

Local Authority Common Ask Electricity



Guide – Domestic Thermal Efficiency

Technical guidance for assembling data for your local network operator's forecasting from a Local Area Energy Plan for Domestic Thermal Efficiency

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Acronyms and Abbreviations

Name	Description
LAEP	Local Area Energy Plan
LSOA	Lower Layer Super Output Areas
DFES	Distribution Future Energy Scenarios
DNO	Distribution Network Operator

1. OVERVIEW

1.1 Introduction

This guide was written to accompany version 2 of the LAEP input for modelling Local Authority Common Ask. The purpose of this guide is to explain the reasoning behind providing a Local Authority Common Ask, how to use it and address frequently asked questions. This document does not override the requirements of the Local Authority Common Ask definition itself, and wherever there is a perceived difference between this guide and the Local Authority Common Ask definition, the Local Authority Common Ask definition is to be taken as the authoritative definition.

This guide specifically covers the compilation of domestic thermal efficiency data. Other guides are provided to support the compilation of data for other technologies. Note that as well as the data requested for the technology in this section, metadata information for this technology should be provided in the Local Authority Common Ask questionnaire, which is in the “General Information” section.

The Local Authority Common Ask is intended to help in the formatting of inputs to be used in your local network operator’s network modelling. The requirements of the data are designed to allow for like for like comparison between different LAEP outputs, and to ensure that the data can be processed effectively by the network modelling tool. It should not require additional outputs to be produced but may require existing outputs to be transformed or reframed in a different way.

The Local Authority Common Ask consists of the Local Authority Common Ask definition in Microsoft Excel format (named Local Authority Common Ask Definition - Domestic Thermal Efficiency) this guide and the associated checklist in Microsoft Word and PDF format, a series of example sheets filled out with data demonstrating the format that data should be returned in using CSV UTF-8 (Comma delimited) format, and a series of templates in Microsoft Excel Workbook format (CSV format available on request). The Local Authority Common Ask definition consists of a sheet describing the inputs required for the relevant technology. The document(s) to be returned are defined in the Local Authority Common Ask definition, which also specifies column naming, data types and includes a description of the data required for the column with examples. The Local Authority Common Ask definition itself does not need to be returned. Where templates are to be provided, these have already been partially filled out, and should be completed and returned in the same format as they are provided in. Apart from custom geographic area shapefiles, all documents returned should be in either CSV UTF-8 (Comma delimited) or Microsoft Excel Workbook format. The Local Authority Common Ask Questionnaire should be returned in Microsoft Excel Workbook format.

Note that where names are used for categorisation, then we ask that names match exactly with standard definitions, allowing no room for interpretation. This includes correctly matching the spelling, capitalisation and spaces present in the official definition of the name.

1.2 General guidance for preparing technology specific data

Existing data can be used as a basis for the data provided and convert it into the correct format to be used as an input for your local network operator’s analysis, as defined in the Local Authority Common Ask definition.

If the data template is used, then note that placeholder text has been included to indicate where the LAEP data will be needed to complete the file. Additional rows should be added so the data file encompasses all of the data contained within the LAEP, ranging across the different categories of data within the LAEP such as different geographical areas.

The “unit” column provided is for information only and should not be altered. The content of the column in the first row can be copied to all of the rows in the file.

The “*laep_name*” columns, which are present in all data templates to be returned, should contain a single name across all data and across all files which describes the LAEP work which the data originates from. This will be used to label the data used in your local network operator’s analysis to distinguish it from data from other LAEP projects.

