Occupancy Assessment for dwellings and enables a re-definition of the current building as the baseline for the assessment.

3. OVERVIEW OF THE GDA TOOL

A building which has already been assessed in SBEM for compliance with regulations or EPC production will already have a corresponding nct file containing the detailed characteristics of the building. This file can be loaded into the GDA tool for the assessor to start the Green Deal Assessment. If the building has not previously been assessed in SBEM for compliance with regulations or for the production of an EPC, relevant information on the building characteristics will need to be entered into the tool first. Full detailed guidance on how to do this is available in the iSBEM User Guide.

3.1. Conversion of existing nct files or creation of new projects

If an existing nct file is available, the first step is to convert it to the current version of the GDA tool. To do this, open the nct_convert_v5.0.c.mdb file. Select the nct file you wish to convert to the GDA tool software version and the name of the updated file to be created, and click on Convert.



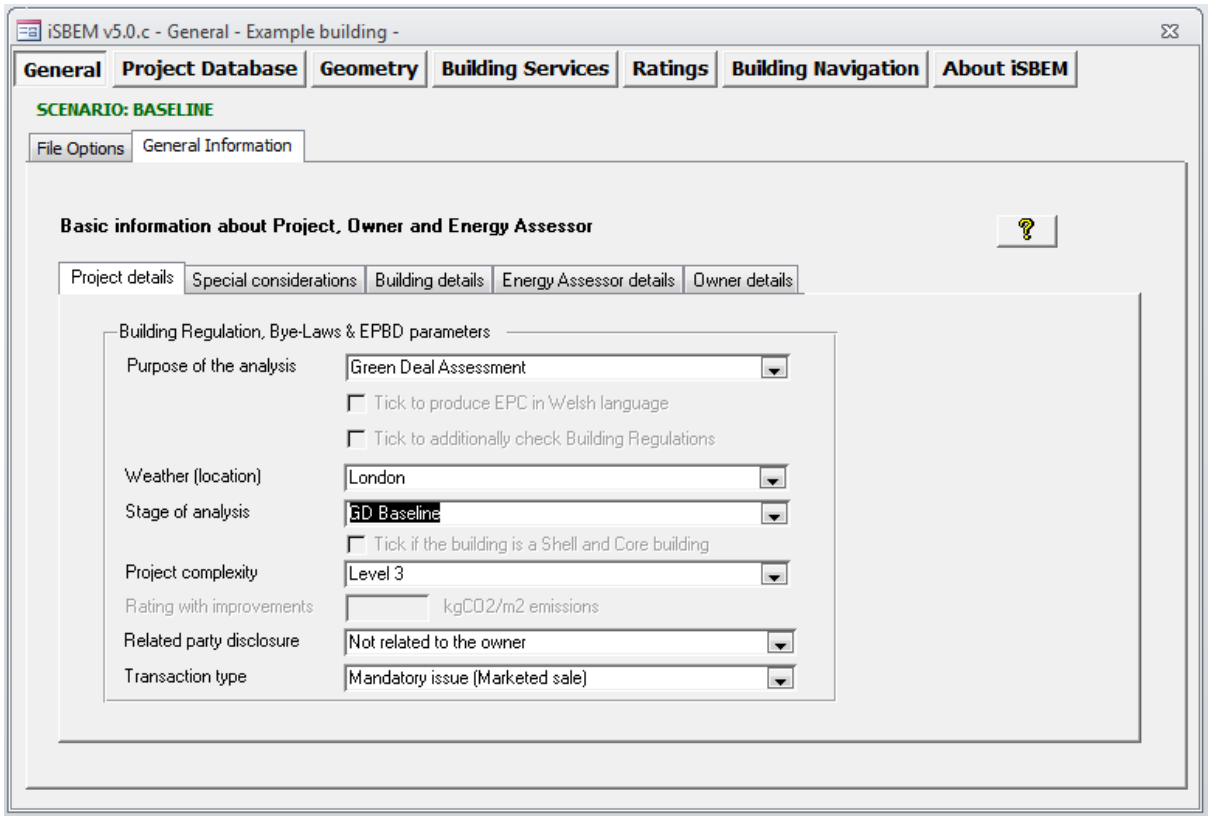
Next open the GDA tool and open the converted nct file.

To create a new project without an existing nct file, open the GDA tool and select Create New Project. Once a new project has been created and all relevant building information entered the Green Deal Assessment may be started.

Note: An EPC assessment using iSBEM has to exist for a building before a Green Deal Assessment can be carried out. The existing EPC assessment might include an nct file that facilitates the modelling of the building for the purpose of Green Deal. If for a building subject to a Green Deal assessment, an nct file does not exist then the building will have to be modelled in iSBEM first and an EPC assessment carried out in order to produce the nct file for Green Deal Assessment.

3.2. Baseline building setup

To start the Green Deal Assessment, click the **Energy Assessor details** and confirm if you are a qualified Green Deal assessor. Note that NOS3 assessors have no access to the Advanced tailoring functionality. Only NOS4 and NOS5 assessors have access to this.
Next go to the **General** tab and then to the **General Information** section. Select the ***Green Deal Assessment*** under the **Purpose of Analysis** options, and then the ***GD Baseline*** for the **Stage of Analysis**.



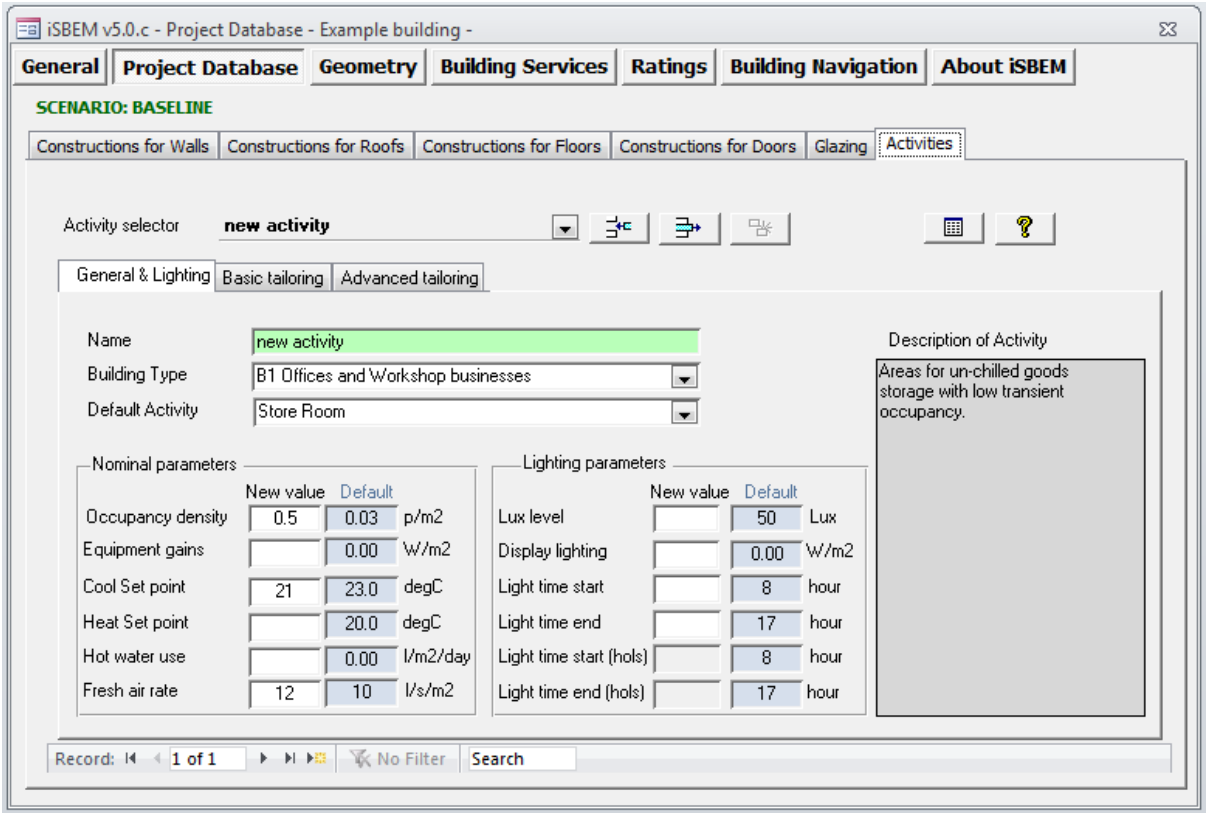
3.2.1. Tailoring

Tailoring is designed to take account of factors related to the current operation of the building which are clearly non-standard and which are likely to have an effect on both actual energy use and potential savings. Specific tailoring of some of the parameters which describe the current building can be applied to enable a closer definition of the current building. This means that changes to the default values assigned to different activities within the building type can be produced by assessors when better and more specific information is available about the current building. This enables a re-definition of the current building in the baseline for the assessment.

If any tailoring of the current building is required to modify any specific activity's defaults, go to the **Projects Database** tab and select the **Activities** sub tab. In the green box, enter a name for the specific activity for which changes are required and click Enter (to help with identification, it is

