

Gas Theft – User Guidance Document

August 2020



All views expressed in this report are solely of Energy Saving Trust

About Energy Saving Trust

Energy Saving Trust is the UK's leading impartial organisation helping people save energy, reduce carbon emissions and use water more sustainably. We do this by directly supporting consumers to take action, helping local authorities and communities to save energy, using our expert insight and knowledge, providing quality assurance for goods and services and by working in collaboration with national and international governments and organisations.

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Version Control

Version	Corresponding tool	Date	Authors	Signed Off by	Notes and changes
1.0	2.0	28 April 2020	William Jamieson	James Wakelin	Updated previous guidance document to correspond to latest tool.
1.1	2.1	27 th August 2020	William Jamieson	Andrew Tod	Added details of the reset button functionality

Contents

Version Control	2
1. Introduction	3
2. Customer Information	4
3. Baseline Calculation	5
4. Domestic Calculation	6
5. Non-domestic calculation	11
6. Results	16
7. Reset Buttons	16
8. Tool Expiry	16

1. Introduction

This guidance document gives an overview describing how the Gas Theft Calculator should be completed in order to estimate the gas consumption in a domestic or business property. The particular version of the tool to which this document pertains can be found in the Version Control section on page 2. The tool is designed to be as simple as possible while capturing an adequate amount of data to come up with a good estimate of the quantity of gas which a home or business could be expected to consume.

In addition to the guidance given in this document, there are tips provided within the tool itself. In the top right-hand corner of many of the boxes in the spreadsheet tool there is a small red triangle. Hovering the mouse pointer over these triangles will make a window pop up with information about how to complete that section.

This tool can make three different estimates of gas consumption:

- Baseline Estimation
 - This approach estimates the quantity of gas stolen based on actual meter readings of the consumption prior to the theft occurring. If the meter readings leading up to the theft are available, this approach is best.
- Domestic Estimation
 - If the property is a domestic residence and meter reading data is not available, then this calculator should be used to estimate the gas consumption over the theft period.
- Non-Domestic Estimation
 - If the property is a non-domestic residence and meter reading data is not available, then this calculator should be used to estimate the gas consumption over the theft period.

Please note that the tool does not calculate the cost of the gas stolen but simply estimates the number of kilowatt hours (kWh) used.

2. Customer Information

This section of the tool allows the assessor to add contextual information about the customer and assessment. It contains information about who the customer is (both private individuals and businesses), the address and dates.

2.1 Calculation Type

It is important to select the correct calculation type. There are three options:

- Domestic – for use where there is insufficient information about the pre-theft consumption at a domestic property
- Non-domestic – for use where there is insufficient information about the pre-theft consumption at a non-domestic property (covering conventional restaurants, fast food restaurants / cafes, pubs serving food, bars or pubs not serving food, hotels and care homes)
- Baseline – for use where there is sufficient information about the pre-theft consumption to estimate the change in consumption post-theft

Selecting the correct calculation type will allow you to navigate to the relevant section of the tool and will display the correct output in the results section.

2.2 Customer Address

This field can be used to record the address of the house or business establishment being assessed.

2.3 Customer Name

These fields can be used to record the name of the customer as well as the business name if applicable.

2.4 MPRN

This field can be used to record the Meter Point Reference Number of the meter being assessed. If more than one meter has been tampered with then it will be necessary to complete a separate calculation for each meter.

2.5 Dates of Theft

These fields can be used to record relevant dates associated with the theft:

- Assessment Date - the date when the tool was completed to obtain an estimate of the quantity of gas stolen
- Start Date of Theft – the estimated date when the theft was initiated (please use the notes if it is not possible to give a specific date)
- End Date of Theft – the date when the theft was discovered / rectified

2.6 Notes

This field can be used to add any notes or relevant information about the customer or property being assessed. Tip: if you wish to start a new line within this field please press Alt+Return.

