



Department  
of Energy &  
Climate Change

# Assessing the cost effectiveness of individual metering: Energy demand benchmarks

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# Contents

1. Calculation of benchmark heat demands for unmetered domestic properties .....	4
2. Calculation of benchmark heat demands for unmetered non-domestic properties .....	5
3. Weather correction factors.....	7
4. Annex .....	8

# 1. Calculation of benchmark heat demands for unmetered domestic properties

The following benchmark heat demands for unmetered domestic properties include both space heating and hot water demand. The benchmarks are for use with the assessment criteria set out in Schedule 1 (Determination of cost effectiveness and technical feasibility) of 'The Heat Network (Metering and Billing) Regulations 2014'.

Final benchmark heat demands for each property type and age band must be adjusted by the regional weather correction factors presented in Table 3.

**Table 1: Annual domestic energy demand (kWh/year) for heating and hot water by property type and age.**

<b>Age band</b>	<b>Flat</b>	<b>Terrace</b>	<b>Semi-detached</b>	<b>Detached</b>
Pre 1917	10,581	16,042	20,476	30,714
1918 – 1938	9,755	14,640	18,652	27,977
1939 – 1959	8,994	13,182	16,688	25,033
1960 – 1975	8,653	12,710	16,065	24,098
1976 – 1982	8,101	11,740	14,749	22,123
1983 – 1989	8,331	11,989	15,072	22,608
1990 – 1999	6,828	9,479	11,728	17,592
Post 2000	6,218	8,371	10,306	15,459

Source: DECC Impact Assessment on the metering requirements for heating, cooling and hot water networks

<https://www.gov.uk/government/consultations/implementing-the-energy-efficiency-directive-metering-and-billing-of-heating-and-cooling>

## 2. Calculation of benchmark heat demands for unmetered non-domestic properties

The following benchmark heat demands for unmetered non-domestic properties include both space heating and hot water demand. The benchmarks are for use with the assessment criteria set out in Schedule 1 (Determination of cost effectiveness and technical feasibility) of 'The of The Heat Network (Metering and Billing) Regulations 2014'.

Final benchmark heat demands for each category of use must be adjusted by the regional weather correction factors in Table 3. This correction factor should be applied to only the proportion of the benchmark related to degree days.

**Table 2: Non-domestic heat demand (kWh/m<sup>2</sup>/year) for heating and hot water by category of use**

<b>Category of non-domestic use*</b>	<b>Fossil-thermal typical benchmark (kWh/m<sup>2</sup>)</b>	<b>% fossil-thermal pro-rated to degree days</b>
General office	120	55
High street agency	120	55
General retail	170	55
Large non-food shop	170	55
Small food store	170	55
Large food store	105	55
Restaurant	370	30
Bar, pub or licensed club	350	40
Hotel	330	45
Cultural activities, Clinics and Terminals	200	55

Entertainment halls	420	55
Swimming pool centre	1130	55
Fitness and health centre	440	40
Dry sports and leisure facility	330	55
Public buildings with light usage	105	55
Schools and seasonal public buildings	150	55
University campus	240	55
Clinic	200	55
Hospital (clinical and research)	420	55
Long term residential	420	55
General accommodation	300	55
Emergency services	390	55
Laboratory or operating theatre	160	55
Public waiting or circulation	120	55
Terminal	200	55
Workshop	180	55

Source: CIBSE TM46 2008 <http://www.cibse.org/knowledge/cibse-tm/tm46-energy-benchmarks>

\*See Annex for further detail on the definition of non-domestic categories

### 3. Weather correction factors for benchmark heat demands

The following weather correction factors should be applied to the domestic and non-domestic benchmark heat demands to achieve final benchmark figures, as set out in Table 1 and Table 2 above.

**Table 3: Weather correction factors by region**

<b>Region</b>	<b>Difference (%)</b>
Thames	-15
South East England	0
Southern England	-5
South West England	-18
Severn	-12
Midlands	3
West Pennines	1
NW England / SW Scotland	13
Borders	12
North East England	11
East Pennines	2
East Anglia	4
West Scotland	12
East Scotland	12
North East Scotland	12
Wales	-3
Northern Ireland	7
North West Scotland	12

Source: CIBSE TM46 2008 <http://www.cibse.org/knowledge/cibse-tm/tm46-energy-benchmarks> Appendix A1