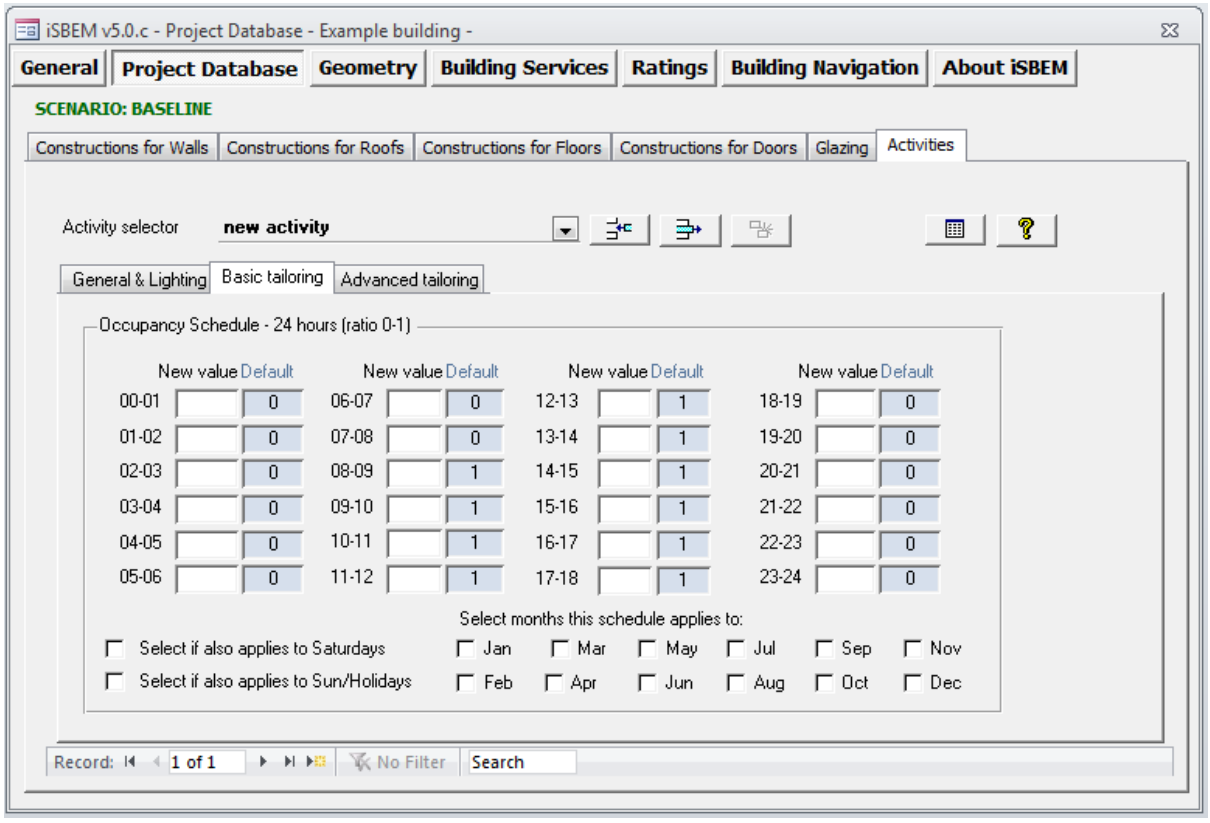
probably wise to choose a name which reflects the standard activity on which the new one is based). Then select the corresponding Building Type and Activity from the drop down options below. Modified activities are all based on existing, standard, ones. This has now created a new activity with the name provided, for which nominal parameters may be modified and tailored from the original default activity values. The default values are shown in the grey boxes. To make any changes, enter any updated values in the **New Value** boxes.

In the General & Lighting section, changes can be made to general nominal parameters for the activity and to the start and end times in the standard working/operational day for the lighting.

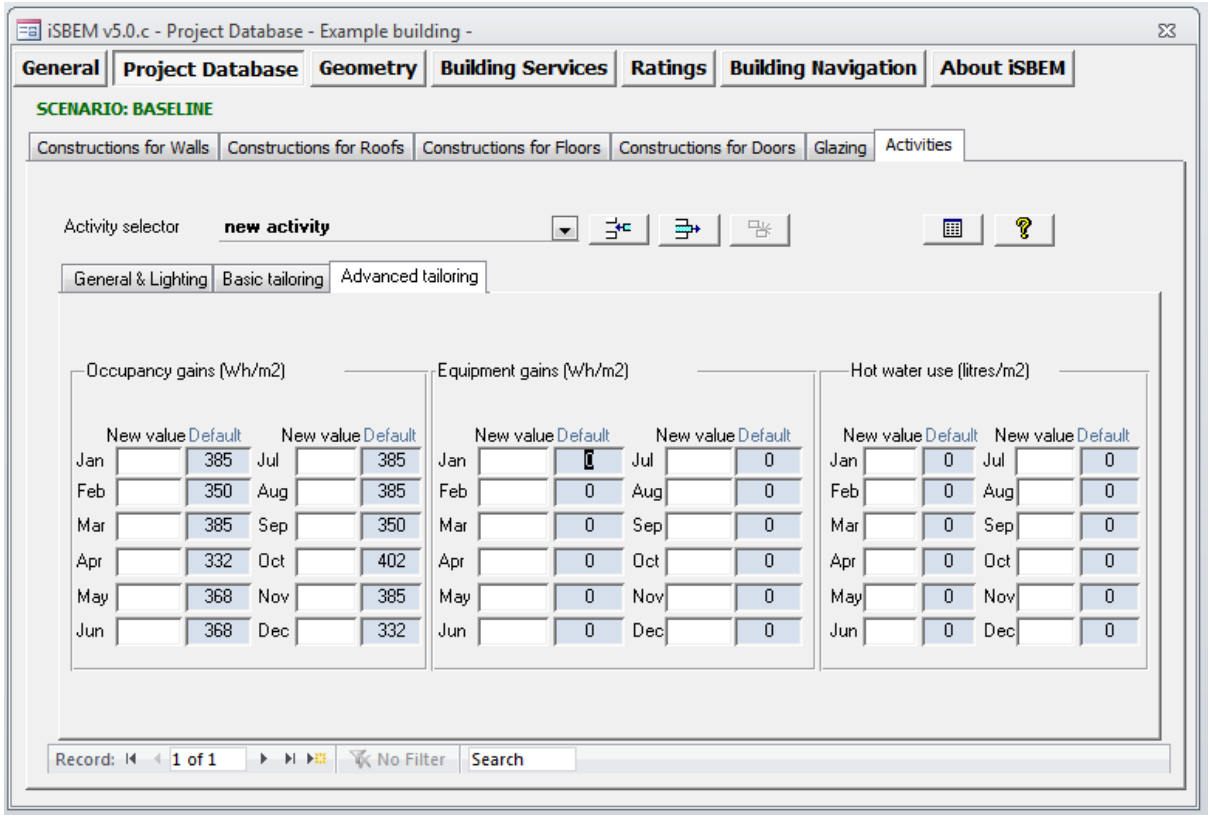


If changes are required to the values of the occupancy schedule, select the **Basic Tailoring** tab. Here the fraction of full occupancy density for each hour of a standard week day (Monday to Friday) can be entered. If left blank then the Default value in the Default columns will be automatically applied. Then select whether the updated values should apply also to either Saturdays and Sundays/Holidays[1]. Also select the months of the year that the updated schedule should be applied to.

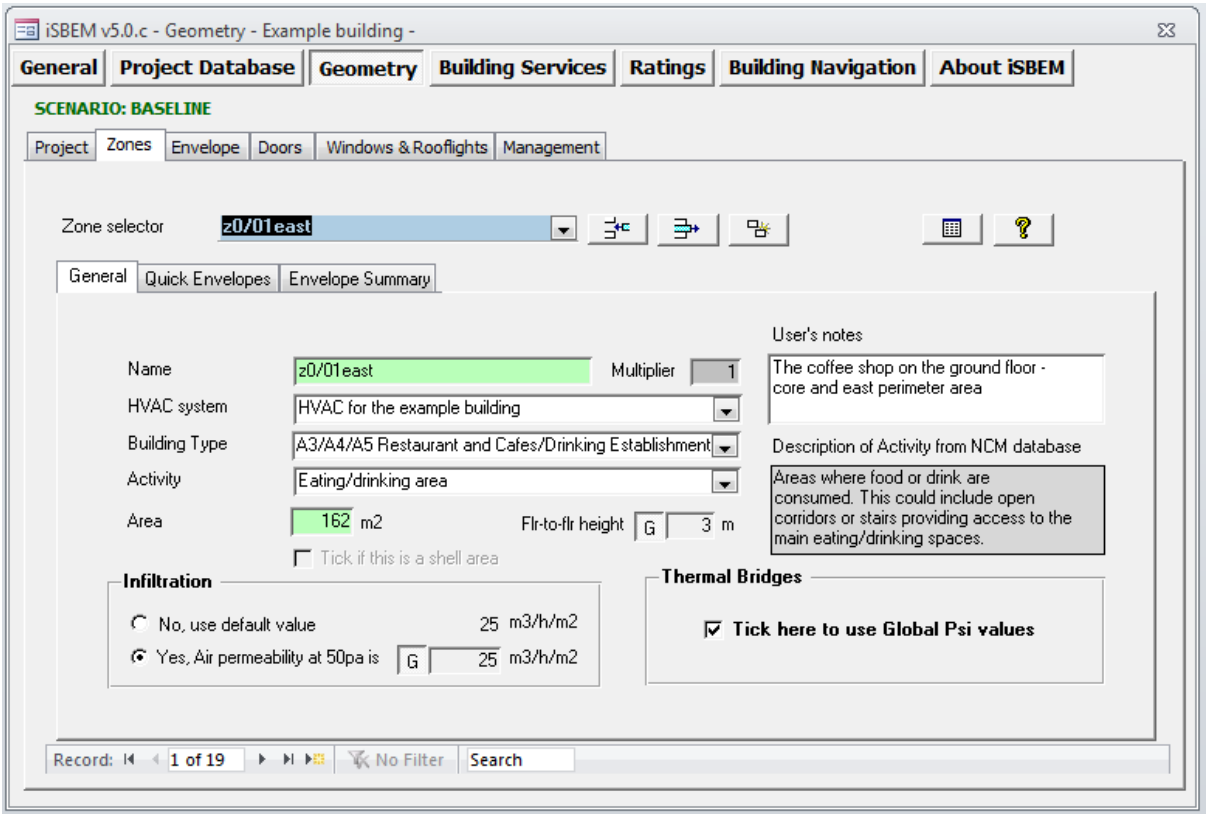
[1] Holidays are bank holidays (not holiday periods such as school holidays)



In instances when the monthly hot water demand, occupancy or equipment gains are specifically known these can be entered in the **Advanced tailoring** sub tab. Again if these are not entered then default values will be applied automatically.



Once the new/updated activity has been specified, go to the **Geometry** tab and then select the **Zones** section and allocate the new/updated activity to one or more zones, to replace the original default standard ones.



3.2.2. Operational Data

The results obtained from the Green Deal tool may be further normalised by comparing the annual asset energy consumption per m^2 with the actual energy consumption per m^2. The actual energy consumption is collected and recorded for the production of Display Energy Certificates (DECs) and therefore these could be used as a source to incorporate this data into the Green Deal tool.

