Energy Performance Indicators and Benchmarking

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Contents

- About IESD
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- Benchmarking in detail
- Some examples of things we can do with energy data

Who we are:

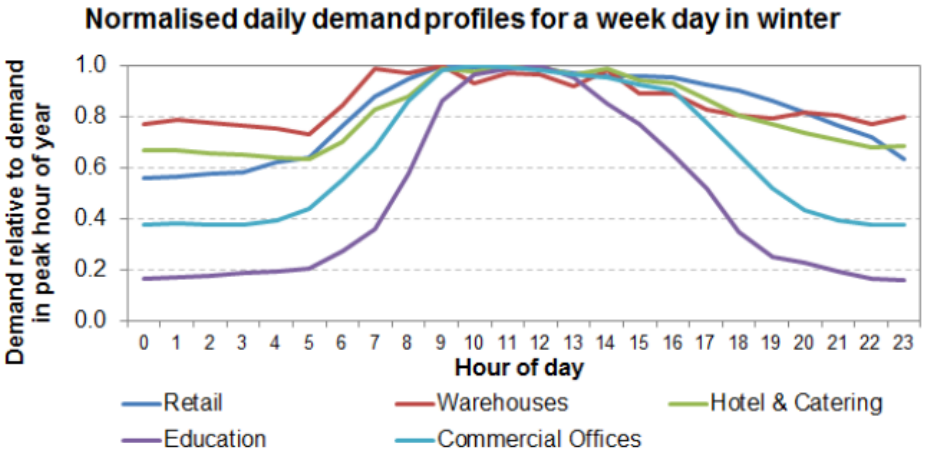
- Energy efficiency, modelling, measurement and analysis
- One of the few UK research institutes with the knowledge to research carbon reduction in the built environment at various scales:
  - City scale (e.g. smart grids, mini-grids)
  - Existing buildings
    - Domestic (including retrofit)
    - Non-domestic (e.g. factories, schools, hospitals)
  - Buildings in use (plant and equipment, behaviour)

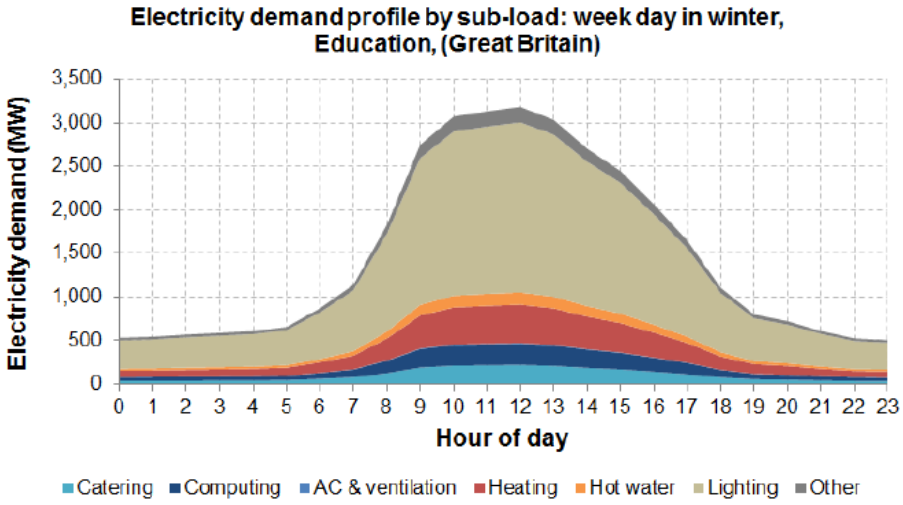
IESD Figures

- Part of DeMontfort University, Leicester
- 14 full-time research active staff
- 13 part time and contract researchers
- 45 PhD students
- Three MSc courses and one BSc

Non-domestic Electricity Profiles

- Project for Ofgem
  - Subcontract to Element Energy
- From large datasets, produced typical non-domestic building profiles
- First time these widely available in UK
- Produced for demand-side response analysis



