Department of Energy & Climate Change

# The Green Deal Occupancy Assessment Process

WITHDRAWN

A description of the process used to produce Green Deal Advice Reports and Improvement Packages

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# Introduction

The Green Deal Occupancy Assessment (GDOA) is a process used to produce a report listing a package of energy efficiency improvement measures suited to a specific dwelling, their expected fuel cost savings and other information needed to facilitate the operation of the domestic Green Deal scheme. A GDOA must be carried out using approved software operated by a trained and accredited Green Deal Advisor (GDA). The resulting Green Deal Advice Report (GDAR) is provided to the householder who may then present it to a registered Green Deal Provider (GDP) to obtain a quote for the installation of the package of measures through a finance plan.

The purpose of this document is to describe the entire GDOA process in a single readable document. It is aimed at readers who wish to understand how GDARs are generated and may be of particular interest to members of government departments and their contractors who work on the Green Deal scheme or related policies. Although focussed on the GDOA and the production of GDARs, the related topics of the creation of Energy Performance Certificates (EPCs) and Green Deal Improvement Packages (GDIPs) are also discussed. EPCs are a prerequisite of the Green Deal Occupancy process. All Green Deal Assessors must be Domestic Energy Assessors to allow the generation and registration of an EPC.

Readers should be aware of the following documents which provide further information:

- *The Standard Assessment Procedure for the Energy Rating of Dwellings (SAP)*[1]. This technical document describes a methodology to estimate dwelling energy consumption that is used to support a number of the UK's energy efficiency policies.
- *The Reduced Data Standard Assessment Procedure (RdSAP).* This is a method to allow the use of SAP based on set of data that is easier and quicker to collect. It is included as an appendix to the main SAP document, but is updated more frequently than the rest of the document.
- *Appendix V: Calculation of energy and costs using actual occupancy parameters*[2]. This is a technical document describing modifications needed to a SAP calculation to take into account occupant behaviour.
- *Green Deal and ECO Measures Update 2014*[3]. This document sets out which energy efficiency improvements qualify for Green Deal Finance and the Energy Company Obligation. It also lists 'In-Use Factors' (discussed later in this document).



[1] http://www.bre.co.uk/filelibrary/SAP/2012/SAP-2012_9-92.pdf

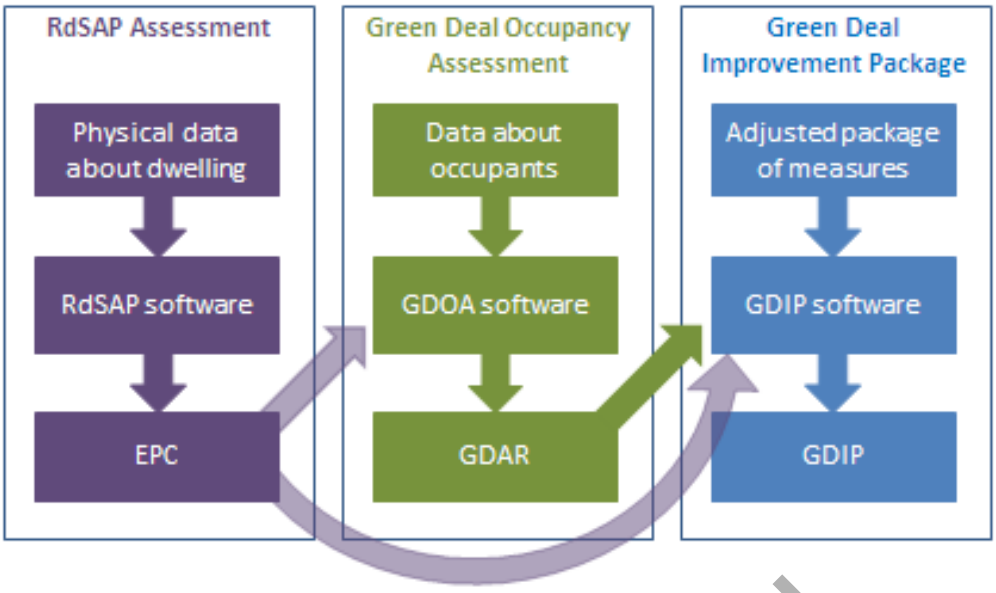
[2] http://www.bre.co.uk/filelibrary/SAP/2012/OccupancyAssessment2014.pdf