## A) Benchmark categories for non-domestic building use with further category details

Name and description			Allocation guides			Further category details		
Name	Description	Space usage	Operational schedule	Distinguishing features	Services include	May be part of mixed use with areas below	Summary of allowable energy uses	Representative buildings
General office	General office and commercial working areas	Mainly by employees, for sedentary desk based activities. Includes meeting and conference facilities	Weekdays and early evenings	Relative uniformity of occupancy, density, conditions, schedule and appliances	Heating, lighting, cooling, employee appliances, standard IT, basic tearoom	Covered car park, staff restaurant	Regional server, trading floor	General office benchmark category for all offices, whether air conditioned or not, Town Halls, architects, various business services that do not include retail functions
High street agency	High street agency	By employees mainly for desk-based activities and off street visitors - public area and back office	Weekdays and early evenings, commonly part of all of weekend	Office type of activities, with retail street frontage and consequent infiltration and glazing losses	Heating, lighting, cooling, employee appliances, standard IT, basic tearoom			Bank branches, estate agents, travel agents, legal, insurance and advertising services, off-street professional services, Post Offices, betting shops
General retail	General street retail and services	Mainly by clients, customers and visitors for a service activity – some facilities required for employees	Weekdays and early evenings, commonly part or all of weekend	Basic heating, lighting, cooling for off street premises that may contain a wide variety of activities besides sale of goods	Heating, lighting, cooling, appliances for small number of employees			High street store of local store. Corner shops, amusement arcades, takeaways, hairdressers, laundries, laundrettes, dry cleaners, hire premises, indoor markets
Large non-food shop	Retail warehouse or other large non-food store	Mainly for customers for purchasing goods – some facilities required for employees	Typically week and weekend days	Large, and tends to be solely used for retailing	Heating, lighting, cooling, appliances for small number of employees			Retail warehouses or shed, department stores, hypermarket, large showrooms
Small food store	Small food store	Mainly by customers for purchasing goods – some facilities required for employees	Typically week and weekend days	Greater needs for refrigeration of goods than other shops	Heating, lighting, display cabinets, food storage, employee appliances			Food stores, green grocers, fish shops, butchers, delicatessens
Large food store	Supermarket or other large food store	Mainly by customers for purchasing goods – some facilities required for employees	Typically week and weekend days, may be used in evenings, some are 24/7 operations	Greater needs for refrigeration of goods, and larger, than other shops	Heating, lighting, display cabinets, food storage, employee appliances	Covered car park	Bakery oven	Supermarkets and freezer centres
Restaurant	Restaurant	Storage and preparation of food which is then cooked and served to users, seating space for eating is provided	There is a wide variety of operational schedules, from selected portions of weekdays to	Assumes minimal reheat of food	Heating, lighting, cooling, food storage, heating of pre-prepared food		Cooking equipment in a catering kitchen	Cafes, restaurants, canteens, refectories, mess, halls



			24/7 operation					
Bar, pub or licensed club	Bar, pub or club	Serving drinks and snacks, with standing and sitting areas for customers	Open to public or members, day or evening	Major activity is the bar and associated areas	Heating, lighting, cooling, some office appliances, snack provision			Pub, licensed clubs, members clubs, wine bars.
Hotel	Hotel or boarding house	Primarily the provision of short-term accommodation and hygiene facilities	Primarily used in evenings	Provision for paid short-term accommodation	Heating, lighting, cooling, some office appliances snack provisions	Swimming pool, fitness and health centre, restaurant, general office (the conference facility)		All hotel types, guest houses, motels
Cultural activities	Museum, art gallery or other public building with normal occupancy	Spaces for displaying and viewing object, with associated office and storage facilities	Daytime use, similar to office hours but more likely to be open in weekends	Activity is office like in its requirements but with some additional conditioning requirements for display and storage of artefacts	Heating, lighting, cooling, humidity control			Municipal museums, libraries and galleries, higher education arts buildings
Entertainment halls	Entertainment halls	Large assembly and seating area, with associated ticketing and snack services, for performance events and films	Mainly in evenings, some daytime use. All days of week	Tend to be large halls, mainly use in evenings	Heating, lighting, cooling of main entertainment spaces, and circulation ticketing and snacks provision			Cinemas, theatres, concert halls. Bingo halls
Swimming pool centre	Swimming pool hall, changing and ancillaries	Swimming pool with associated facilities	Ranges from occasional use to daily and evening	Pool hall is the dominant space use – may have small café and fitness room	Heating, lighting, cooling of all spaces. Office appliances, showers, snack provision and bar			Swimming pool centre without sports facilities
Fitness and health centre	Fitness centre	Fitness, aerobics, dance and solarium/sauna facilities	Typically daily and evenings	Provision of sports and entertainment equipment with generally high energy usage and internal gains	Heating, lighting, cooling of all spaces. Office appliances, showers, snack provision and bar			Fitness centre, health centre
Dry sports and leisure activity	Dry sports and leisure activity	Dry sports and club house buildings – for a combined leisure centre include pool, etc	Ranges from occasional use to daily and evening	Provision of sports to support separated sporting and entertainment activities often lightly serviced	Heating, lighting, and basic office equipment	Swimming pool, fitness and health centre	Sports flood lighting	Dry sports hall, sports grounds with changing rooms, tennis courts with office, speedway tracks, stadiums, pavilions
Public buildings with light usage	Light use public and institutional buildings	Variety of facilities and services provided with generally public access when in use	Intermittent usage	Lightly serviced or lightly used	Heating and lighting			Churches, club houses, village halls
Schools and seasonal public buildings	Public buildings nominally used for part of the year	Teaching and community activities	Weekday usage for part of the year	Public buildings with part annual occupancy	Heating, lighting, and basic office equipment, teaching equipment	Restaurant (dining hall), swimming pool		Primary and secondary schools, nurseries, crèches, youth centres and community centres
University campus	University campus	Lecture theatres, offices, workshops, eating places, laboratories and	Week days and evenings	Large floor space and variety of activities	Heating, lighting, cooling, office and teaching equipment	Laboratory, restaurant	Furnace or forming plant	Typical campus mix for further and higher education universities and colleges