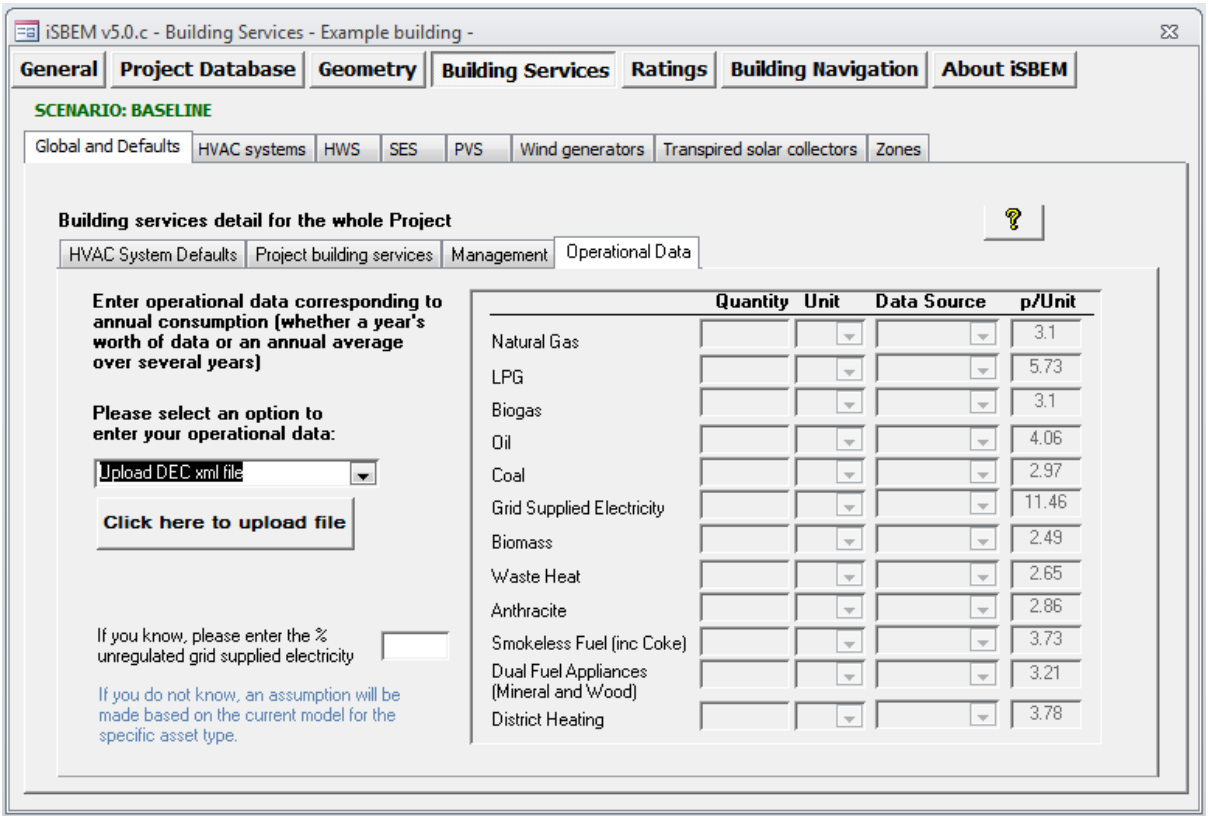
Hence in this section the user can either upload a DEC xml file or input actual consumption data for the fuels used in the building. For each fuel used in the building, the user may enter the annual consumption quantity, consumption unit, reliability of the data provided and the pence per unit for the fuel:

- **Quantity** defines the annual fuel consumption
- **Unit** defines the unit of fuel i.e. kWh etc
- **Data Source** defines how accurate the fuel consumption data is. There are two options to select from, "**Actual meter readings (manual or automatic)**" or "**Utilities suppliers (estimates)**".

Select the **Building Services** tab. Within the **Global and Defaults** tab, select the **Operational Data**. There are two types of data sources for inputting the consumption data:

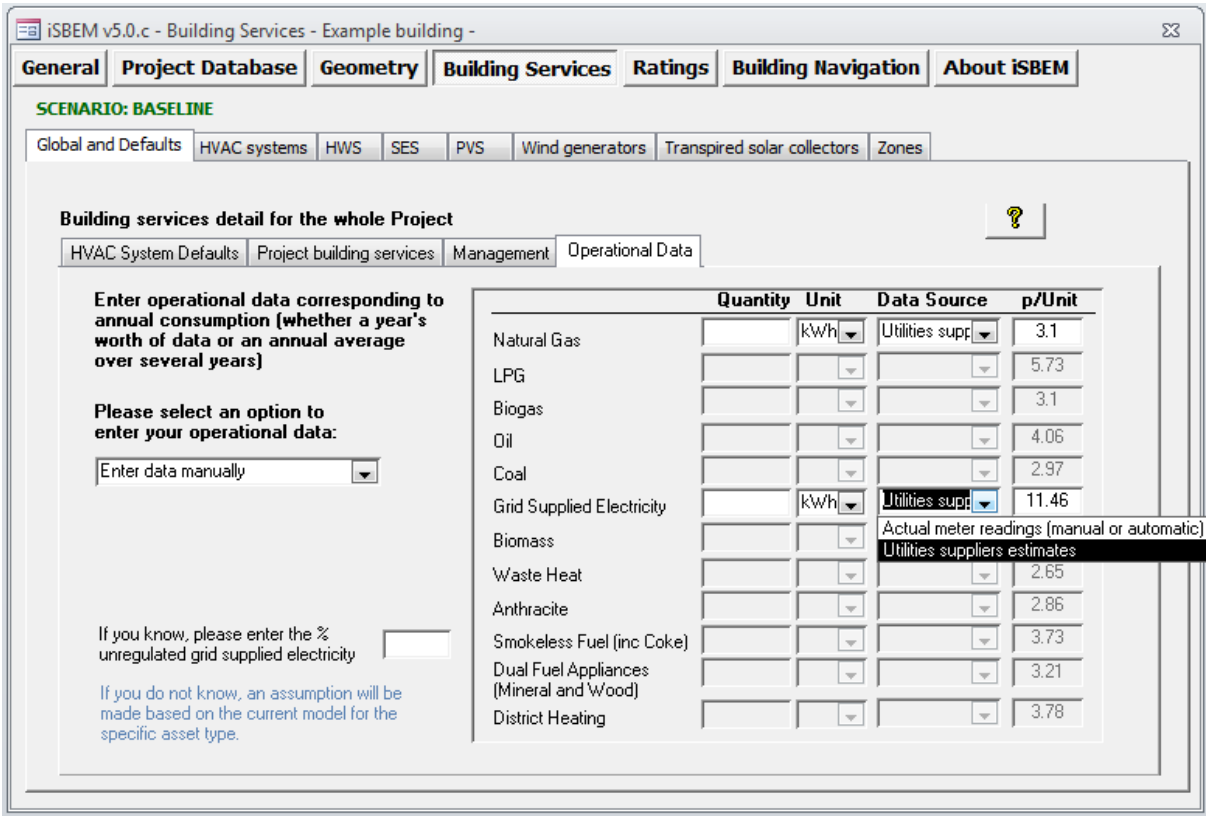
1) DEC File

If the data source is a DEC file select **Upload DEC xml file** from options. Click the button labelled **"Click here to upload file"** and select the file to upload. Review the default marginal fuel prices and update if required.



2) Manual data input

If the data source is Manual data input then select **Enter data manually** and enter the fuel consumption data in all the relevant fields together with the units applicable and the Reliability level of the data entered. Review the default marginal fuel prices and update if required.



Lastly enter the percentage unregulated Grid Supply Electricity which has been included in the electricity consumption quantity supplied.

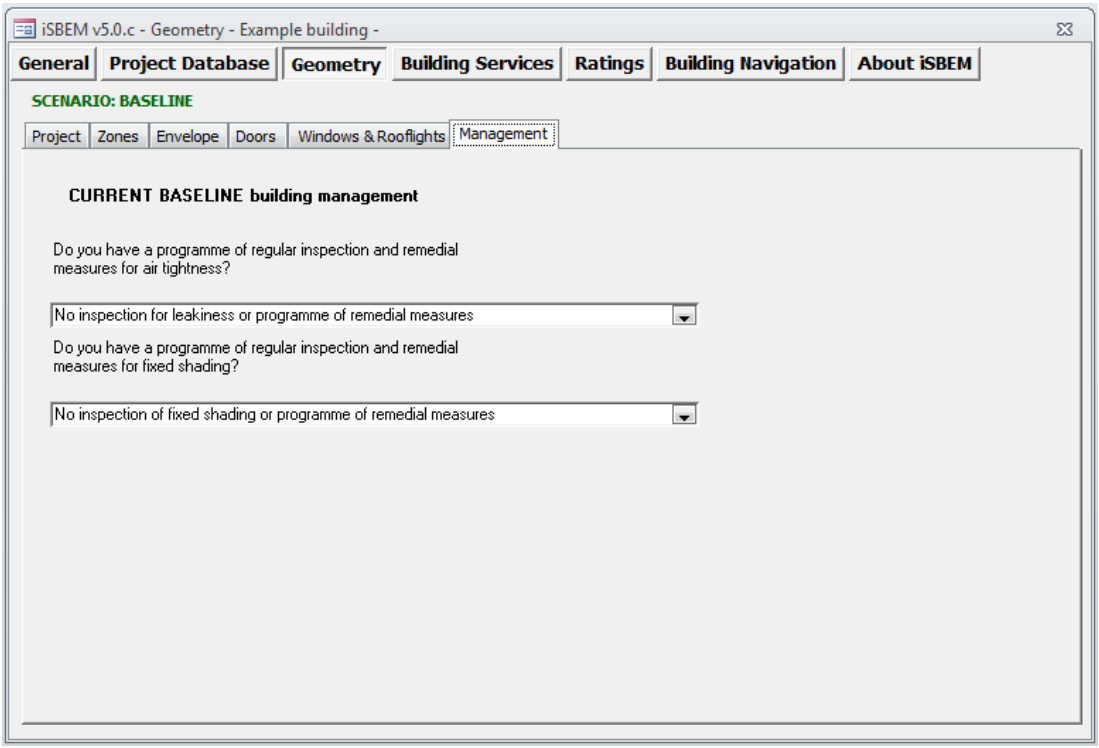
Regulated energy is energy consumption for the fixed building services, including heating, cooling, ventilation and lighting, whilst unregulated is that dedicated to the use of processes, small appliances and power plug loads such as IT equipment. Currently this also includes lifts, escalators and external lighting. These items are not regulated (within Building Regulations) because they are not an integral part of the building and are likely to be changed every few years.