[3] https://www.gov.uk/government/publications/information-for-the-supply-chain-on-green-deal-measures

## Overview

The following steps give an overview of the GDOA process.

| | |
|---|---|
| **RdSAP Assessment** | A Domestic Energy Assessor (DEA) undertakes an RdSAP survey to collect physical information about the dwelling. |
| | The DEA enters RdSAP data into accredited RdSAP software. The software produces an Energy Performance Certificate (EPC) for the householder. |
| | The data used to create the EPC is lodged in the EPC register. This contains the raw dwelling data and the results of the EPC calculations. |
| **Green Deal Occupancy Assessment** | During an interview/survey a Green Deal Advisor (GDA) collects data about how the occupants use their home and enters this into accredited Green Deal (GD) software. |
| | The GD software retrieves physical data about the dwelling from the EPC register and combines this with occupancy data to calculate the energy savings for selected energy efficiency measures, and other data required in the GDAR. |
| | The GD software calculates the data needed for the GDAR and lodges this in the GD register. The data lodged includes the occupancy data collected and the results of the GDAR calculations. The register produces a GDAR on demand via the online web portal. |
| | The GDAR is given to the householder, providing them with a generic list of recommended improvement measures suitable for their home which they can take to any Green Deal Provider (GDP). |
| | Following discussions with the householder, the GDP or a GDA use accredited GD Improvement Package (GDIP) software to create an adjusted package of measures based on the actual performance of the products they propose to install. |
| | GDIP software retrieves physical dwelling data from the EPC register and occupancy data from the GD register. It repeats the GDAR process to produce a report for the new package and lodges the GDIP data in the GD register. |
| | If the householder and GDP agree to go ahead with the package of measures listed in the GDIP, the provider organises a GD finance package to pay for the work and for a registered GD Installer to undertake the work. |






## RdSAP and EPCs

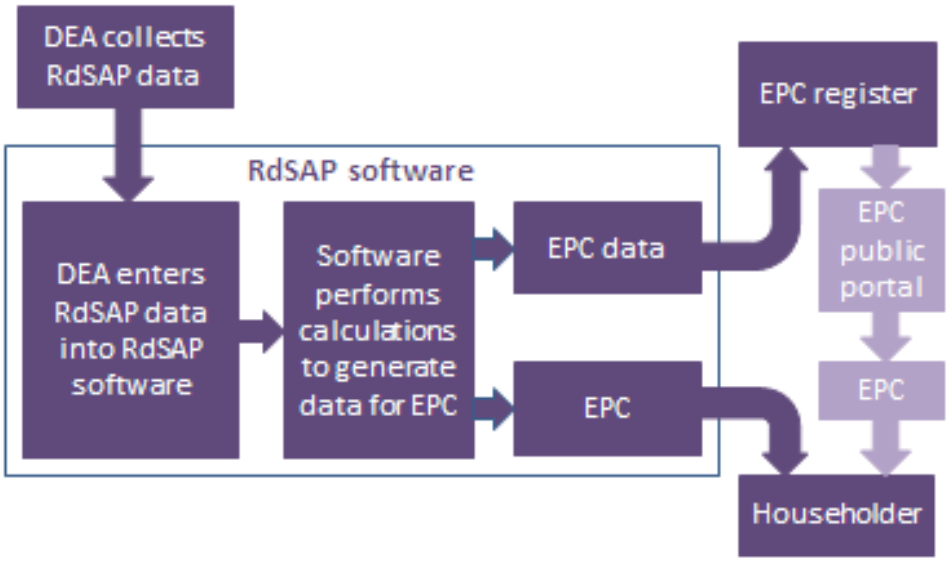
An EPC can only be created by a qualified DEA affiliated to a recognised accreditation body. The DEA is responsible for correctly entering physical data about the dwelling into an accredited RdSAP software tool (usually provided by their accreditation body)[4]. The software uses logic[5] to generate a list of appropriate energy efficiency improvement measures and performs a sequence of calculations to estimate the energy savings for each. It also calculates the energy efficiency rating of the dwelling. All these calculations use standardised assumptions[6] about occupant behaviour – they do not attempt to reflect how the current occupants use their home. The software then generates an EPC presenting this information in a standard format, intended to be relevant and understandable to a householder or potential house-buyer.