Where the Local Authority Common Ask definition specifies a column for geographical area information, then the naming of standard geographical areas should exactly match the definitions found on the [ONS Open Geography Portal](#) for the relevant boundary. The geographical areas referenced here should match the resolution declared in the Local Authority Common Ask questionnaire for this technology. If using LSOAs, note that the “General Information” folder of the Local Authority Common Ask contains lists of relevant LSOAs for your local network operator area for both 2011 and 2021 boundary definitions, both of which can be selected as the geographical area in the Local Authority Common Ask questionnaire. If the data uses a custom geographical definition for which a shapefile has been provided, then the names of areas in these columns should exactly match the names in the accompanying shapefile provided. Note that if your data is at a higher granular resolution than LSOA, then we ask for you to aggregate it to LSOA level before submitting it. This is to ensure only an appropriate level of data is shared, and to avoid intellectual property concerns about disclosing the details of modelling approaches. Wherever data is not provided for a specific geographical area, then data derived from the network operator DFES will be used in its place. If your LAEP spans across multiple network licence areas or DNOs and you are unable to resolve it to LSOA level, note that this data can be accepted, and will be processed to represent only the relevant contribution before it is used in modelling.

In some cases, there may be a trade-off between granularity in different categories, such as between high geographic granularity with data provided for years at set intervals and a lower geographic granularity with a full annualised forecast for every year between the base year and 2050. In these cases, the order of preference for granularity is first a preference for data resolved into archetypes that reflect the reference archetypes as closely as possible, then for geographic granularity, and finally for a full time series of data. This order of preference reflects the assumptions that must be made to convert the data into the right format where cannot be provided in the preferred data format. Where the Local Authority Common Ask definition specifies a column for categories referenced in an associated definitions file, then the naming of the categories in this column should exactly match the naming of the categories in the LAEP data from the relevant definitions file.

Where the Local Authority Common Ask definition allows columns for multiple years, then a base year column and a 2050 column must be included, but intermediate year columns should only be completed where output data from the LAEP is available for that year. The base year of the forecast will be taken as the first year for which any data is provided. If data for any years is not provided, then interpolation methods will be applied to create an annual forecast for use in your local network operator’s forecasting tool. Note that a column should be included for every year between the base year and 2050 to clearly indicate the years for which data is provided.

The definition of a year can be given in the Local Authority Common Ask questionnaire for each technology by specifying the day of the year on which values apply. For LAEPs with shorter timescales, this information could have a significant impact on the rate of uptake expected by a target date. However, for some LAEP datasets, this information will be less critical as the longer timescales make differences in the day of the year that uptake applies minor, such as for 2050 net zero plans. If a date is not provided, then a default DFES date will be used in its place, so this information should only be provided if it is felt to be important for your case.

As the naming used in the categorical data columns are cross-referenced to other tables and data sources, it is important that the names used are precise to avoid any ambiguity when comparing

names. For all files, we ask that the format of the names be carefully checked, including spelling, capitalisation and spaces, especially spaces that might occur at the end of names.

Note that if data is provided for fractions of LSOAs as defined in the “non_standard_area_lsoa_definition” file in the General Information folder, the data provided should only cover the fraction of the LSOA affected by the LAEP and should not be scaled up. If data is provided for a custom area defined in a geojson shapefile, then data should be relevant to the whole of the area referenced in the geojson file.

1.3 General guidance for completing definition templates

Where definition templates are provided, we are asking for an indication on how the categories used in the LAEP analysis correlate with the categories defined as an input for your local network operator’s modelling.

Each definition file contains at least 3 columns:

- Left: A column that is empty when the document is supplied and is to be filled out with the names of the category or categories that correspond to the template category.
- Middle: A column of the names of the categories used in your local network operator’s forecasting for quick reference.
- Right: A column giving the detailed definition of each category to allow you to establish how your categories align with the categories in the template.

Some definitions files, such as the buildings definitions file, will have additional categorisation to increase the readability of the document. These categorisations are a repeat of information included in the definition description and SFS definition columns.

laep_heating_technology_building_archetype_definition	sfs_heating_technology_building_archetype_definition	fuel	size	age	sfs_heating_technology_building_archetype_definition_description
	DOMESTIC_FUEL_GAS_SIZE_SMALL_AGE_VERY OLD	Gas	Small	Very Old	Domestic building using natural gas as a primary fuel for heating, with 1-2 bedrooms (small), and which were built before 1918 (very old).

Figure 1: An example of the first line of a building archetype definition table with additional categorisation to increase readability.