		other activities						
Clinic	Health centres, clinics and surgeries	Provision of primary health care	Usually week days and early evenings	Daytime use, essentially office hours, but needs to provide for high public use, generally by appointment	Heating, lighting, cooling, hot water services			Doctors surgeries, health clinics, veterinary surgeries, dentist
Hospital, clinical and research	Clinical and research hospital	Mainly space for medical care with 24-hour accommodation for patients, with associated operating theatres, laboratories, offices and workshops	Continuous for the majority of the facility	24-hour accommodation with stringent environmental conditions, ventilation control, quarantine, and high occupant servicing needs	All services	Laboratory or operating theatre, restaurant	Furnace or forming plant	Acute hospital, specialist hospital, teaching hospital and maternity hospital
Long-term residential	Long-term residential accommodation	Full accommodation, including sleeping space, day time space, all domestic facilities, some office facilities	Continuous	24-hour fully conditioned and serviced accommodation	Heating, lighting, cooling, appliances, food and hot water services, entertainment, laundry	Restaurant (dining hall)		Residential home, homeless unit, cottage hospital and long-stay hospital, detention centre and prisons
General accommodation	General accommodation	Space for sleeping, showers, basic domestic services	Non-continuous occupancy, often used in the evenings	Slow turnover of occupants requires fewer facilities and less laundry than for example a hotel	Heating, lighting, cooling, laundry, and drying rooms			Boarding houses, university and school hostels, homeless units, nursing homes
Emergency services	Emergency services	Offices, accommodation, food services, cells, garaging and other activities as required	Normally continuous, some stations closed in the evenings and weekends	Provision of a variety of services that would be in separate category in other parts of non-domestic stock (eg accommodation, offices and vehicle garaging)	Heating, lighting, cooling, food services, office and training equipment			Police, fire and ambulance stations
Laboratory or operating theatre	Laboratory or operating theatre	Special equipment and conditions in at least 30% of floor areas	Either weekday or 24-hour multi-shift	Spaces requiring controlled ventilation and conditions	Heating, lighting, ventilation		Furnace or forming plant	Research chemical laboratory, hospital operating theatre
Public waiting or circulation	Bus or train station, shopping centre mall	Public circulation or waiting facilities	Variable – intermittent to continuous	Waiting and circulation areas, booking desks, boarding facilities	Heating, lighting, cooling, snack services	Retail		Bus stations, local train stations, shopping centre malls
Terminal	Regional transport terminal with concourse	Waiting and boarding facilities for air, ship or regional/international train travel	Daytime and evenings each day to near continuous	Concourse areas, booking areas, identification, customs, security and baggage handling	Heating, lighting, cooling, baggage handling	Retail, restaurant, covered car park		Large train stations, airport terminals
Workshop	Workshop or open working area (not office)	Facilities for light mechanical work	Generally working week but can be multi-shift	Goods access, mechanical tools and facilities	Industrial heating and lighting standards		Furnace or forming plant	Workshops, vehicle repair
Storage facility	Storage warehouse or depot	Storage and goods handling areas	Continuous storage with weekday or multi-	Lightly serviced long-term storage areas	Low-level lighting and heating in storage areas			Distribution warehouse without public areas, and local authority depot

			shift goods handling					
Cold storage	Refrigerated warehouse	Refrigerated storage and goods handling areas	Continuous storage with weekday or multi-shift goods handling	Refrigerated long-term storage areas	Refrigeration, lighting and heating of handling areas		Blast chilling or freezing plant	Refrigerated warehouse without public areas

Source: CIBSE TM46 2008 <http://www.cibse.org/knowledge/cibse-tm/tm46-energy-benchmarks>

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