3.2.3. Management Scores

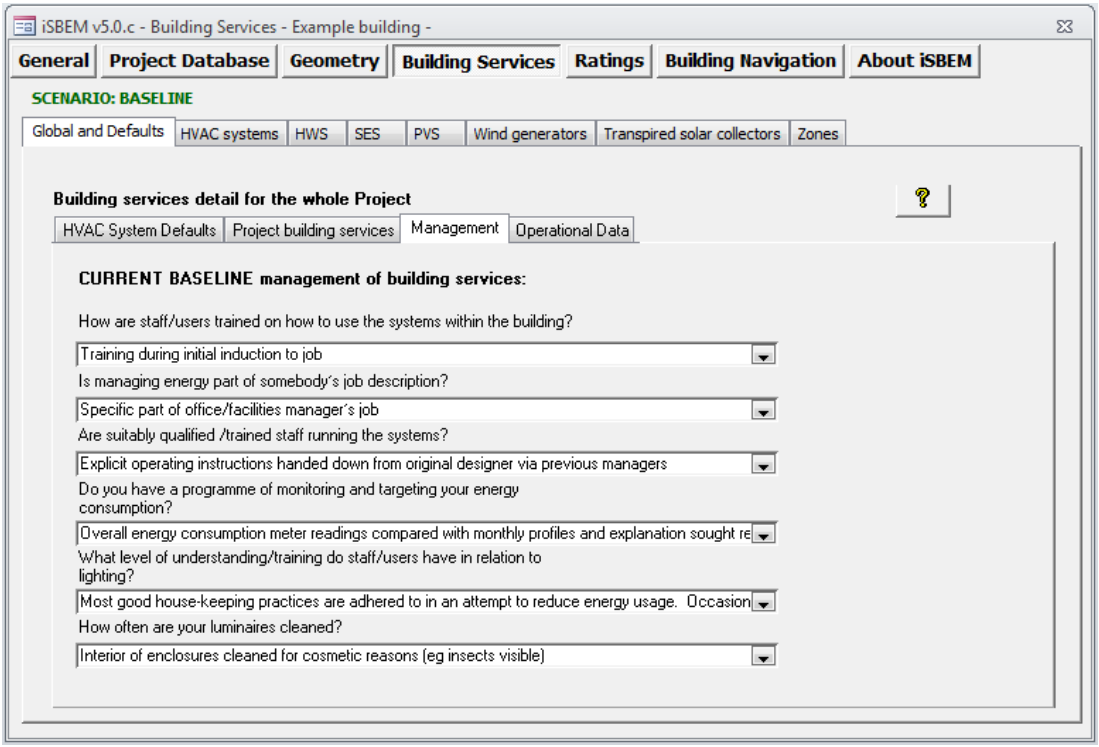
The principle behind the application of normalisation via management scores is the assumption that the modelled building in the Green Deal tool has been set up for Regulation and EPC purposes with the best possible management of all aspects of the building, and therefore the values of the required parameters are the best as designed and/or from manufacturer specifications. From this building asset information, the performance of the asset as best managed is obtained.

To understand the performance of the building as currently managed, users need to provide information about the actual management of the building. The interface asks a series of questions regarding current management of the building and answers to these questions generate a set of scores which are then applied to degrade the performance of the current building as best managed. This provides the results for the performance of the building as currently managed (Actual as

Managed). Select the **Geometry** tab and then the **Management** tab. This section covers the management questions relating to the air tightness and fixed shading. Select answers from the drop down menus:



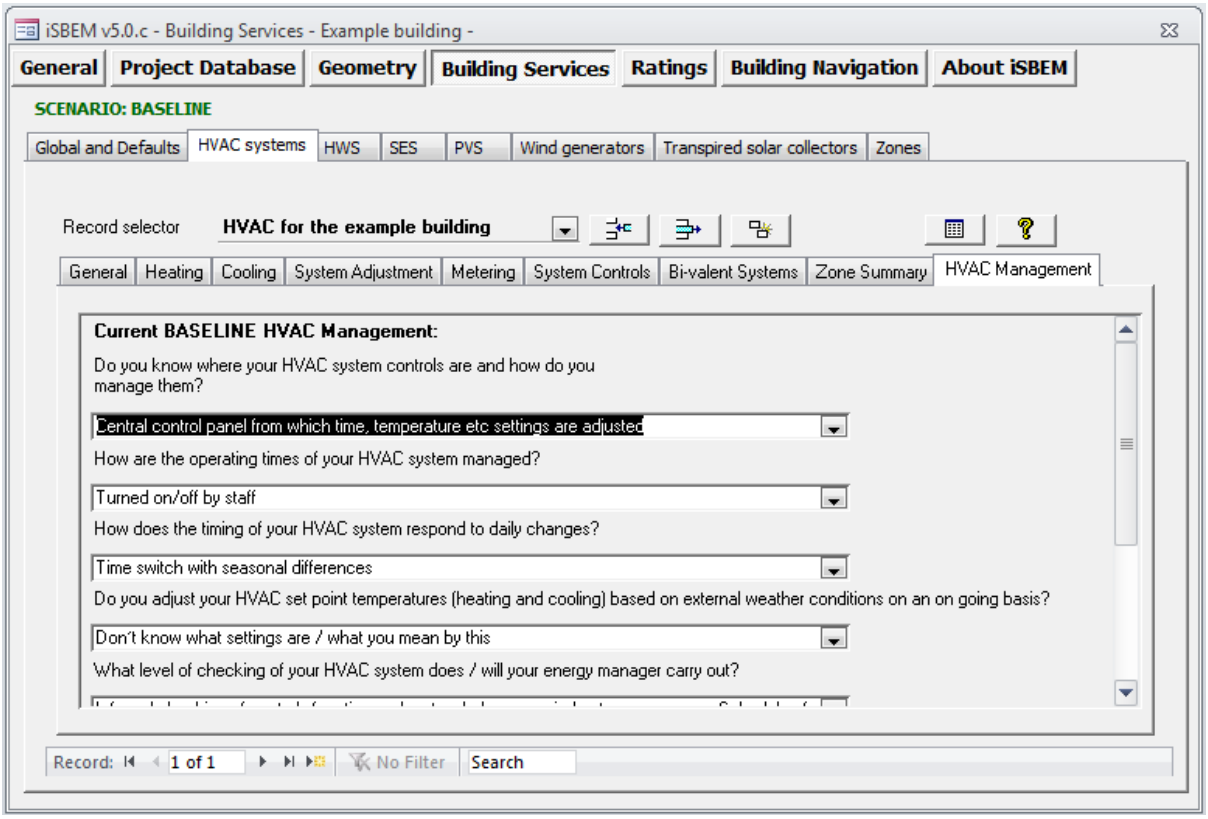
Next, select the **Building Services** tab. Within the **Global and Defaults** tab, go to the **Management** sub tab (next to the **Operational Data**).



This section covers general management of building services.

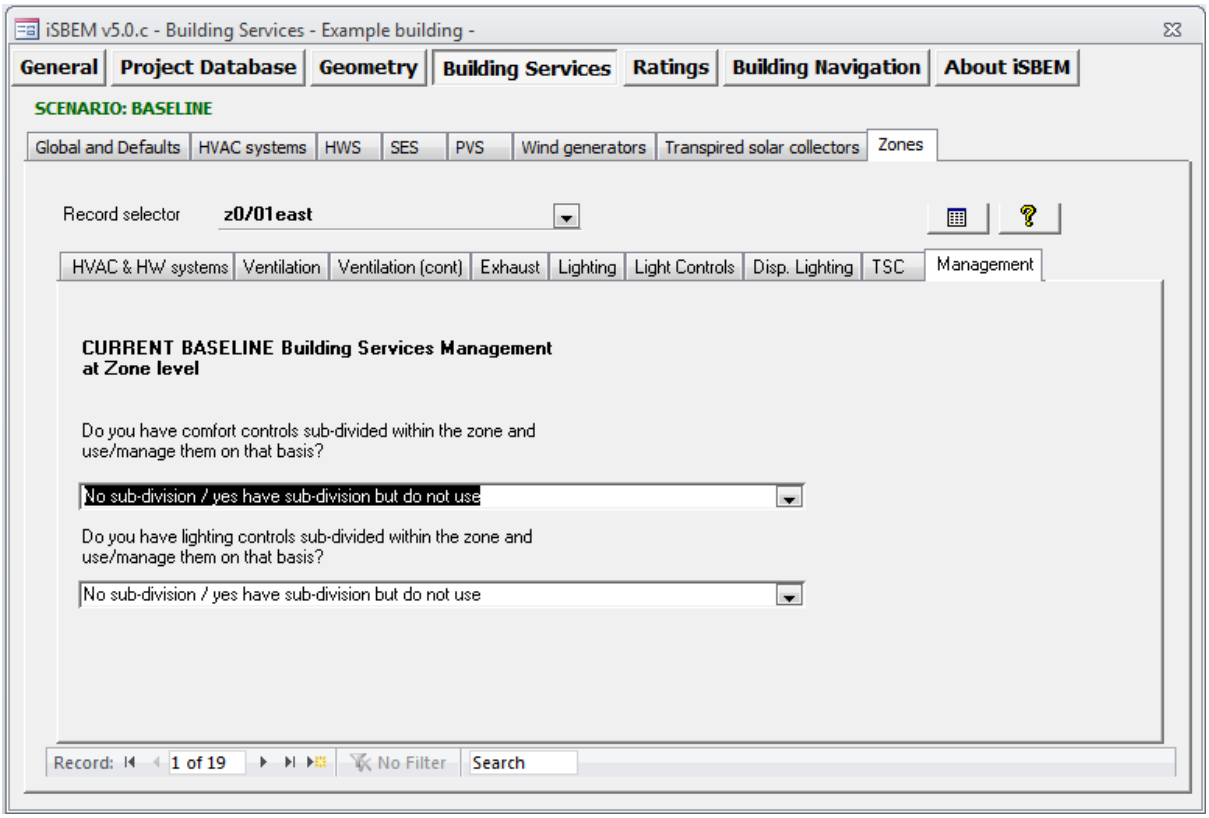
Select the answers from the drop down menu under each question.

Next, in the **Building Services** tab, within the **Global and Defaults** tab, select **HVAC systems** tab**.** In this section, select the **HVAC Management** sub tab. This section contains management questions relating to the management of HVAC system in terms of operation, control and maintenance of the building.



Again, select the answer closest to the current HVAC management of the building from the drop down options under each question.