There are the following options for defining categorisation matching:

- Where the category in the template aligns with a category in the LAEP data, then the category name from the LAEP data should be entered against the respective category in the template.
- Where the LAEP data uses broader definitions than are used in the template, then the same category name from the LAEP data can be provided against multiple template category names to indicate the template categories which should be combined to match the category in the LAEP data.
- Where the LAEP data uses more specific categories than are used in the template, then multiple LAEP category names can be provided against a single template category name to indicate the LAEP categories which should be combined to match the category in the template data.
 - For some technologies, this option is not available, as the process of converting this data to a usable format would require additional data to be provided, which could raise potential IP concerns about data sharing. Where this is the case, the Local Authority Common Ask definition and the guide include it in their description of how to handle the definitions files for the relevant technologies. In this case, we would encourage you to perform the data aggregation before submitting the data to your local network operator, as you will have the greatest familiarity with the details of the data.

- Where there is not good alignment between LAEP and template categories, then categories should be aggregated to a level where agreement is possible. In extreme cases, all categories from the LAEP data could be aggregated into a single category, and disaggregation will be performed on the data using standard assumptions and methods.
- If a technology listed in a definition file is outside the scope of the LAEP work, then the column can be left blank to indicate there is no relevant data from the LAEP for this category, and standard data will be used in its place.

Note that for all LAEP archetypes defined in the definitions file, there should be corresponding data in the data files to avoid misinterpretation of the intention of the data.

2. DOMESTIC BUILDING THERMAL EFFICIENCY DATA

If you are unable to provide quantified data for domestic thermal efficiency improvements, as an alternative, a DFES scenario can be selected to represent thermal efficiency gains if they are qualitatively understood for the area of your local area energy plan. If this is the best option for your LAEP data, there is no need to provide the below data, just complete the Local Authority Common Ask questionnaire accordingly.

2.1 Building Archetype Definition for Thermal Efficiency

The definition document for buildings for thermal efficiency is used to specify how the building definitions used in the LAEP work correspond to the building definitions used in your local network operator's forecast modelling for domestic thermal efficiency modelling. **Note that the categorisation of a building for factors such as fuel used and age should reflect its category in the base year or at the time of being built, rather than the category at the end of the modelled period.**

Buildings should not move between categories over the modelled period.

Please refer to the [general guidance on completing definition templates](#) for advice on how to complete the template.

For this technology, multiple LAEP technologies cannot be listed against the same template technology description due to IP and methodology considerations, as the current scope of the Local Authority Common Ask does not include the stock data we would need to enable this in processing.

Note that separate definition documents are provided for building definitions in the heat pump uptake case and the domestic thermal efficiency case, as different definitions could be used in these two different cases. Both templates should be returned in all cases to ensure no ambiguity about how to interpret the data inputs.

laep_efficiency_building_archetype_definition	sfs_efficiency_building_archetype_definition	fuel	size	age	sfs_efficiency_building_archetype_definition_description
	DOMESTIC_FUEL_GAS_SIZE_SMALL_AGE_VERY OLD	Gas	Small	Very Old	Domestic building using natural gas as a primary fuel for heating, with 1-2 bedrooms (small), and which were built before 1918 (very old).

Figure 2: An example of the first line of the building archetype definition table for heating technologies.

Number of bedrooms is the metric used to determine the size of domestic buildings, which aligns with the DFES data that the LAEP data will be compared to. If the dataset you are using uses the metric of floorspace to determine size, and the building data cannot be linked to a metric of the number of bedrooms, then we would suggest using the following size bands to categorise your building sizes:

- 1-2 bedrooms: less than 75m²
- 3 bedrooms: between 75m² and 110 m²
- 4 or more bedrooms: more than 110m²

Note that due to the variation in the size of domestic buildings, this correlation is not exact, and should not be relied upon to accurately determine the number of bedrooms in a domestic building. Because

of this, we would only recommend using the size bands if there is no reasonable way for you to determine the sizes of your buildings in terms of number of bedrooms.