Once complete, the software sends to an electronic repository (the 'EPC register') all the physical data collected about the dwelling, as well as the results of the EPC calculations undertaken, creating a permanent record of the assessment. It is this data that is used as the starting point for the Green Deal Occupancy Assessment (GDOA) calculations.

[4] The list of approved RdSAP software can be found here: http://www.bre.co.uk/sap2012/page.jsp?id=3330

[5] The logic for which measures should be offered is described in Appendix T of SAP (ref 1)

[6] These assumptions are described in detail at various points during SAP (ref 1). Two important ones are a heating pattern of 7-9am and 4-11pm on weekdays and 7am-11pm at weekends, and the living room temperature of 21°C during heating periods.

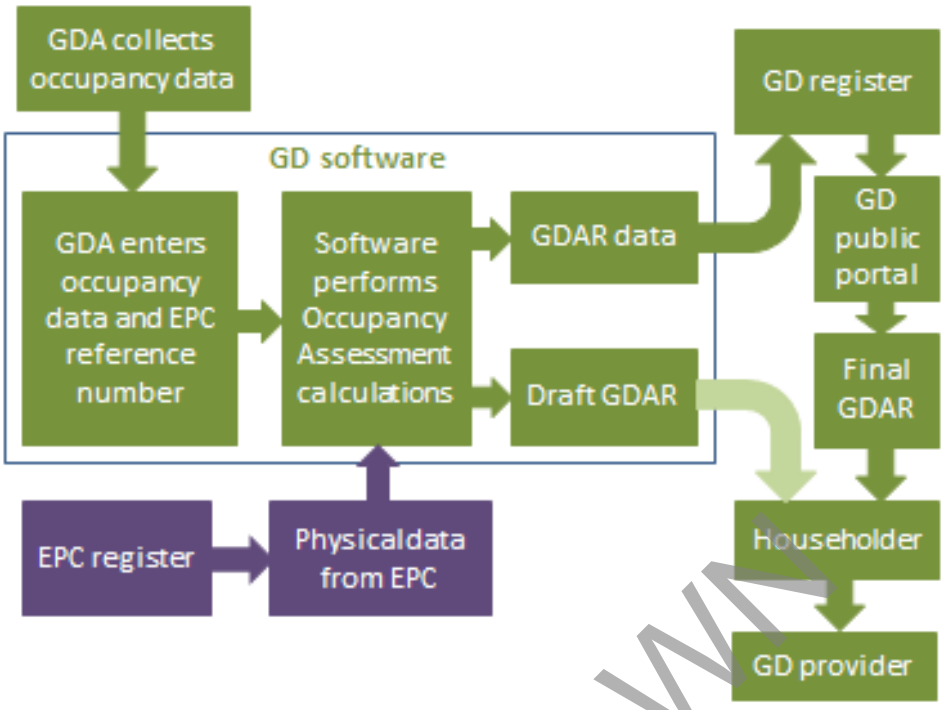



Further information on EPCs, including a useful FAQ section is available on the EPC public portal retrieval site[7].



[7] https://www.epcregister.com/faq.html

## The GDOA process






### Collection of occupancy data

The GDOA makes use of the physical data collected during the RdSAP assessment, but data about how the occupants use their homes is also needed. This occupancy data must be collected by a suitably qualified GDA, meaning they must hold a suitable qualification based on the National Occupational Standards[8]. They must also:

- Be certified by a Green Deal Certification Body against the Green Deal Assessor Specification[9]
- Comply with the Green Deal Code of Practice[10]
- Be listed on the Green Deal Participant Register[11]

**Advisor or Assessor?**

A Green Deal *Assessor* is an organisation certified to carry out Green Deal Assessments.

A Green Deal *Advisor* is an individual employed or contracted by a Green deal Assessor to carry out Green Deal Assessments.

The main job of the GDA is to acquire the data described below during discussions with the occupant and by observation of appliances present in the home and their settings.

### Data to be collected

A detailed description of the data to be collected is provided in the Occupancy Assessment specification document[12], but it is outlined here.