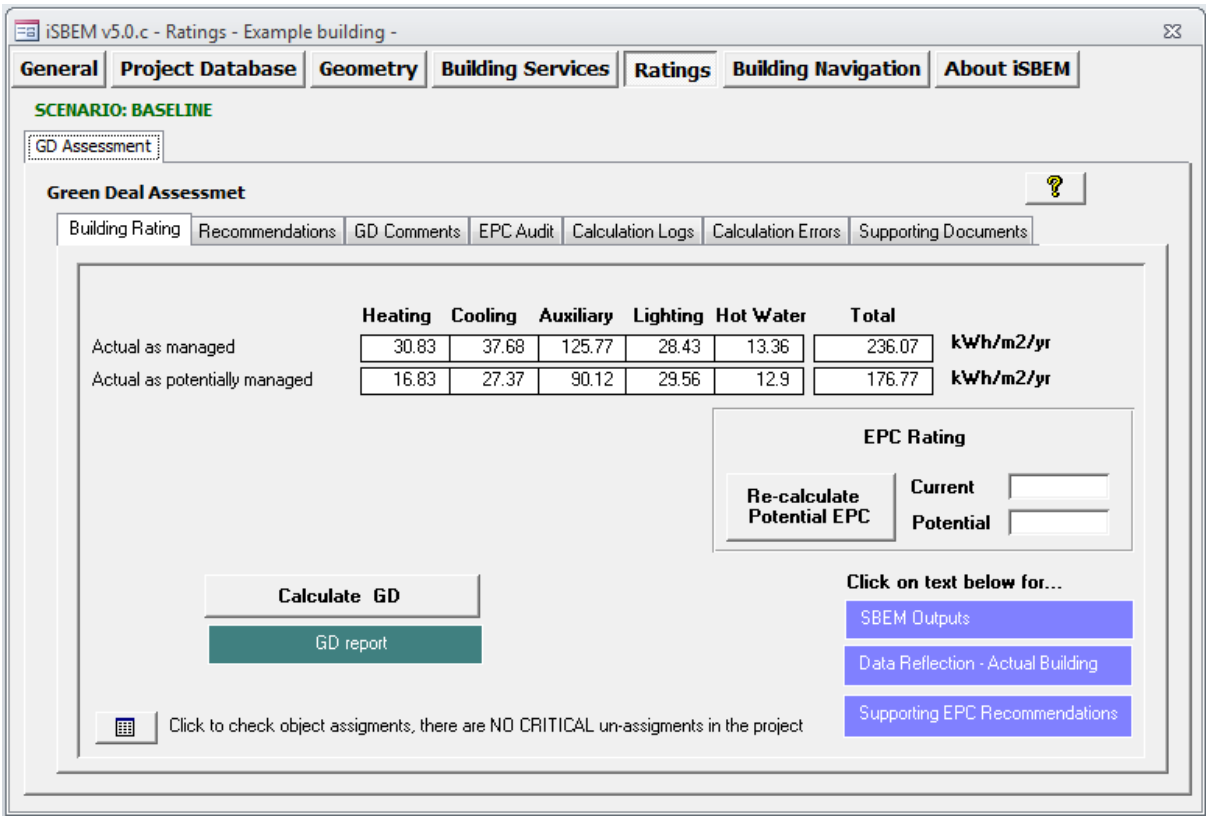
Next, in the **Building Services** tab, select the **Zones** tab and select the **Management** sub tab.



In this section the questions are related to the zone comfort and lighting controls. Answers need to be selected as mentioned before for other management tabs, this time separately for each different zone.

3.2.4. Results

Once any changes have been made to activities, operational data entered/revised and management scores assigned to the baseline, go and obtain the performance results by selecting the **Ratings** tab. In the **Building Rating** sub tab click on ***Calculate GD***. The results for the actual building as currently managed will then be shown.

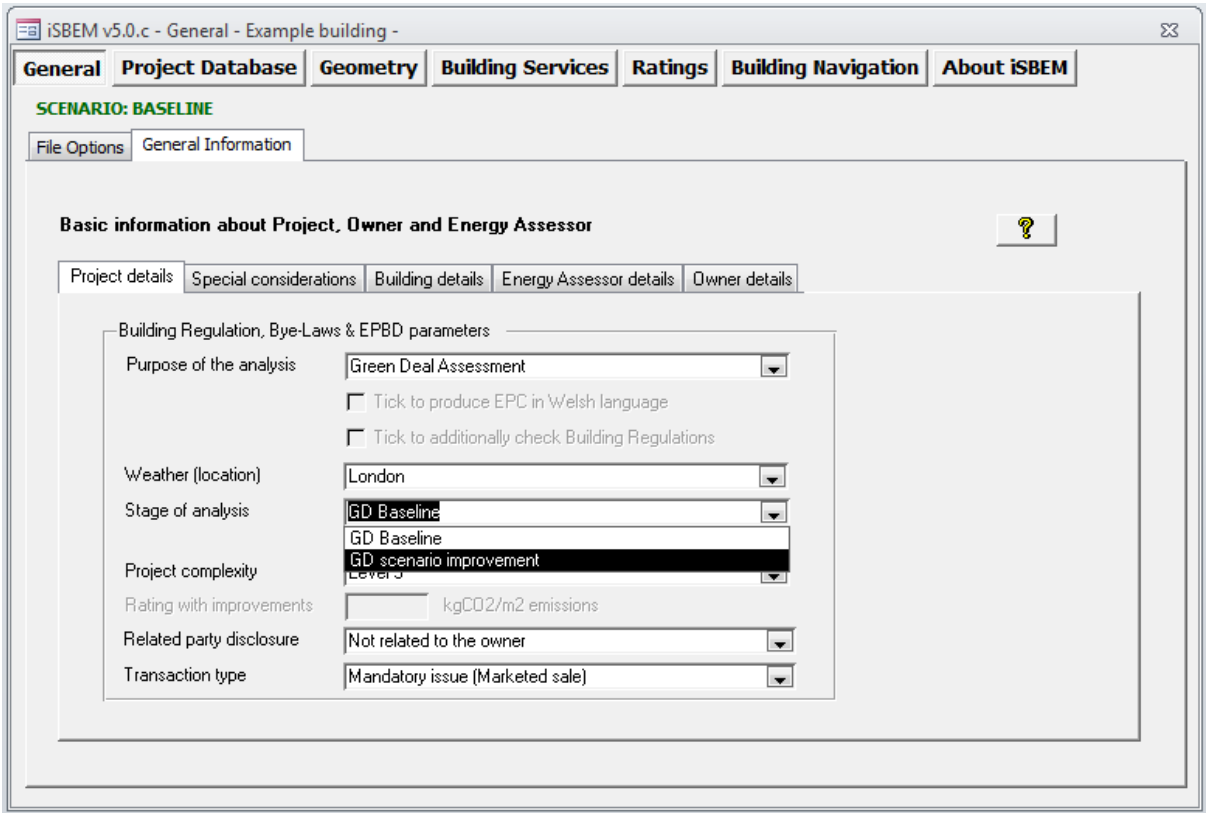


Results for the building as could potentially be managed (improved via management actions) are also shown as these form the baseline for the Green Deal Assessment. Management recommendations are provided upon completion of the Green Deal Assessment to improve the building via improved management actions.

3.3. Scenarios and Measures

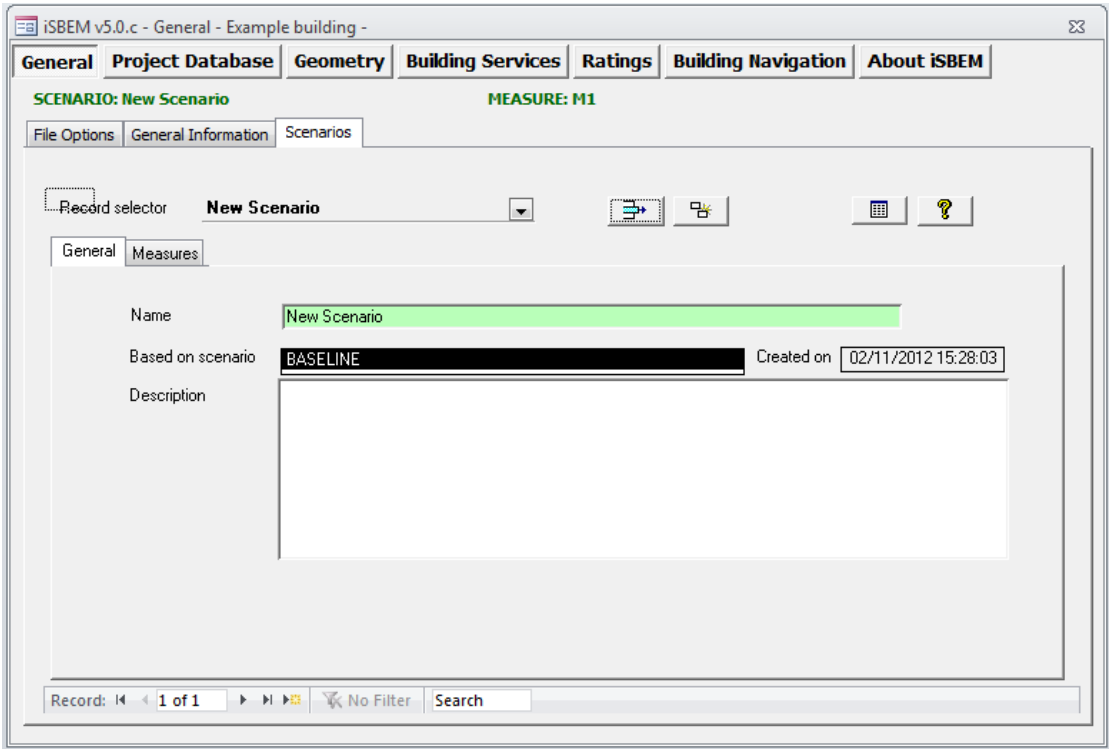
Once the baseline has been set and the results for its performance obtained scenarios or packages and improvement measures can be created to identify options for improvements.

To enter a scenario, go to the **General tab** and select the **General Information** sub tab. Here change the **Stage of Analysis** (currently set as GD Baseline) to be ***GD scenario improvement***.