2.2 Domestic Building Thermal Efficiency Data Input

If using the unit of “Quantified Thermal Demand”,

“*efficiency_building_thermal_domestic_data_template_v7*” will contain the data describing domestic building thermal efficiency across the LAEP area between the base year and 2050, indexed by geographical area and building definition. The relevant demand referred to should be the annual thermal energy demand, rather than the peak demand. Note that the efficiency gains described here should be solely due to building fabric efficiency improvements, and should not include other thermal efficiency gains, such as appliances becoming more efficient. Please refer to the [general guidance on preparing technology specific data](#) for advice on how to compile the data and checks to perform.

If using the unit of “Thermal Efficiency Measures Adopted”,

“*efficiency_building_thermal_domestic_data_template_v7*” will instead contain data on the percentage of buildings with a measure installed. The columns “*geographical_area*” and “*laep_efficiency_building_archetype_definition*” specify where the measure uptake should apply, and the *laep_efficiency_measure_name* column should specify exactly which measure applies, matching exactly in name to a measure defined in the file “*efficiency_measures_domestic_data_template_v7*”. Note that the percentage of building stock values for domestic heating uptake used in “*efficiency_building_thermal_domestic_data_template_v7*” should then use units of percentage of buildings with the measure installed if possible. If using this unit, additionally check that each combination of geographical area, building archetype definition and measure have a corresponding row in the “*efficiency_measures_domestic_data_template_v7*” sheet. For clarity of combination, there should be no unmatched data in either sheet.

“*efficiency_building_thermal_domestic_data_template_v7*” should contain the following columns:

- *laep_name* – this should be the universal name for the data from this LAEP, as described in the general advice section.
- *geographical_area* – this should be an index for the data describing the area which the row corresponds to, the definition of which matches the definition declared in the Local Authority Common Ask questionnaire, and is either a standard geographical area, or a custom area for which boundary data has been supplied.
- *laep_efficiency_building_archetype_definition* – this should be an index for the data describing building type which the row corresponds to, the naming of which should exactly match the naming in the “*laep_heating_technology_building_archetype_definition*” column of the [building definition file for thermal efficiency](#).
- *laep_efficiency_measure_name* – If the preferred unit of domestic building annual thermal demand as a percentage of base year annual demand is used, this column should be left blank. Otherwise this should be an index for the data describing the efficiency measure applied to the percentage of building stock described which the row corresponds to, the naming of which should exactly match the naming in the “*laep_efficiency_measure_name*” column of the [definition file for efficiency measures](#).
- Annualised data columns from base year to 2050 – there should be as many columns as required to span, with one column for each year. The unit of each column should agree with the definition provided in the Local Authority Common Ask questionnaire. As examples:
 - If the preferred unit of “Quantified Thermal Demand” is used, the relative efficiency of the building compared to the base year as a percentage, so if thermal demand decreases by 5%, the value would be 95. The value of each row in the column should be greater than 0 and less than 100, and the value in the base year should be 100 in all cases if using “Quantified Thermal Demand”.

- If using the unit of “Thermal Efficiency Measures Adopted”, then data should still be given as a percentage, but as the percentage would refer to the number of buildings with a certain measure adopted, it no longer must be 100 in the base year.

laep_name	geographical_area	laep_efficiency_building_archetype_definition	laep_efficiency_measure_name	unit	2023
TO BE COMPLETED BY LAEP PRACTITIONER - ADD ROWS FOR EACH COMBINATION OF GEOGRAPHICAL AREA AND BUILDING ARCHETYPE IN YOUR LAEP	TO BE COMPLETED BY LAEP PRACTITIONER - ADD ROWS FOR EACH COMBINATION OF GEOGRAPHICAL AREA AND BUILDING ARCHETYPE IN YOUR LAEP	TO BE COMPLETED BY LAEP PRACTITIONER - ADD ROWS FOR EACH COMBINATION OF GEOGRAPHICAL AREA AND BUILDING ARCHETYPE IN YOUR LAEP	OPTIONAL - TO BE COMPLETED BY LAEP PRACTITIONER - IF USING, ADD ROWS FOR EACH COMBINATION OF GEOGRAPHICAL AREA AND BUILDING ARCHETYPE AND DEFINED EFFICIENCY MEASURE IN YOUR LAEP	As defined in data dictionary questionnaire	TO BE COMPLETED BY LAEP PRACTITIONER - COMPLETE ALL YEARS FOR WHICH YOUR LAEP REPORTS DATA

Figure 3: First row of domestic building thermal efficiency data template including first year of data, with comments detailing how data should be entered.