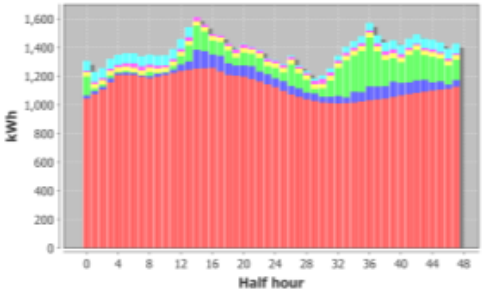


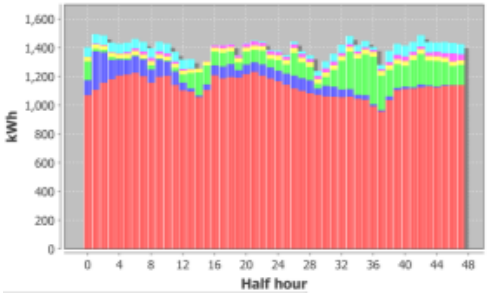
ESCoBox

- EPSRC (+DECC & DfID) - £0.8M
- Platform for establishing and growing ‘smart’ micro-grid systems in the developing world
  - Providing energy for income generation and community development
  - Cashless billing and micro-payment via MPesa
- Partners:
  - De Montfort University, UK - *Lead*
  - Newcastle University, UK
  - University of Nairobi, Kenya
  - Institute of Sustainable Development, UK
  - access:energy, Kenya
  - Practical Action, UK
  - BBOXX, UK
  - Ashden, UK

AMEN

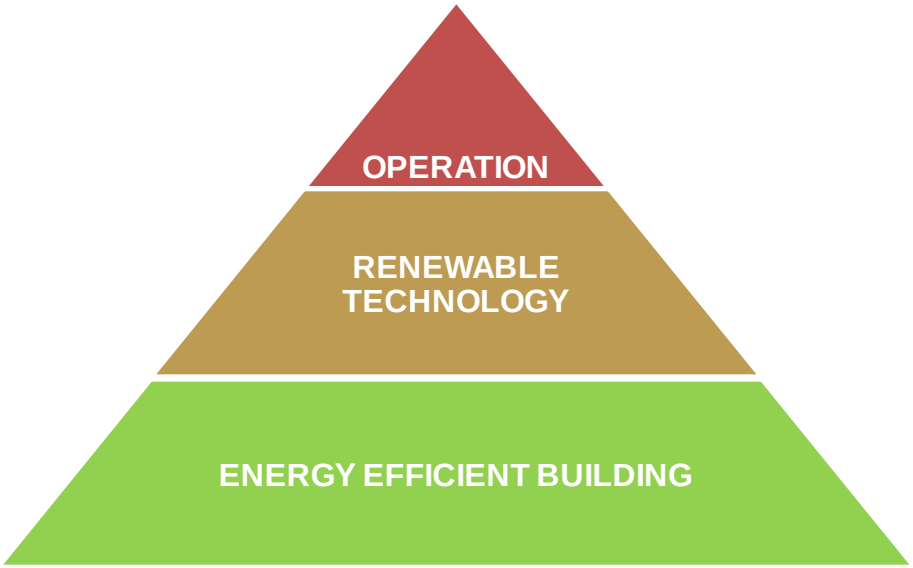
- EPSRC - £562,000
- Whole system **A**gent-based **M**odelling of **E**lectricity **N**etwork
- Investigating paths to smart decarbonised electricity grid
- Includes demand response
- Industrial partner E.On
- Builds on previous project (CASCADE)
- Includes behaviour (firms and households), electrical model and market





Low Carbon Schools

- Through a Knowledge Exchange Partnership, IESD is helping Leicester City Council to deliver energy efficient and low carbon schools fit for the 21st Century