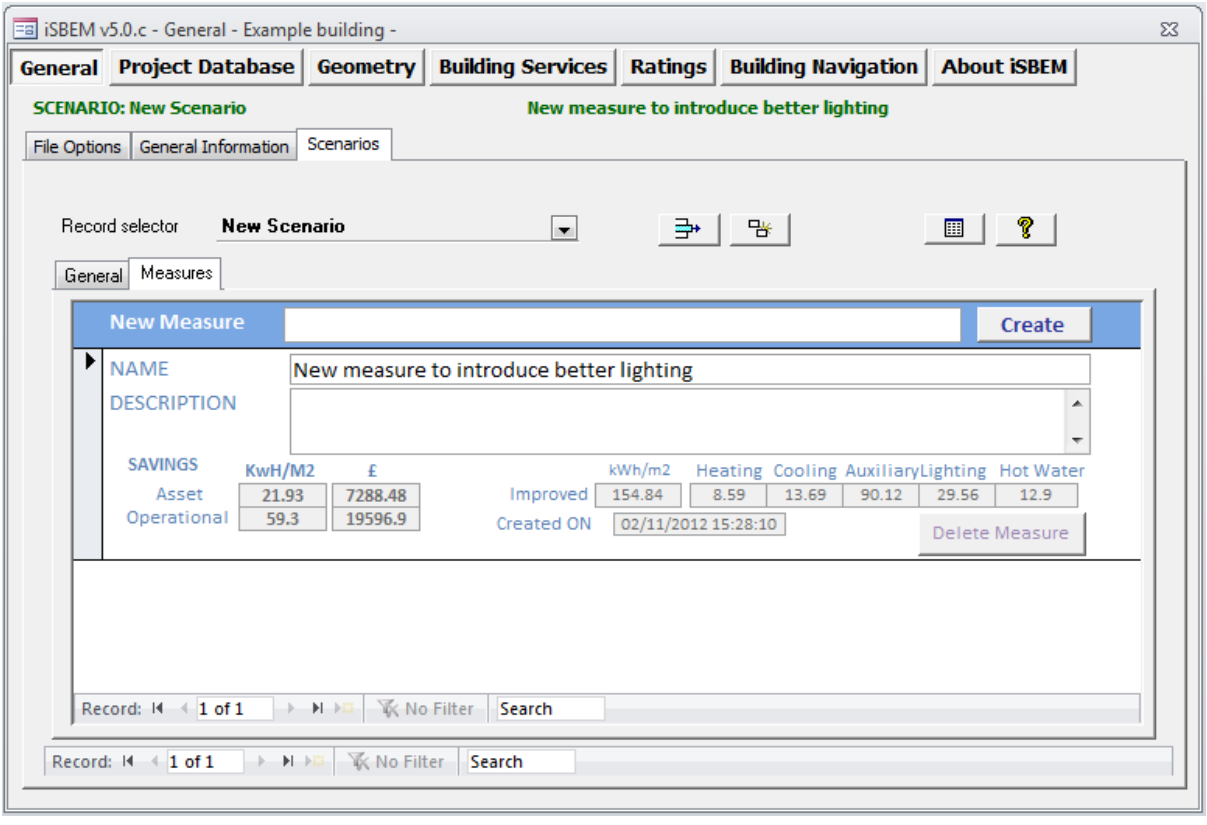


This action will bring you to the Scenarios section. Here select ***Create New Scenario based on BASELINE***. This action will create a copy of the baseline building model, but independent from it, to make any changes required in order to introduce measures for performance improvement.

The tool assigns a default name to the new scenario. To change this and make it meaningful to the specific assessment, change the name of the scenario in the green box (Name). Enter a description for this scenario explaining what changes will be introduced and assessed. Notice that the name of the scenario the user is working on is shown at the top left hand side of the form in green.



The next step is to create the specific individual measures to be included in this scenario. Select the Measures sub tab and enter the name of the first measure to be introduced as part of this scenario. Then click the CREATE button.

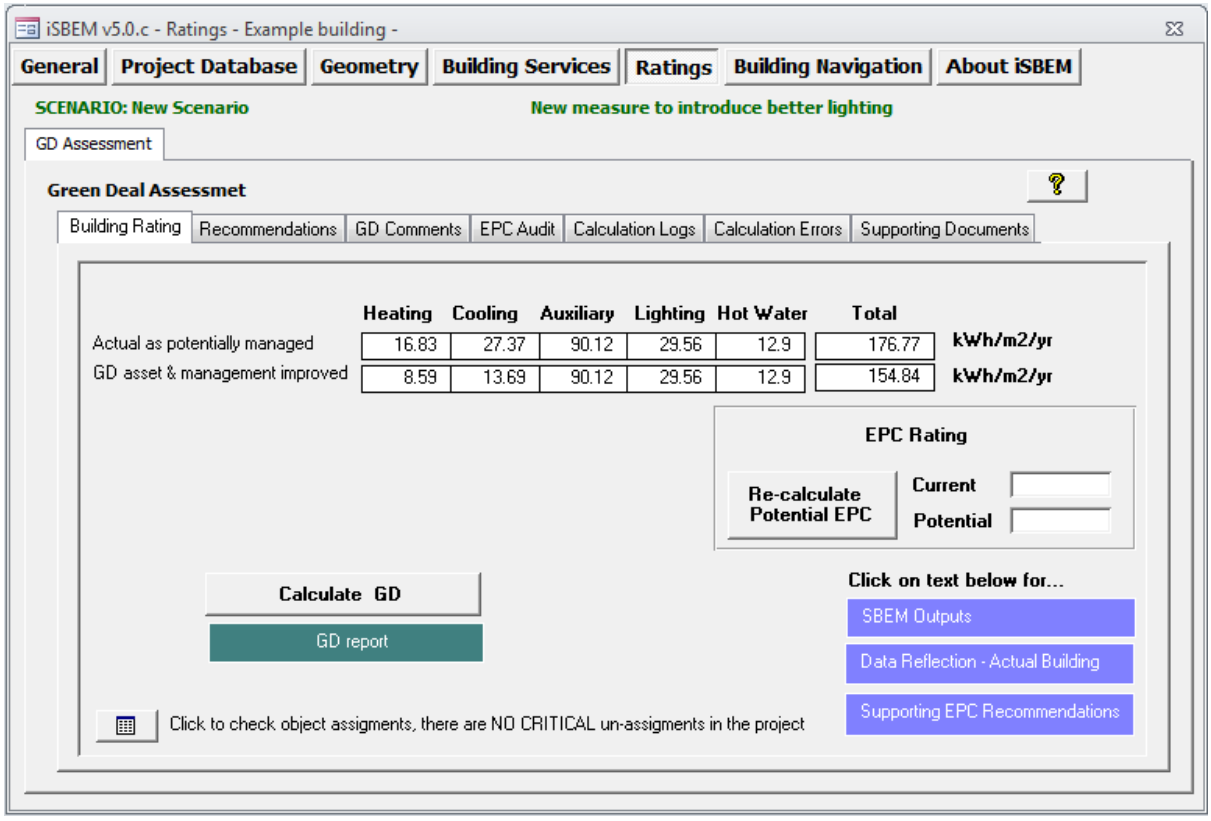


Notice that the name of the measure the user is working on then appears at the top of the form in green. Enter a description of the measure to be introduced, for example explaining the detail of what is going to be changed. At this point, make any required changes in the software to introduce the measure change, for example, change the lamp type to a better one as the measure for improvement. It is usually advisable to select one measure at a time – e.g. change lamp type – rather than mix up changing lamps with changing controls.

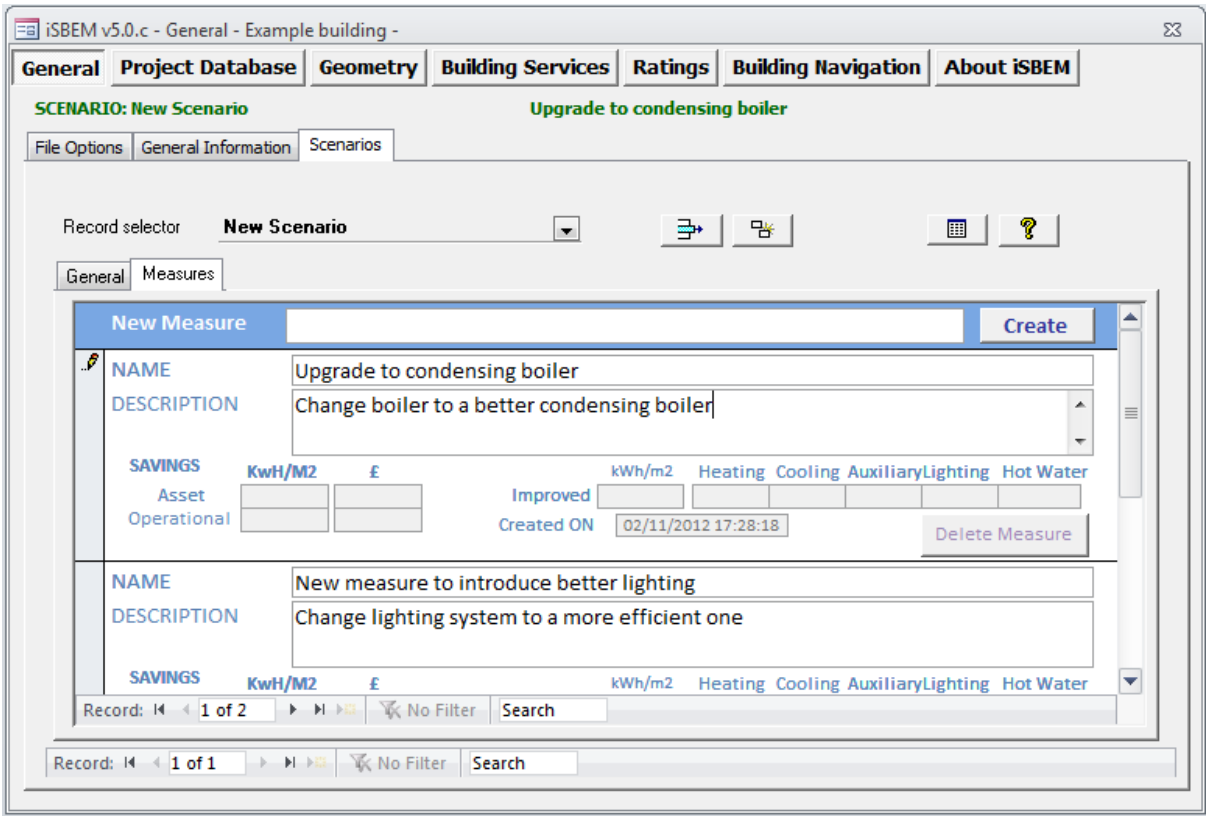
Once the specific change has been introduced in the software, go to the **Ratings** tab and in the **Building Rating** sub tab. Enter the current EPC rating for the building (this is the rating number) and then select ***Re-calculate Potential EPC***. This will provide the EPC rating for the improved building for the selected Scenario of measures. Next, click on ***Calculate GD*** to obtain the results. This time the results show:

Actual as Potentially Managed: this shows the results of the baseline building without any improvement measures but when management improvements are applied to the current management. Management improvements are always to be considered first to create the basis to evaluate any improvements due to additional physical measures. It is assumed that management improvements can be introduced by which, for a building performing under average, average management can be achieved. For buildings managed at average or above level, one better management improvement should be achieved (up to the top management possible). These improvements apply to all and each of the management areas (questions).

GD Asset and Management Improved building: this shows the results of the building as potentially managed including the improvement measures applied in the scenario.