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[8] http://www.assetskills.org/PropertyAndPlanning/PropertyNOS.aspx

[9] http://gdorb.decc.gov.uk/assessors/assessor-specifications

[10] http://gdorb.decc.gov.uk/code-of-practice

[11] http://gdorb.decc.gov.uk/green-deal-participant-register

- Number of occupants
- Main heating systems used
- Secondary heating system used
- Number of rooms that are unheated or partially heated
- Heating pattern (times of day heating is normally used)
- Living room temperature during heating periods (e.g. thermostat setting)
- Number of showers and baths taken per day by the household, if known
- Percentage of clothes drying done using a tumble dryer
- Number of fridges and freezers present
- Type of cooker present
- Presence of any unusual energy-using item present (e.g. swimming pool, electric car)
- Fuel bill data for each fuel (fuel price and amount of fuel used per year)

A table of default values for each of the above items is given in the Occupancy Assessment specification document[13], in case the owner of a dwelling wishes to have GD funded work carried out when it is unoccupied. These default assumptions are also used to generate 'standard' figures for use in the Golden Rule calculation (this is discussed further below).

In addition to collecting the information above, the GDA discusses options for improvement measures with the householder to ensure a suitable package of recommended measures is created. All the above data is then entered by the GDA into GD software.

## Software data entry and use

### Software requirements

Only software that has been tested by BRE and approved by DECC can be used to produce GDARs and GDIPs. Testing requires software developers to submit the results of a number of example test cases which must match the reference values to within a tight tolerance. If BRE are satisfied that the software functions correctly they will recommend to DECC that the software is approved for use. Once approved by DECC it will be added to the list of approved software[14].

### EPC data retrieval

When the GDA inputs the Report Reference Number (RRN) of the EPC that has been created previously for the dwelling this enables the software to connect to the EPC register using the GDA's credentials and import the physical data about the dwelling collected when the EPC was created[15]. When combined with the occupancy data described above this provides all the inputs



[12] See table V13 of http://www.bre.co.uk/filelibrary/SAP/2012/OccupancyAssessment2014.pdf

[13] Table V12 of http://www.bre.co.uk/filelibrary/SAP/2012/OccupancyAssessment2014.pdf

[14] http://www.bre.co.uk/sap2012/page.jsp?id=3330

[15] If necessary the EPC and GDOA can be done in a single visit by the same assessor.

needed by the software to undertake the necessary calculations to produce the data contained within a GDAR.

### The calculation methodology used

The figures provided in GDARs and GDIPs are calculated using a standard methodology to estimate the fuel requirements of the dwelling. This is used to calculate running costs and savings for measures. For around 20 years SAP has been used to support government energy efficiency policy. When EPCs were first developed around 10 years ago, it was decided that it would be impractical to collect all the data needed for a full SAP calculation, leading to the development of RdSAP. This is an inference procedure to turn the smaller data set collected into the full data set required for a SAP calculation. In all cases SAP uses standardised assumptions about occupant behaviour.

However, for the Green Deal it was decided that a method was required capable of recognising differences in occupant behaviour and preferences, in order to provide sufficient information to enable householders to make informed choices about which measures will best suit them and whether they should opt for Green Deal finance. Hence the GDOA methodology was developed. This is largely the same as RdSAP/SAP, but with some normally fixed parameters 'unlocked' and with some new sections of methodology added to take account of items like the number of fridges and freezers owned, or the type of shower present.

The GDOA process requires a mixture of calculations based on standard occupancy and actual occupancy conditions (discussed further below). Rather than using the RdSAP methodology for the former and GDOA for the latter, both are run using the same GDOA methodology in one of two modes, either with standardised or actual occupancy inputs.

## Software outputs generated

The following information is generated by the software for use in the GDAR[16]:

a) Running costs for the unaltered dwelling based on standard occupancy

b) Running costs for the unaltered dwelling based on actual occupancy

*c)* Generation of statement: *Your households energy use is [about the same as/higher than/lower than] typical*

d) Generation of a list of improvement measures suitable for the home

e) Savings for each measure based on actual occupancy

f) Savings for each measure based on standard occupancy

g) Total savings based on actual occupancy and total savings based on standard occupancy, assuming all recommended measures are installed

h) Total savings for gas, electricity and other fuels if all measures are installed, based on standard occupancy

i) Typical and actual values, and whether higher than, lower than, or same as typical, for:

- Number of occupants
- Hours of heating per day



[16] A subset of these are also required for GDIPs

- Thermostat setting
- Number of unheated rooms

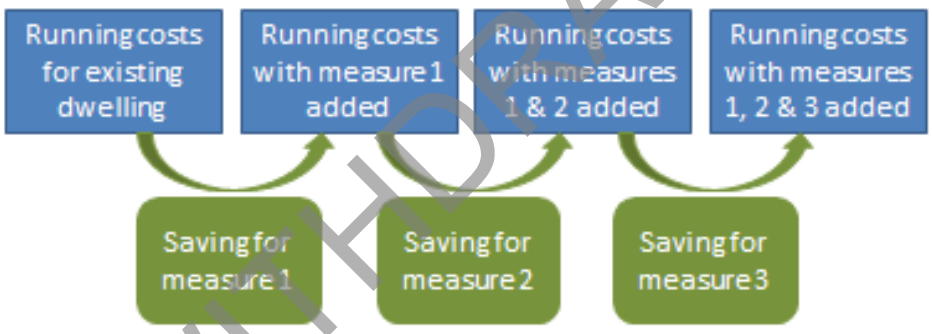
j) Generation of a statement indicating whether savings are higher or lower than typical

k) Advisor's accreditation number, name, phone number, e-mail address and related party disclosure

## Generation of improvement measures list and savings

The software does not calculate the savings for every possible measure eligible for inclusion in the GD. Instead it uses a table of logical rules[17] to produce a list of possible measures for the home from which the GDA, in discussion with the householder, can select the measures that are to be included in the package for which GD finance is wanted. Some measures are mutually exclusive (e.g. there may be several heating system types, only one of which can be selected at a time), so generally not all can be selected at once, but which measures are selected ultimately is up to the householder, under the guidance of the GDA.

One of the key tasks for the software is to calculate fuel cost savings associated with each of the improvement measures selected. Initially a base-line calculation is done (with no improvements), then measures are added one-by-one in the order they appear in Table V13 of the OA methodology document[18]. At each stage the running costs are calculated, such that the savings for each measure are given by the difference between the current and previous run.






This series of calculations is run twice: once using standard occupancy and once using actual occupancy parameters for the household. In both cases the savings for each measure are then reduced using In-Use Factors (IUFs). These are reduction factors that correct for the fact that theoretical savings, on average, are found to be greater than actual savings for many measures. They are included to reduce the likelihood of over-estimating the benefits of measures and potentially misleading householders into installing measures which are not cost-effective. Different IUFs are applied to different improvement measures according to the evidence available on each. IUFs are discussed in more detail elsewhere[19].

The set of savings based on standard occupancy is used to calculate the maximum amount of GD finance available for the package of measures, according to the 'golden rule'. This requires that the savings from a package of measures should at least offset the repayments on the GD loan needed to fund their installation, ensuring that an average householder is no worse off

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[17] See Table V13 of http://www.bre.co.uk/filelibrary/SAP/2012/OccupancyAssessment2014.pdf

[18] http://www.bre.co.uk/filelibrary/SAP/2012/OccupancyAssessment2014.pdf

[19] https://www.gov.uk/government/publications/information-for-the-supply-chain-on-green-deal-measures

following the work. The use of standard occupancy for this purpose reflects the fact that the future occupancy of the property is uncertain.

The set of savings calculated based on the actual use of the house by the current occupants is provided to allow them to make a more informed choice about whether they will be better or worse off following the installation of measures. Generally speaking, the benefits of measures will be greater where householders use their home in a more energy intensive way prior to installation, or less if they use their home more frugally.

## The GDAR

Having calculated all the necessary information, the software presents this in a standardised report format to produce a *draft* GDAR for the householder and GDA to discuss. It is still possible at this stage to edit the package of measures and produce another draft if required. When the GDA and householder are content with the draft the GDA instructs the software to lodge the assessment in the GD register (a web-based repository). The software sends this data to the register to create a permanent record of the assessment. This contains all the occupancy data collected as well as the calculated data items needed for the GDAR. A PDF version of the completed report is created by the GD register. This is immediately made available for download from the GD public portal website[20]. Software may automatically retrieve the GDAR PDF so it can appear as though it was generated by the software. The householder may then take the PDF report to any GDP to arrange for the package of measures to be financed and installed. Using the RRN, the GDAR PDF can be retrieved by the householder from the public portal again at any time.