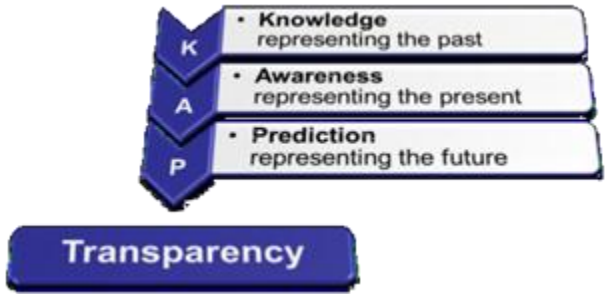


KAP

- EU 7th Framework - €7.5M
- IESD working on energy awareness
- Production and technical building services (TBS)
- Display for awareness & decision support
- Industrial partners include Intel, SAP, Nissan and Volvo
- Complex Event Processing (CEP) for monitoring and analysis of data streams

KAP
knowledge › awareness › prediction

SEVENTH FRAMEWORK PROGRAMME



Terms and definitions

- Data
- Benchmarking
- Normalised production
- Degree day
- Regression

Energy Data

- Timestamp / meter reading time /date
- Meter reading
- Units
- Multiplier
- Conversion to kWh

Supporting data

- Weather data or location
- Production data
- Building floor area
- Building material
- Industry type
- Description of what is metered (zone, machinery etc)

Benchmarking

- Lets us compare similar businesses
- Energy use is taken, vs. a qualifier

For example:

kWh/m^2

GJ/tonne

Benchmarking

- Typical and good practice figures are used to check performance

Category	Electricity kWh/m^2	Fossil Fuel kWh/m^2	
Town Hall	111	205	Typical
Town Hall	84	138	Good practice
Air conditioned civic offices *	203	160	Typical
Air conditioned civic offices *	115	87	Good practice
Naturally ventilated civic offices *	81	143	Typical
Naturally ventilated civic offices *	51	75	Good practice
Dry sports centre †	105	343	Typical
Dry sports centre †	64	158	Good practice