2.3 Domestic Building Thermal Efficiency Measures Data

NOTE: If the preferred unit domestic building annual thermal demand as a percentage of base year annual demand is used, then the Domestic Building Thermal Efficiency Measures Data file does not need to be provided.

The file “efficiency_measures_domestic_data_template_v7” will contain the data describing the impact of implementing user defined efficiency measures on the thermal demand of a building, indexed by geographical area and building definition. The relevant demand referred to should be the annual thermal energy demand, rather than the peak demand. These measures can then be referenced in the Domestic Building Thermal Efficiency Data Input to describe the percentage of building stock that have these measures implemented on an annual basis. Please refer to the [general guidance on preparing technology specific data](#) for advice on how to compile the data and checks to perform.

Note that to ensure clarity of communication, each combination of geographical area, building archetype definition and measure should have a corresponding row in the “efficiency_building_thermal_domestic_data_template_v7” sheet.

A file named “efficiency_measures_domestic_data_defaults_template_v7” has also been provided, which gives suggested reference measures and their associated impacts. This is intended to provide a starting point if the unit of “Thermal Efficiency Measures Adopted” is used, but the impact of the measures adopted has not been quantified in the LAEP. Note that only one of “efficiency_measures_domestic_data_template_v7” or “efficiency_measures_domestic_data_defaults_template_v7” should be returned. The format of the data provided should be the same regardless of the data file used as a base.

The file should contain the following columns:

- **laep_name** – this should be the universal name for the data from this LAEP, as described in the general advice section.
- **geographical_area** – this should be an index for the data describing the area which the row corresponds to, the definition of which matches the definition declared in the Local Authority Common Ask questionnaire, and is either a standard geographical area, or a custom area for which boundary data has been supplied.
- **laep_efficiency_building_archetype_definition** – this should be an index for the data describing building type which the row corresponds to, the naming of which should exactly match the naming in the “laep_heating_technology_building_archetype_definition” column of the [building definition file for thermal efficiency](#).
- **laep_efficiency_measure_name** – this should be a standard name for the efficiency measure used in your LAEP and should be referenced in the Domestic Building Thermal Efficiency Data Input using this exact name.
- **laep_efficiency_measure_impact** – this should be the percentage reduction in thermal demand experienced by a building in the relevant geographic area and with the relevant

building archetype with this measure implemented. The value of each row in the column should be greater than 0 and less than 100.

laep_name	geographical_area	laep_efficiency_building_archetype_definition	laep_efficiency_measure_name	laep_efficiency_measure_impact
TO BE COMPLETED BY LAEP PRACTITIONER - ADD ROWS FOR EACH COMBINATION OF GEOGRAPHICAL AREA AND BUILDING ARCHETYPE IN YOUR LAEP	TO BE COMPLETED BY LAEP PRACTITIONER - ADD ROWS FOR EACH COMBINATION OF GEOGRAPHICAL AREA AND BUILDING ARCHETYPE IN YOUR LAEP	TO BE COMPLETED BY LAEP PRACTITIONER - ADD ROWS FOR EACH COMBINATION OF GEOGRAPHICAL AREA AND BUILDING ARCHETYPE IN YOUR LAEP	TO BE COMPLETED BY LAEP PRACTITIONER - ENTER A UNIQUE NAME FOR EACH EFFICIENCY MEASURE MODELLED	TO BE COMPLETED BY LAEP PRACTITIONER - ENTER A PERCENTAGE VALUE FOR THE REDUCTION IN DEMAND

Figure 4: First row of domestic thermal efficiency measures data template, with comments detailing how data should be entered.