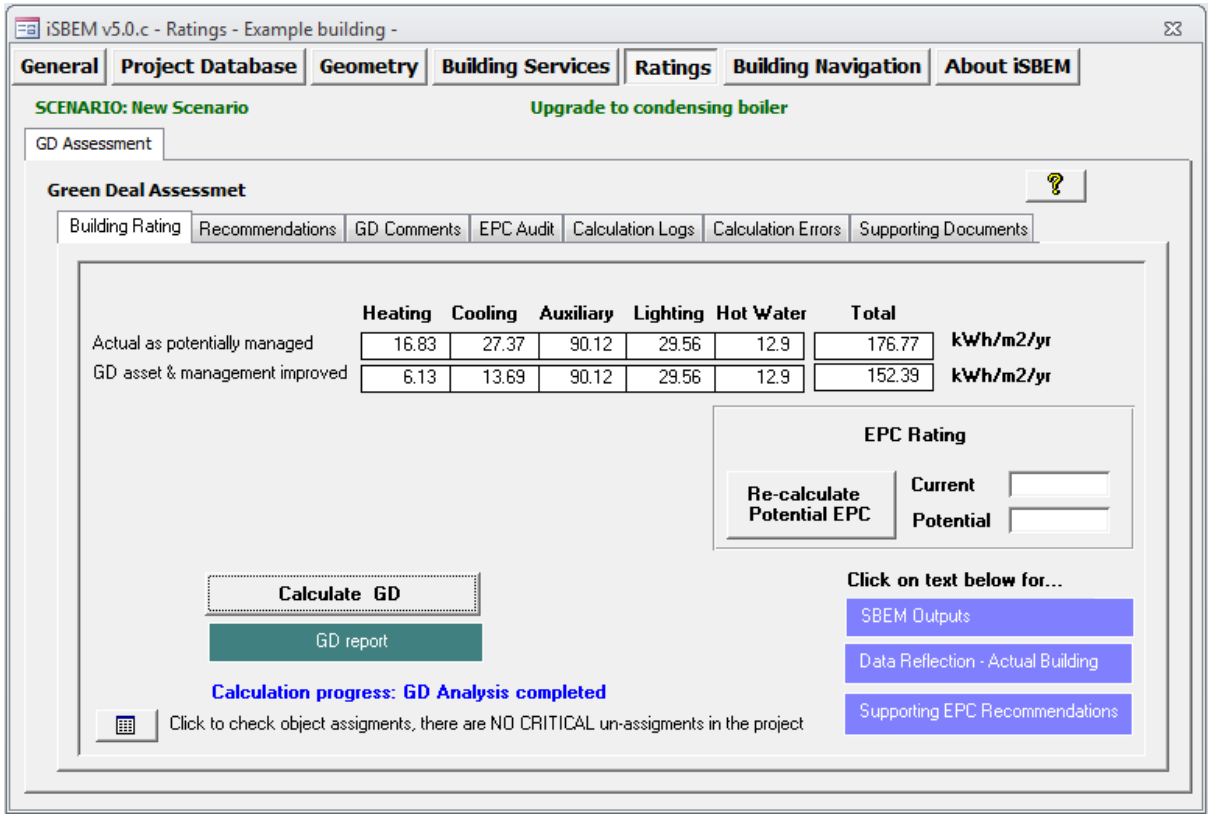


If the scenario includes more than one measure, return to the Measures tab and create a new measure.



Following the same procedure, make any required changes to the relevant system and then run the Ratings again. Notice that the results shown will be those applying to the scenario which includes the cumulative improvements of all measures within it.

Remember always to run the Re-calculate Potential EPC first, and then the Calculate GD in this order, otherwise the GD Assessment report may not show the correct updated potential EPC rating.

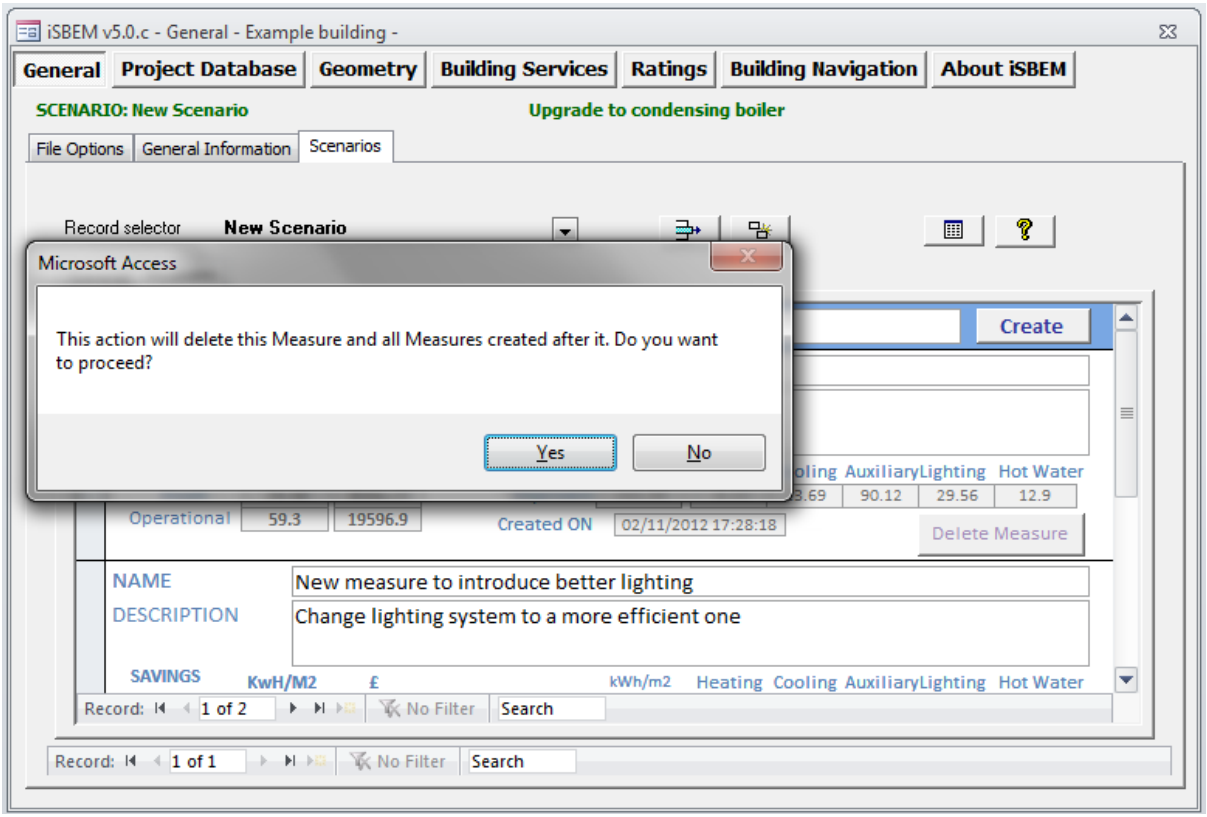


If changes are required to the current measure, these can be made in the software and then the results can be updated by running the calculation in the Ratings tab once again. The results will be updated. Remember to run the Re-calculate Potential EPC first, and then the Calculate GD in this order, otherwise the GD Assessment report may not show the correct updated potential EPC rating.

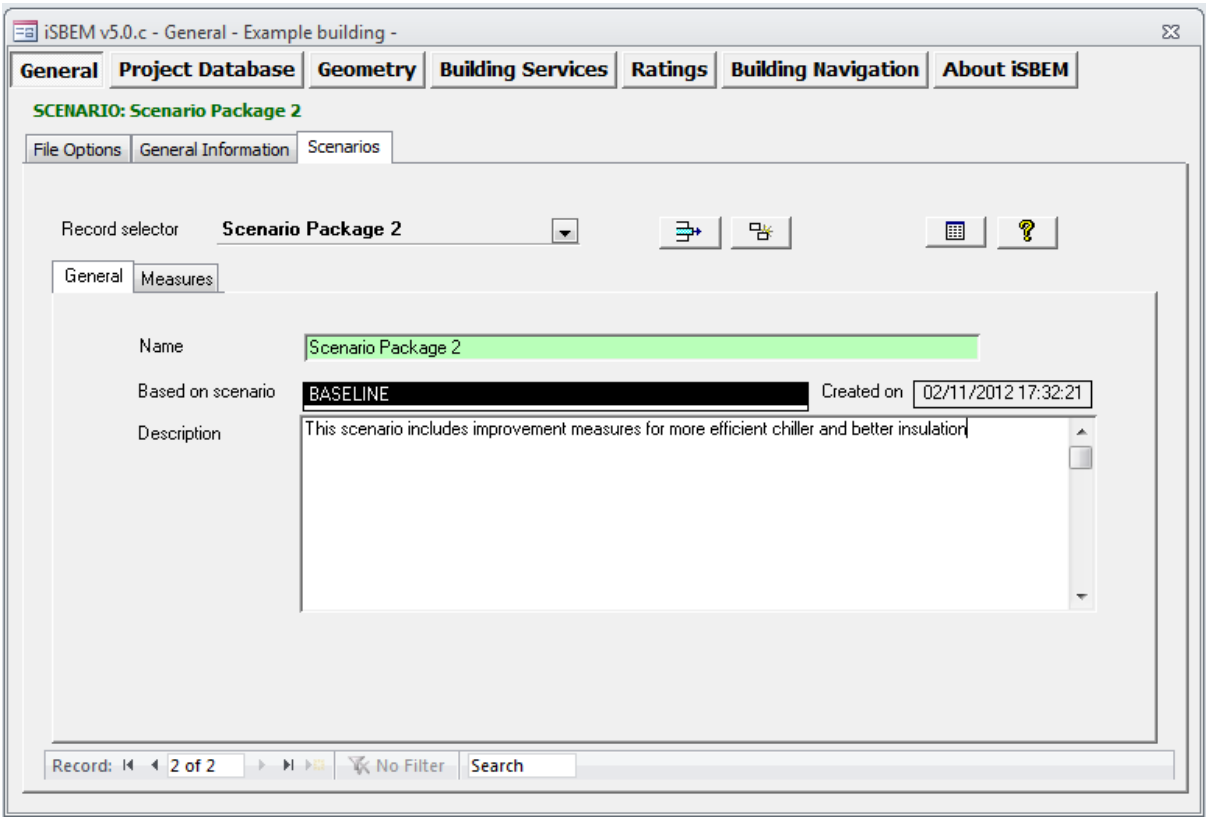
Once a new measure is created, previous measures are locked and can not be changed.

To access a previous measure to make changes or re-run its results, the measures created after it must be deleted.