3. Baseline Calculation

If meter readings are available for a period of time during which theft did not take place, the baseline calculation should be used as this is the most accurate means of estimating consumption. Ideally, this period should be at a similar time of year in order to account for seasonal variability.

3.1 Baseline meter readings

Details of a period of known consumption when theft has not taken place can be entered in two ways:

- Using two meter readings with their corresponding dates. The appropriate units and gas correction factor should be entered.
- Entering an energy value in “Total baseline consumption” and providing the dates over which this took place.

3.2 Theft period meter readings

Similarly, details of the theft period consumption can be entered in two ways:

- Using two meter readings with their corresponding dates. Again, the appropriate units and gas correction factor should be entered.
- Entering an energy value in “Total theft period consumption” and providing the dates over which this took place.

Once the information has been added for both, a daily consumption for before and during the theft period is calculated and scaled to the duration of the theft period defined on the Customer Information tab to give the estimated results.

4. Domestic Calculation

For the domestic calculation the following inputs are required to determine the consumption for the property:

4.1 Region

The region which you select should be the Government Office Region in which the property is found.



In England these are:

- North East
- North West
- Yorkshire and The Humber
- East Midlands
- West Midlands
- East of England
- London
- South East
- South West

In addition to these English regions we have included options for Scotland and Wales.

If the property is in England and you are unsure of the correct region then please go to the region/nation profile search section of the Nomis website:

<https://www.nomisweb.co.uk/reports/lmp/gor/contents.aspx>. Input the property's postcode in the postcode search box, click search and the correct region will be displayed.

4.2 Property Type

There are six options for dwelling type within the tool. These are defined as follows:

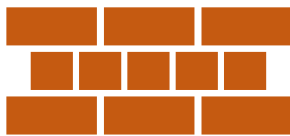
- **Flat / maisonette**
 - A flat is a self-contained unit which occupies part of a building and is accessed via a shared front door. Flats may be found in purpose-built blocks or in subdivided houses and tend to be laid out over a single floor. A maisonette tends to be laid out over multiple floors and has its own entrance but shares a building with another maisonette (or is sometimes found over retail premises).
- **Bungalow**
 - A house with one floor only (although chalet bungalows which have an additional room in the loft space fall into the bungalow category).
- **Mid terrace**
 - A house with more than one floor that is found in the middle of a row of terraced houses (i.e. it shares one internal wall with the house on each side).

- **End terrace**
 - A house with more than one floor that is found on the end of a row of terraced houses (i.e. an end terrace house shares one internal wall with the neighbouring mid terrace house).
- **Semi-detached**
 - A house with more than one floor that shares one inside wall with another house or building.
- **Detached**
 - A house with more than one floor that does not share an inside wall with another house or building.

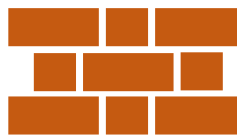
4.3 Property Age

Pre-1930s

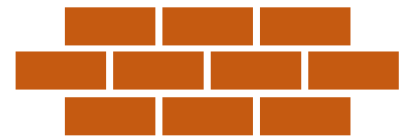
The easiest way to spot a pre-1930s home is to check the wall construction. Most homes built before 1930 were of solid wall construction while most homes built after this date were of cavity wall construction. It is possible to identify the likely wall construction by observing the arrangement (or 'bond') of the brickwork. There are two bonds which were used in solid wall construction: English and Flemish. These have an alternating pattern of 'stretcher' (the side of the brick) and 'header' (the end of the brick). Cavity wall properties (which were mostly built from 1930 onwards) tend to have their bricks arranged in a Stretcher bond where only the stretchers can be seen:



English Bond



Flemish Bond



Stretcher Bond

- There were three main architectural styles during this period: Georgian (around 1720 to 1830), Victorian (around 1830 to 1900) and Edwardian (from around 1900 to 1920).
- Bay windows (window spaces projecting out from the front wall of a house) and sash windows (which had panels which slide vertically rather than opening outwards) were common to all three periods.
- Georgian homes were generally larger with high ceilings and flat or shallow pitched roofs, often hidden behind a parapet.
- Victorian homes tended to have steeply pitched roofs (which meant that many have had loft conversions in order to increase the internal space) with slate roof tiles. As a typical Victorian home had a fireplace in nearly every room the roof of a Victorian home usually has many chimney pots.
- Edwardian homes tended to be wider than Victorian homes, allowing space for a full-size hallway.
- Georgian homes were mostly built as detached and semi-detached properties, Victorian homes were mostly built as terraces and Edwardian homes were also mostly built as terraces and are typically found in the suburbs of cities and towns (generally speaking housing within a town or city tends to be more modern the further out from the centre you go as urban areas have expanded over the centuries).

- In the 1920s and 1930s semi-detached homes predominated. These often had pebble dash renders or were half timbered (i.e. had visible timber frames infilled with a render) and featured leaded glass windows. Decorated wooden gable ends (the triangular end section of a pitched roof) were popular along with wooden balconies and verandas and porches.

1930-1972

- Predominantly semi-detached homes were built during this period but the late 1940s saw the start of the large post-war council housing construction programme with large numbers of socially rented flats built
- Modern architectural styles also arose during this period with Art Deco designs such as curved metal window frames. Art Deco properties often had features reminiscent of old cruise liners and usually had flat roofs.
- Bungalows became popular during the inter-war period. Bungalows constructed during the 1930s to the 1950s tended to have square floor plans while bungalows built during the 1960s tended to have rectangular floor plans. Chalet bungalows (which included rooms built into the pitched roof) also started to appear.
- During the 1930s towns and cities expanded as people moved out to the suburbs which were becoming better connected with public transport links
- The typical house of the 1930s was smaller than houses that came before but often featured a garage as cars were becoming more popular.
- Design features of houses prior to the 1950s included herringbone decorative brickwork (with bricks laid at 90-degree angles to each other in a herringbone pattern) and red clay roof tiles rather than slate roof tiles.
- So called New Towns were constructed after the Second World War around existing cores to house people displaced from damaged homes. These were mostly located around London with a few sites in the north of England. By the end of the 1940s Basildon, Bracknell, Corby, Crawley, Harlow, Hatfield, Hemel Hempstead, Newton Aycliffe, Peterlee, Stevenage and Welwyn Garden City had all seen rapid development.
- The modern house form which is familiar to us today emerged during the two decades after the Second World War.
- Bay windows had disappeared, as had sash windows and there was little in the way of the embellishments seen in previous housing styles
- Semi-detached homes continued to be very popular during this period, but purpose-built flats comprised 20% of homes constructed during this period as post-war social housing construction gathered pace.
- Concrete became popular after the Second World War, especially in social housing developments and high-rise blocks.
- A second wave of New Towns were constructed in the early 60s including Redditch, Runcorn, Skelmersdale, Telford and Washington.
- A third wave of New Towns was constructed in the late 1960s including Milton Keynes, Northampton, Peterborough, Telford and Warrington.

1972-1999

- Tower block construction at the start of this period tended to be more medium-rise than high-rise.
- 1970s homes were generously sized compared with homes built in the 1980s and later with houses typically having a generous front and rear garden. They also tended to have larger windows than houses which came before or after.
- 1980s homes often had large driveways or garages to accommodate two cars

2000 onwards

- Modern homes are smaller than equivalent homes constructed in previous decades
- Recently constructed homes will tend to look fresher as they have not had a chance to weather as much as older properties
- There is a tendency towards more minimalist and contemporary design features during this period.
- Eco-friendly materials and use of tubular steel, laminated plywood and fibreglass gained more prominence.

4.4 Number of Bedrooms

The number of bedrooms is used in the tool as a proxy to estimate the size of a property. If you can gain access to the property, please count the number of bedrooms and please include rooms which would have originally been bedrooms but may have been converted to other uses (e.g. into a study).