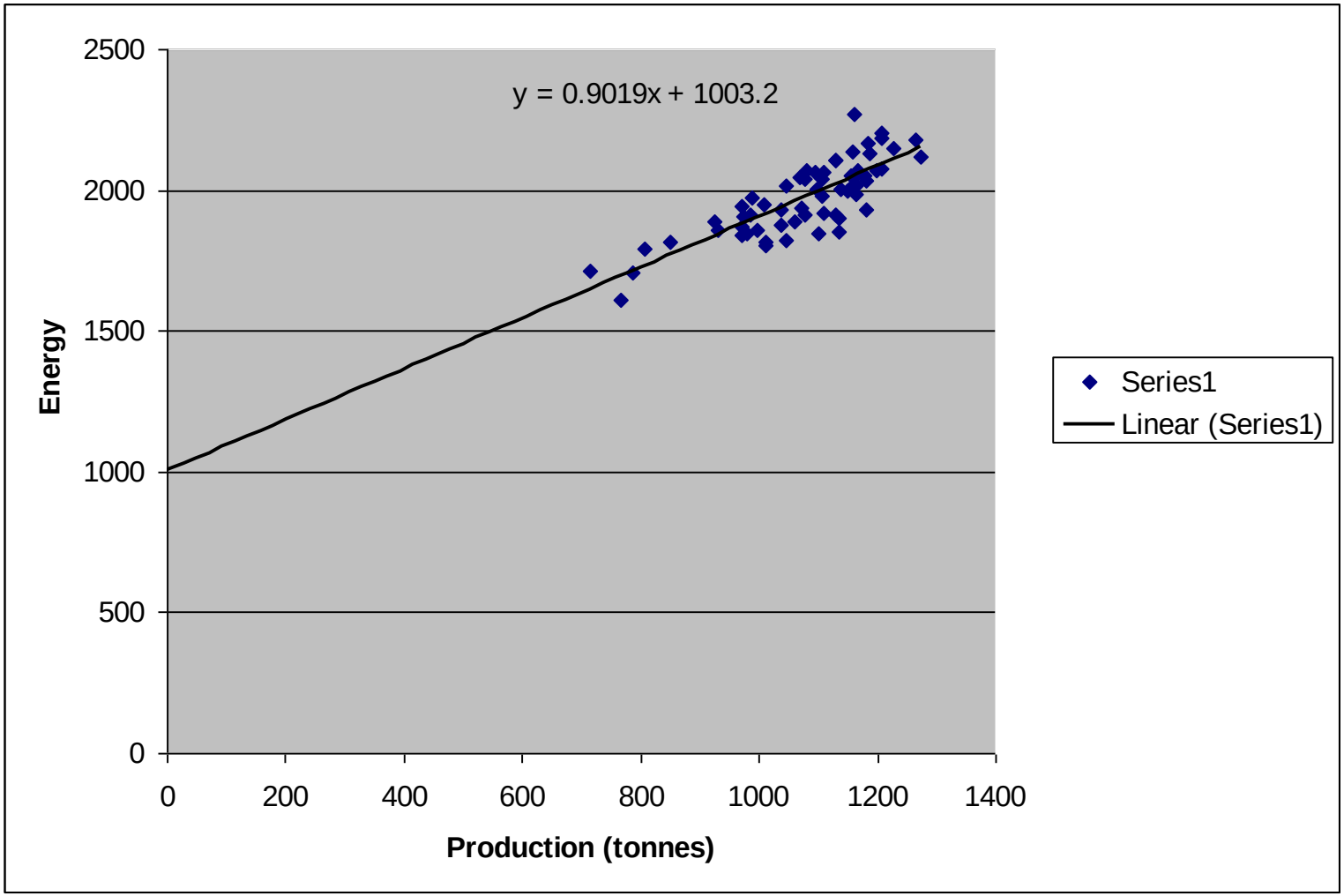
Normalised production

We compare *actual* energy use
(for example, gas use in kWh)

..To *expected* energy use from a process
(for example, tonnes of material produced)