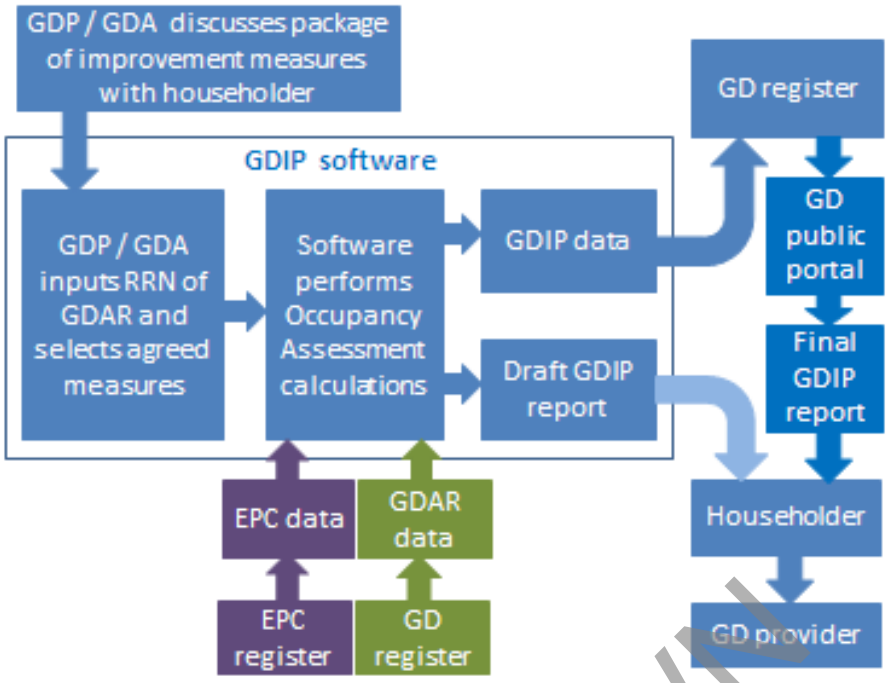
## The Green Deal Improvement Package

The GDAR is designed to represent a generic package of improvement measures that are appropriate for the dwelling and that the householder is interested in installing. However, when it is taken to a GDP the actual products they propose to install are unlikely to have exactly the same properties as assumed in the generic calculations. The GDP may even suggest alternative or additional improvement measures are installed. Therefore at the point where the GDP makes their offer to the householder it is necessary to produce a revised assessment which accurately represents the actual package of measures proposed. To do this the GDA who did the original assessment, another GDA, or the GDP must use approved GDIP software to create a tailored GDIP.

No new data about the dwelling or the occupants is required to carry this out (and nor can that data be adjusted) because it is retrieved by the GDIP software from the EPC and GD registers. The only new input information required relates to the choice of improvement measures.



[20] https://www.gdregister.com/public/oa/lodgementretrieval




There are limits on who can do what when creating a GDIP. The GDA who lodged the original GDAR can make any changes required to any measures, including adding new measures to the package (subject to them being applicable to the dwelling). Other GDAs or GDPs can make more limited changes. They are allowed to remove measures or amend options for existing measures, but they cannot add measures that were not included in the GDAR package. This is intended to ensure measures that are inappropriate for the dwelling are not added by someone who has not visited the dwelling.

For the GDIP, more choices are available about each specific measure being installed. The GDAR assumes generic performance for improvement measure, for example assigning a typical U-value to an insulated solid wall. For the GDIP, a specific U-value for the system being proposed can be entered for use in the calculation[21]. The GDA/GDP must be able to provide evidence to support the figures they enter, which may be checked by audit. This provides a means of recognising better performing measures, allowing more GD finance to be released to fund them if necessary.

Once adjustments to measures have been made and options for those measures selected, the same process used to calculate the information presented in the GDAR is repeated using the new assumptions to generate the savings for the package of measures. The software then creates a draft GDIP report in a standard format. This is similar to the GDAR, but doesn't repeat guidance and advice sections, instead focussing only on the savings for measures. The software lodges the GDIP data in the GD register as a record of the assessment. The register produces the final GDIP report, which is either retrieved by the software and given to the householder, or retrieved by the householder directly from the GD public portal. This completes the OA process for the chosen package of measures. Multiple GDIPs can be created if necessary to allow the householder to compare offers from different GDPs. Even if nominally the same, it is likely that offers from different GDPs will make use of slightly different products, so in practice a new GDIP is likely to be needed for each GDP's offer.



[21] A list of the GDIP options for each measures is given in Table V13 in http://www.bre.co.uk/filelibrary/SAP/2012/OccupancyAssessment2014.pdf

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