If you are unable to gain access to the property, please estimate how many bedrooms there are likely to be given the size of property and the layout of similar properties. This can be done using a visual inspection or by identifying the house on Google Street View.

4.5 Wall insulation

Identifying whether a house has cavity wall insulation can be challenging as the signs of the installation can be covered up by skilful mortar work, painting or rendering.

Cavity walls came into general usage in housing construction during the early 1930s so the first step to identifying whether a house has cavity wall insulation is to establish whether it has cavity walls. Please see the section on identifying Pre-1930s homes for information about different wall construction. If the property is a pre-1930s home, then it will be of solid wall construction and it will be very unlikely to be insulated as solid wall insulation is currently quite rare.

Homes built since about 1990 were constructed with cavity wall insulation fitted. Homes built before this date were built with unfilled cavity walls however there has been a lot of activity retrofitting of cavity wall insulation in older properties, especially since the 1990s. Now, over two thirds of cavity wall homes have cavity wall insulation.

Homes which have had cavity wall insulation fitted post-construction will have had 20mm to 30mm holes drilled at regular intervals so that the insulation pump could be inserted into the wall. These holes are usually found just below the ground floor windowsill up to near the top of the wall and will usually be spaced a meter or two apart. These holes will have been filled in with mortar which may be a slightly different colour to the mortar in the rest of the wall.

Note that homes which are exposed to strong wind and rain are generally not suitable for cavity wall insulation and should not have had it installed.

4.6 Roof insulation

Conventional loft insulation in an unconverted loft with a pitched roof is quite easy to identify if you have access to the loft space. In most cases you will be able to see the loft insulation fitted between the roof joists (the horizontal beams which run across the roof space). In some cases, the insulation will be laid across the joists as well (this is an example of a fully insulated loft space). More often the insulation is laid up to the top of the joists only. Loft insulation can come in the form of rolls of fibrous materials (mineral wool or sheep's wool) or rigid insulation boards.

In some cases, the joists will have been boarded over in order to use the loft space as storage. If this is the case, it may be difficult to establish whether the loft is insulated or not. However, it should be possible to see the insulation under the boards at the edges of the loft or near the loft hatch.

If the loft has been converted into an additional living area in the last two decades then insulation should have been fitted between the rafters (the sloping beams which create the pitch of the roof), however, in older loft conversions, it may not have been done. Insulating the rafters will normally involve fitting a stud wall which will make the depth of the roof considerably greater than the normal depth of just the uninsulated rafter and plasterboard.

4.7 Boiler Type

Condensing boilers can be identified using a range of approaches. If the boiler make and model is known then the SAP Products Characteristics Database (<http://www.ncm-pcdb.org.uk/sap/searchpod.jsp?id=17>) will tell you what the SEDBUK efficiency of the boiler is. Select the fuel (mains gas), brand name and model name and it will tell you what the annual efficiency of the boiler is. Anything which is 86% or better (SEDBUK band B or better) can be assumed to be a condensing boiler.

If the boiler was installed after 2005 it is virtually certain to be a condensing boiler, although in a small number of cases non-condensing boilers have been fitted since 2005.

If you have access to the boiler you can also look to see if there is a pipe to take the condensate away from the boiler to a drain. The condensate pipe usually comes out of the bottom of a condensing boiler and should have an outside diameter of at least 22mm and be made of plastic. It sometimes passes through the wall to an outside drain or may be plumbed into a kitchen or bathroom waste pipe.

5. Non-domestic calculation

The non-domestic calculation tool allows the user to estimate the gas consumption from restaurants, fast food restaurants, cafes, bars, pubs, pubs serving food, hotel's and residential care homes. Unlike the domestic calculator which is based adjusted usage data from meter readings of dwellings across the UK, the non-domestic calculation models the energy usage from first principles based on the heat requirement of the establishment, plus the energy used and excess heat generated by kitchen appliances.