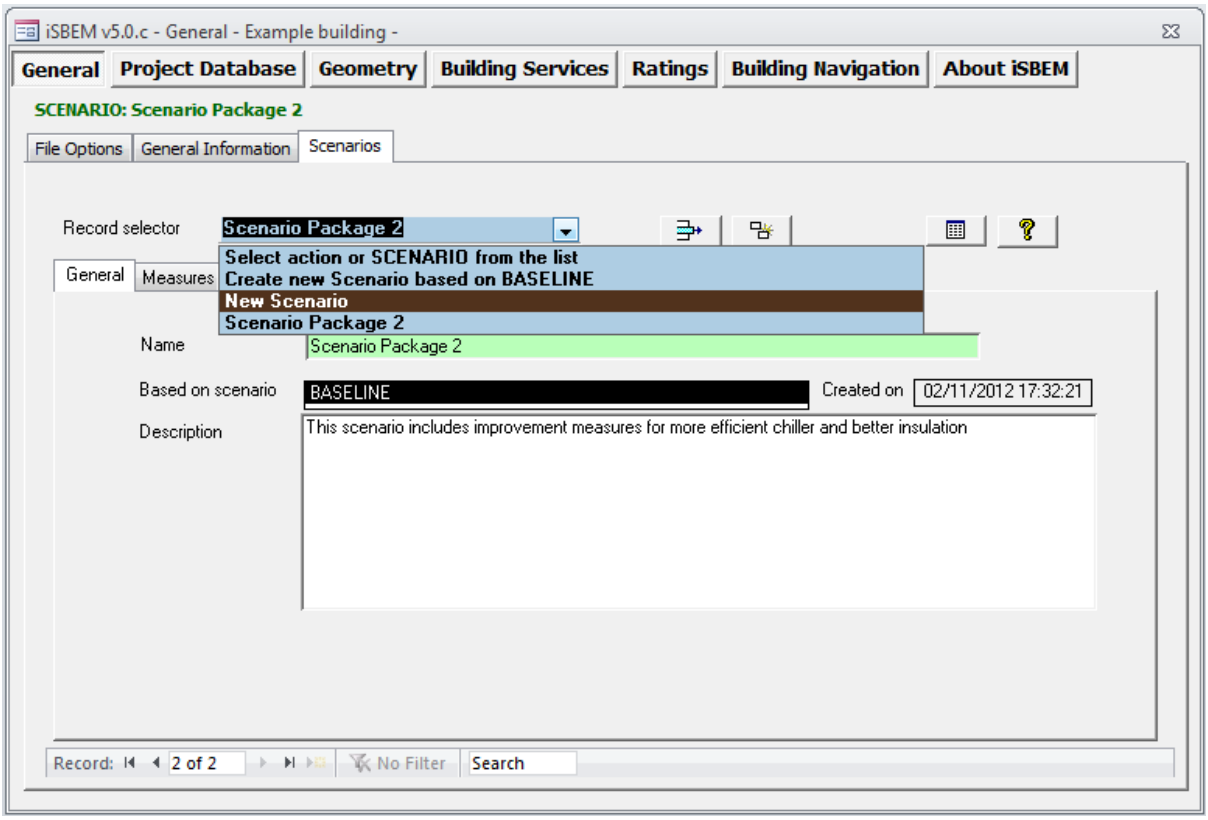
To do this go back to the Measures tab, select the measure to be deleted and click on the Delete Measure button. Note that, when deleting a measure which is not the last one created, all measures created after it will also be deleted. These deletions can not be recovered.



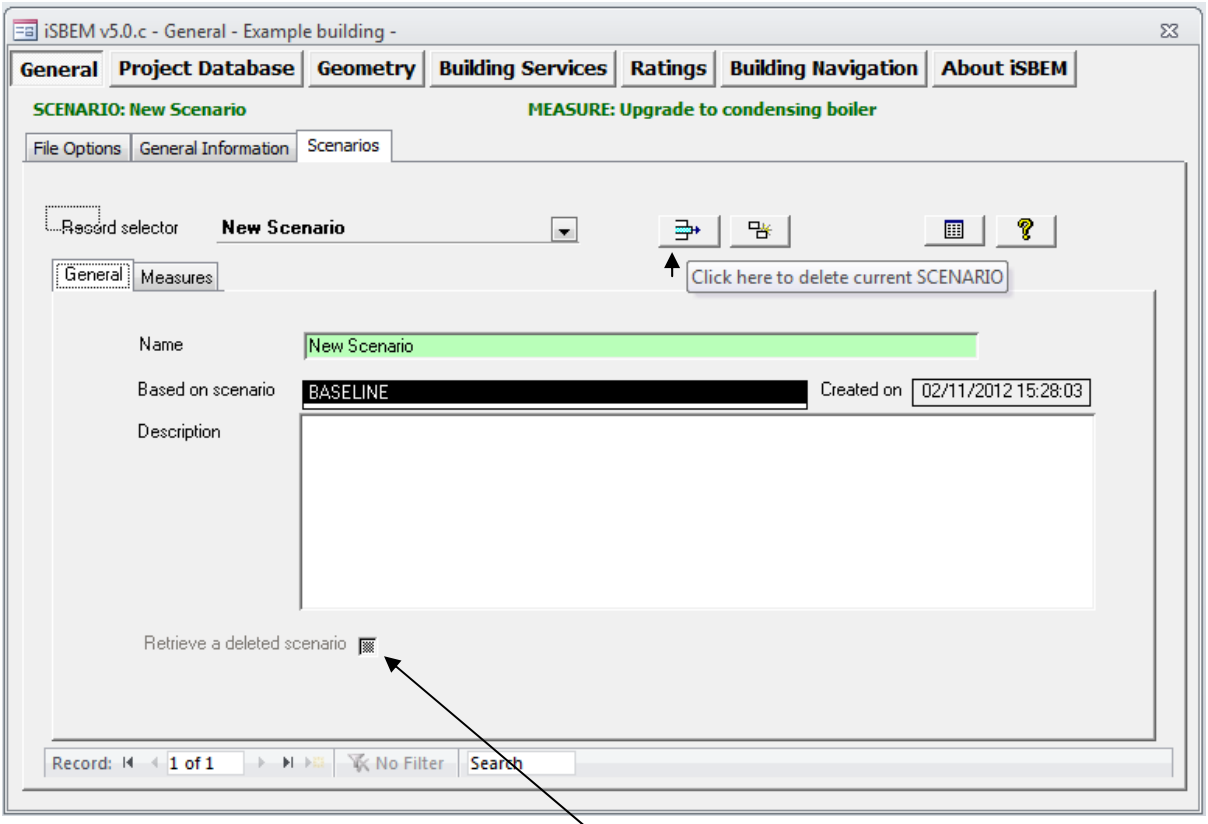
Once a scenario is completed, a new scenario can be created to asess different measures or measure combinations. To do this go to the **Scenarios** tab, and then the **General** sub tab. Select either whether to create a new scenario based again on the baseline (***Create new Scenario based on BASELINE*** option) or alternatively select an existing scenario from the drop down box as the basis for the new scenario. Once selected, then click on the ***Create new scenario based on selected option*** button.



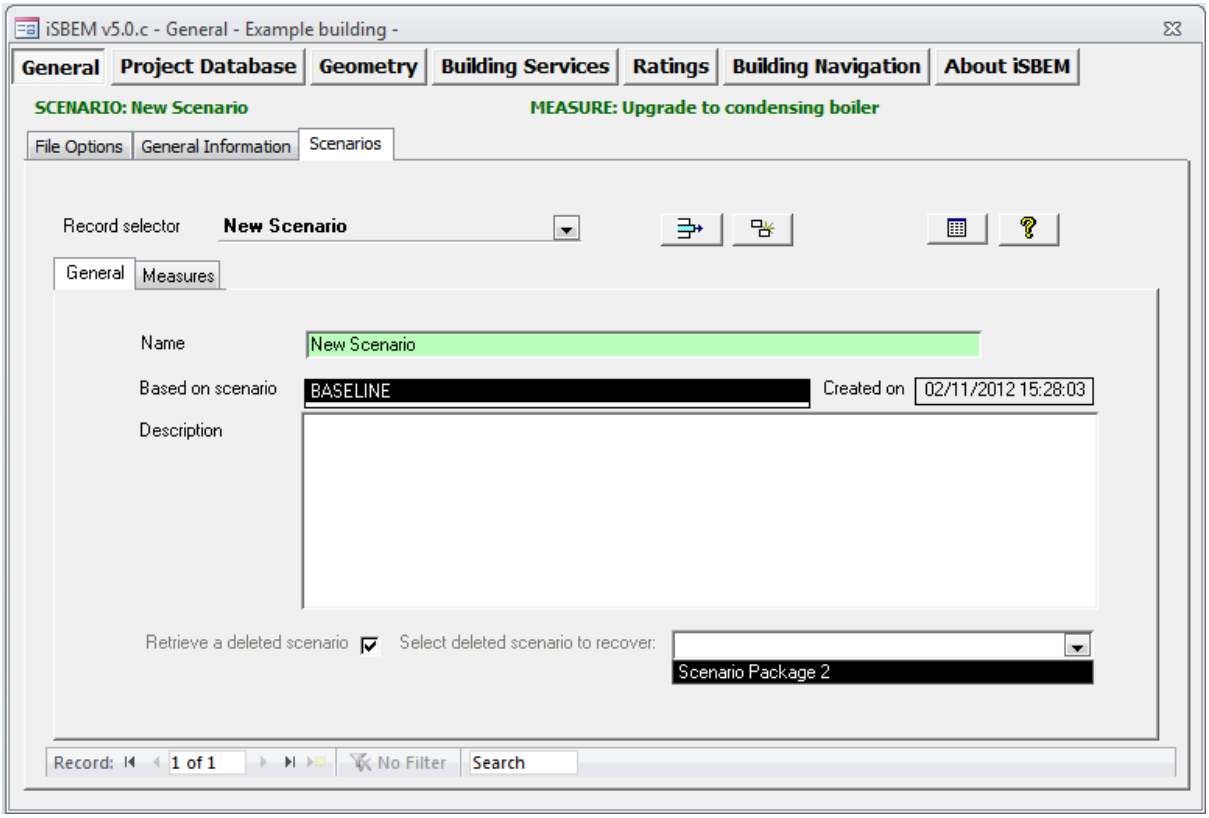
To switch between different scenarios, select the required one from the Record selector drop down.



To delete a scenario, select the scenario and then click on the ***Click here to delete scenario*** button next to the Record selector.



To recover a deleted scenario, tick the **Retrieve a deleted scenario** box at the bottom left hand corner of the **Scenarios** section. A drop down will then appear showing the deleted scenarios available to be recovered. Select the required scenario to be recovered.


iSBEM v5.0.c - General - Example building -
General
Project Database
Geometry
Building Services
Ratings
Building Navigation
About iSBEM
SCENARIO: New Scenario
MEASURE: Upgrade to condensing boiler
File Options
General Information
Scenarios
Record selector
New Scenario
General
Measures
Name
New Scenario
Based on scenario
BASELINE
Created on
02/11/2012 15:28:03
Description
Retrieve a deleted scenario
Select deleted scenario to recover:
Scenario Package 2
Record:
1 of 1
No Filter
Search