= Key Performance Indicators

Example from industry

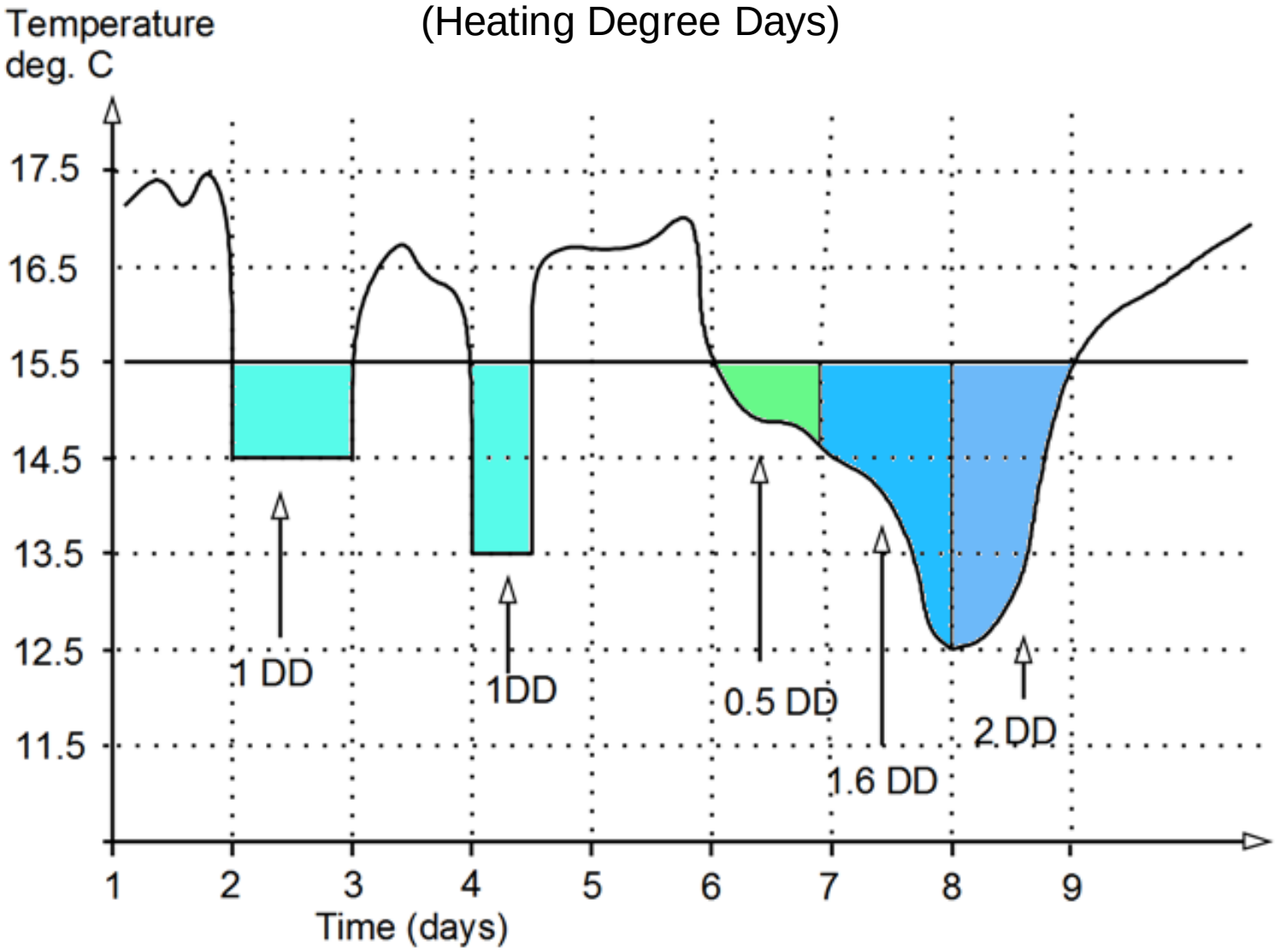


Degree Days

- Are a measure of the predicted heating or cooling demand
- Used in benchmarking
- Used in subsequent analysis