5.1 General Tab

5.1.1 Business type and size

The type of business to be assessed should be selected first as this affects the type of inputs required in later stages of the calculation.

The floor area of the business is required in metres squared. Floor area can be obtained from the business's energy performance certificate. These are available online and searchable by address at <https://www.ndepcregister.com/reportSearchAddressByPostcode.html> for properties in England and Wales and <https://www.scottishepcregister.org.uk/> for those in Scotland.

For establishments where EPCs are not available an estimate should be made.

5.1.2 Region

Selecting a region helps to estimate how much heat the business requires. If there is any uncertainty which region the business is located in – then a postcode lookup is available on the website: <https://www.nomisweb.co.uk/reports/lmp/gor/contents.aspx>.

5.2 Heating tab

5.2.1 General facts

These inputs about gas usage for heating can be assessed by examining the heating system and looking for evidence of mechanical ventilation and insulation on site.

5.2.2 Thermal Building Parameters

The thermal efficiency of the construction is estimated by the type of materials used for construction. The input variables range from “Lightweight construction, wood, drywall, interior thermal insulation” the most efficient option, to “Concrete filled with heavy materials” the least efficient option. If there is doubt about the construction type, opt for the middle option.

5.2.3 Building Type

Building type helps to assess the amount of heat that is generated within the business premises from equipment other than the heating system. This internal heat gain offsets space heating requirement. The first option “Building with large area of glazing...” is suitable for businesses producing the most internal heat, “Building characteristic similar to a domestic dwelling” should be selected for businesses with little or no equipment generating internal heat gains.

5.2.4 Boiler details

Details about the boiler can be found on the boilers commissioning record. This can help to establish the age of the boiler. In general, the older the boiler is the less efficient it will be. Evidence of regular servicing should be sufficient to whether the boiler is well maintained.

5.3 Non-Domestic Kitchen Appliances tab

5.3.1 Service type

For kitchen appliances we include two general purpose variables, namely the kind of meals offered (breakfast, lunch, dinner) and the serving hour type (Restricted for hotels, care centers, pubs etc. or Continuous for restaurants etc.). These variables are scale the operating time, idle time and preheat energy consumed by the appliances.

5.3.2 Appliances

As part of the calculation please only include appliances that use gas. Electric catering equipment should be excluded from this part of this calculation.



Combination ovens

A combination oven is the same as a convection oven, only with the ability to provide steam in the oven cavity. They can range in size from countertop size to full size floor mounted. Common values are 6,10,12,14 or 20 steam pans (trays)



Convection ovens

A convection oven is a standard oven without the function to include steam in the cavity. Commonly they will have 5-6 test pans



Conveyor ovens

A conveyor oven is a rectangular housing unit containing a baking cavity or chamber open on two opposing tracks. A typical counter to unit has a conveyor width as small as 25 cm, a freestanding unit can have a conveyor as wide as 95 cm. Typical lengths are 0.5,1.4 or 1.77 meters.



Fryers

All deep fat fryers share a common basic design. A large “kettle” containing a large volume of oil into which food can be submerged. They range in capacity from 15lb (7kg) of oil for a countertop small fryer to 200lb (90kg) for a large floor standing model). Common capacity values range from 30, 50, 65, 80, 100 to 135 lb.

Griddles



Griddles are generally used for searing meat, cooking bacon and eggs as well as warming and toasting bread. They generally consist of one hot plate that may either be flat or grooved. Some may include a second heating element that swings down from the top to cook items on both sides. The Common width of appliances is 24", 36", 48", 60" etc. Cooking zones of 12" that are individually controlled can be assumed as different appliances of that width



Steam Cooker (Steamer)

In appearance steamers can resemble ovens, however they contain a series of stacked pans generally used for cooking vegetables. They can be either countertop or freestanding. These will range in capacity typically from 3,6 to 10 pans.