Degree Days

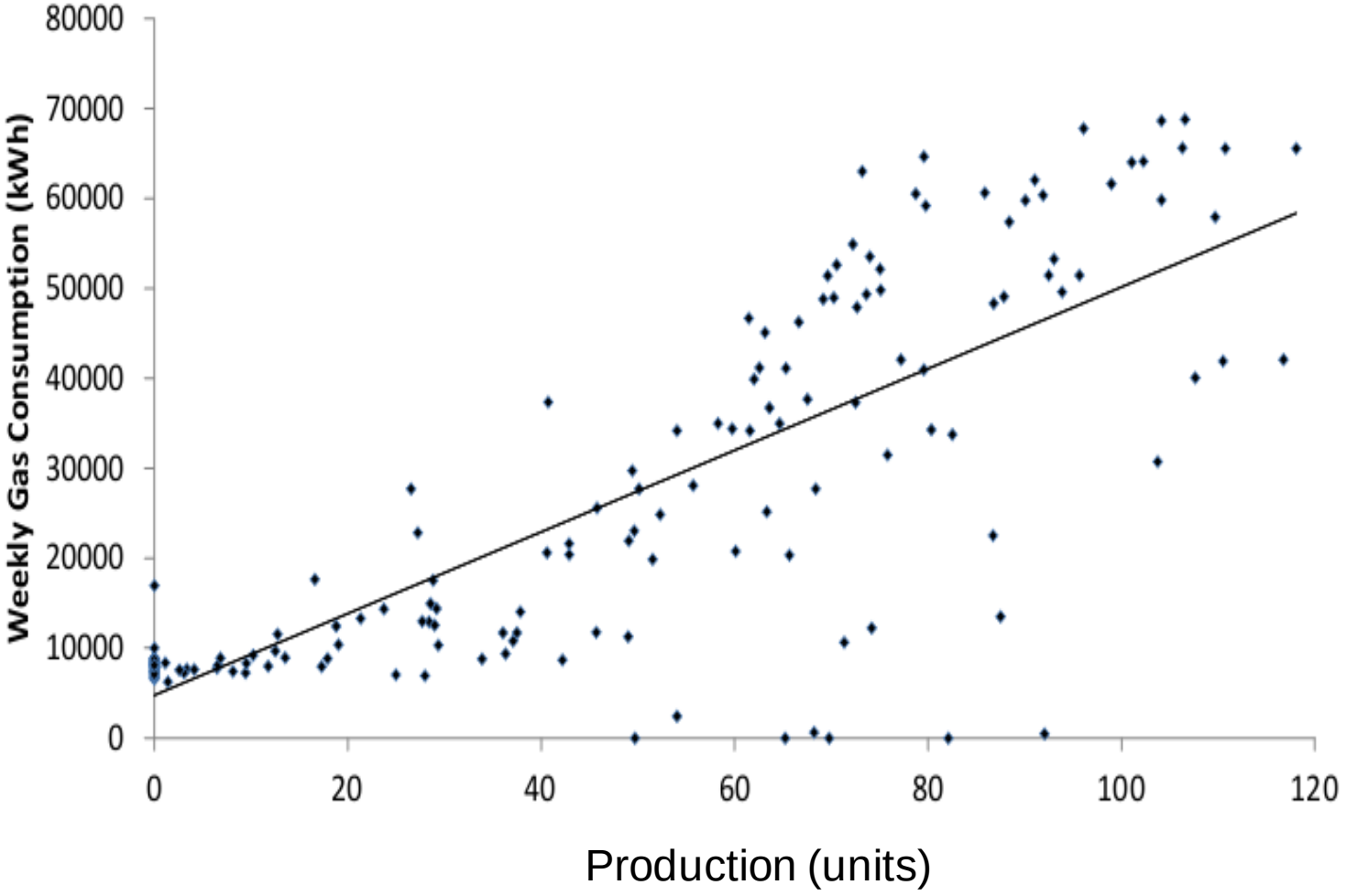
(Heating Degree Days)



Regression Analysis

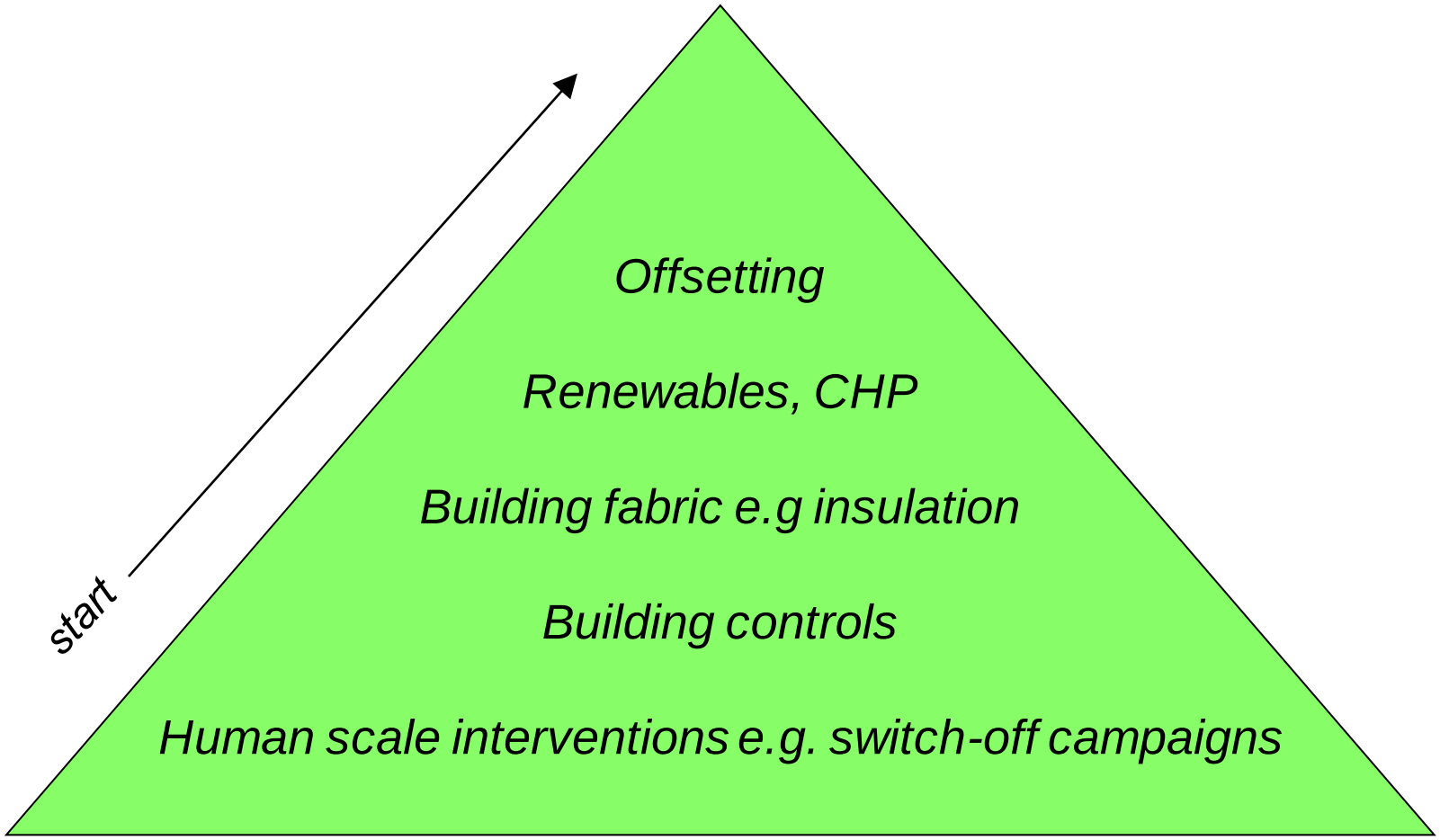
- Uses energy data to make energy saving recommendations
- Typically around 12 month's data may start to produce useful results
- Works well with degree days (e.g. for offices) or production data (e.g. for manufacturing)
- **Compares the expected energy demand against actual energy use.**