Grill



This covers a range of different grill types. Salamander grills are typically found in a cooking range and have a slidable tray to allow easy insertion and removal of food. Underfired grills are grooved surfaces that are heated from below. Upright grills cook the food in a vertical position to allow easy access and take up less space. Cheesemelters are used to grill cheese and conveyor grills are typically used to cook burgers evenly and with less supervision from cooks.

Chargrill



A chargrill system is a specific type of grill where the heat source comes from underneath. They consist of a grooved surface to sear the food to create a smoky flavour. The tool uses a typical 600 mm system.



Fryer (Pressurised)

Pressure fryers are a variant on conventional fryers where the foods are cooked under pressure to enable lower temperature cooking, longer oil life and faster cooking times. The tool uses an oil capacity of 43 lb or 22 L.



Hot Dog Griller

A hot dog griller is used to cook hot dogs on rotating rollers which allow for even cooking of the sausages. It should be noted that data for a gas version was not found so the rated power for this device is based on electric version which are much more widely available.



Hot Water Urn

These are gas powered versions of the more popular electrical versions. They heat water to a desired temperature for use in hot drinks or for filling pans with near boiling water. They typically come in 10 L and 20 L sizes



Oven (Roasting)

Roasting ovens typically come with a range on top in order to save on space (as seen in the picture). However, simple ovens are also available. This appliance rating is based purely on the oven portion and the range tops should be specified separately (see below).



Soup Cooker

Soup cookers are used to heat and keep warm soup or other liquidous foods (e.g. stews). They consist of an internal heated bowl and an insulated lid to allow access to serve the food. Some have a tap to allow food to be served without opening the lid.



Rangetops

Sometimes referred to as hobs or stoves, range tops usually consist of four or more burners that enable cooking methods such as boiling, pan frying, searing in pots and pans.



Kebab Grill

These grills are designed to cook a variety of meats and vegetables on a skewer, continuously rotating the food whilst a back-grill cooks it. They typically have 2 to 8 controls controlling 2 – 16 burners.



Bain Marie

Sometimes known as a water bath or double boiler, these appliances are designed to keep foods warm or gradually bring foods to a fixed temperature. They can be identified as several cans are suspended over a larger vat or water which is heated, the steam gradually heats the cans to temperature. These are typically 40, 60, 80 or 120 cm wide.



Boiling Pan

These high production appliances enable several cooking functions such as braising, boiling, steaming, poaching, stewing, poaching, roasting and frying. These are usually single standalone units. These are typically 40, 50 or 60cm wide.



Booster Water Heaters

These instantaneous water heaters provide hot water at 82 degrees C for the sanitising of dishes and cookware as part of a dishwashing station. These are typically from 80 to 60 cm wide.

6. Results

The Results section pulls in some of the information from the Customer Information section and displays the estimated gas consumption.

7. Reset Buttons

7.1 Macro enabled reset buttons (recommended)

The tool incorporates two reset buttons on each sheet. Macros should be enabled for this functionality to work. The 'Reset Page' simply resets the page you are currently on back to defaults, while the 'Reset Tool' button will reset all pages to their defaults. This clears all data already input throughout the tool, so should not be used unless the user is sure they want to do this. A warning will appear which the user will have to confirm prior to reset.

7.2 Reset without macros

Individual page resets of the tool are not possible without macros. To reset the whole tool without using macros, the original file should be saved in a template location as a Read-only file. EST will provide a version of the tool in this state. To reset the tool with the default values, the user should simply re-load this version and use 'Save As' for each scenario.

8. Tool Expiry

The tool has functionality built in which will prevent it from delivering results after a certain date. This has been done to ensure that the latest version is always used by assessors. In the months prior to the tool expiry date, a warning message will appear that an updated version should be downloaded. If the final expiry date is reached, a further warning will appear that the tool is out of date. The warnings appear in red text in the Customer Information and Results sections.

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Underpinned by our independent status and impartial perspective, we offer a depth of energy expertise, but we're not content to stand still. Our goal is to find new and better ways to drive change and reduce UK energy consumption.

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