Example using real data

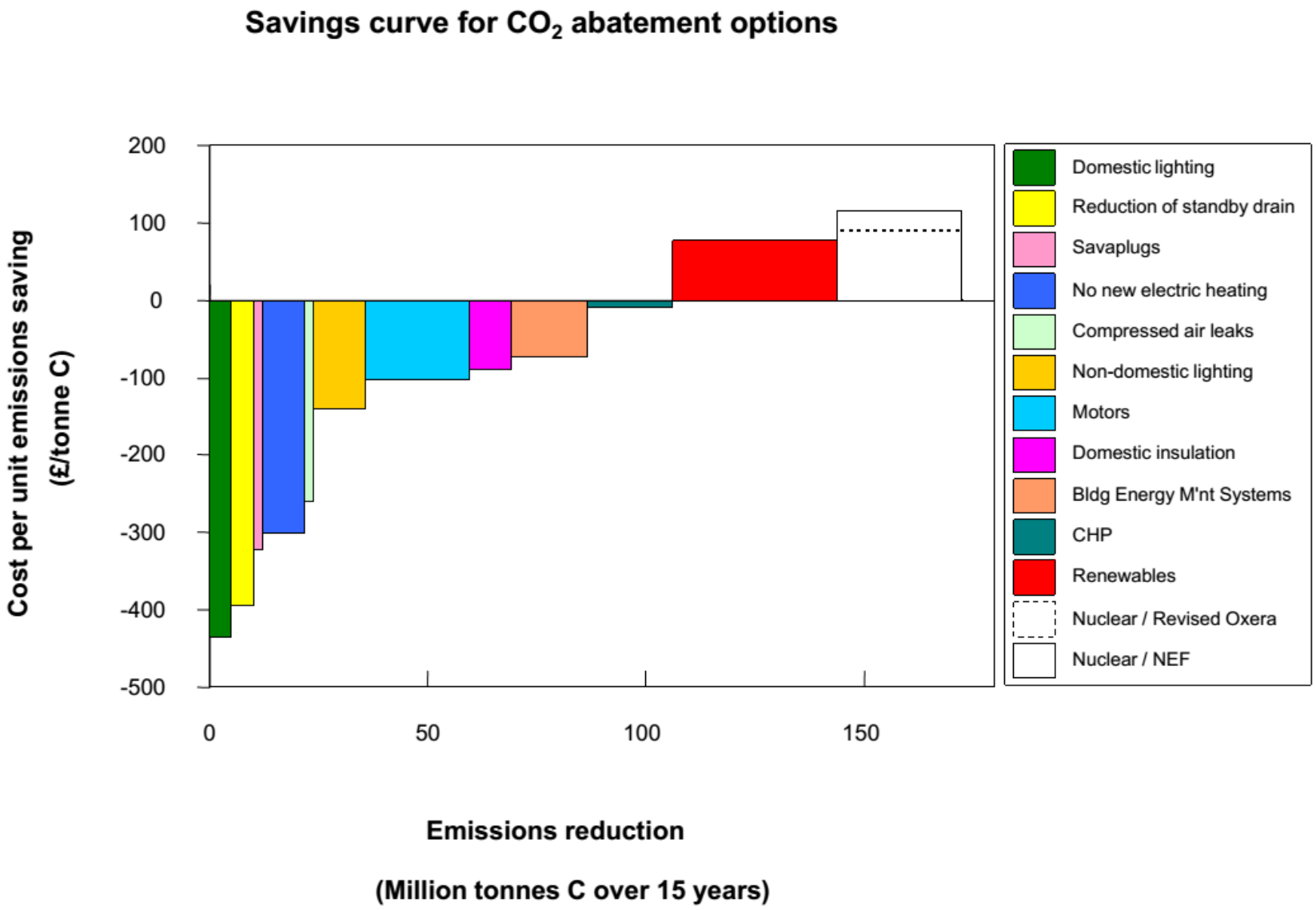


Energy Saving Measures

Energy pyramid



Energy Saving Measures



Benchmarking in detail

Benchmarking

(From Carbon Trust Guide)

2 Introduction to benchmarks for buildings

The aims of this guide

- Enable fair comparisons of energy use within the different types of building categories against typical and good practice energy consumption benchmarks. These are based on data collected from a sample of local authority buildings
- Provide a method to prioritise which buildings/sites need attention to improve their energy consumption performance
- Promote the benefits of energy efficiency and provide practical advice on improving performance within buildings.

- Percentage improvement targets look back at past performance but give no indication of absolute performance for a particular building nor the potential for future savings
- Past performance may have been particularly poor so that a given absolute improvement might appear good in percentage terms. In the past, blanket percentage improvement targets have often been set for several buildings within a portfolio. Sites that have performed poorly find it easy to achieve the set target, and sites that have performed well find it difficult. This is unfair to sites which have put effort into energy efficiency

- Target percentage savings for the whole portfolio could be achieved when the authority out-sources certain services or mothballs buildings, rather than by improving energy efficiency. Therefore, a percentage improvement on its own is no indication that the portfolio is performing well.

In contrast, benchmarking is a useful tool because:

- Performance can be measured against national standards rather than relative to past performance
- Future energy saving potential can be assessed
- Effort can be targeted on areas of need
- Over-investment can be avoided in buildings already performing well
- Buildings on the same site can be compared
- Similar buildings on different sites can be compared
- Sensible and appropriate targets can be set for each site.

Note on the following few slides:

- The next few slides serve as an introduction to the process of energy analysis to show how useful it is
- But there will be no need to apply these methods – DMU can do this, so there is no need to take notes.

Method:

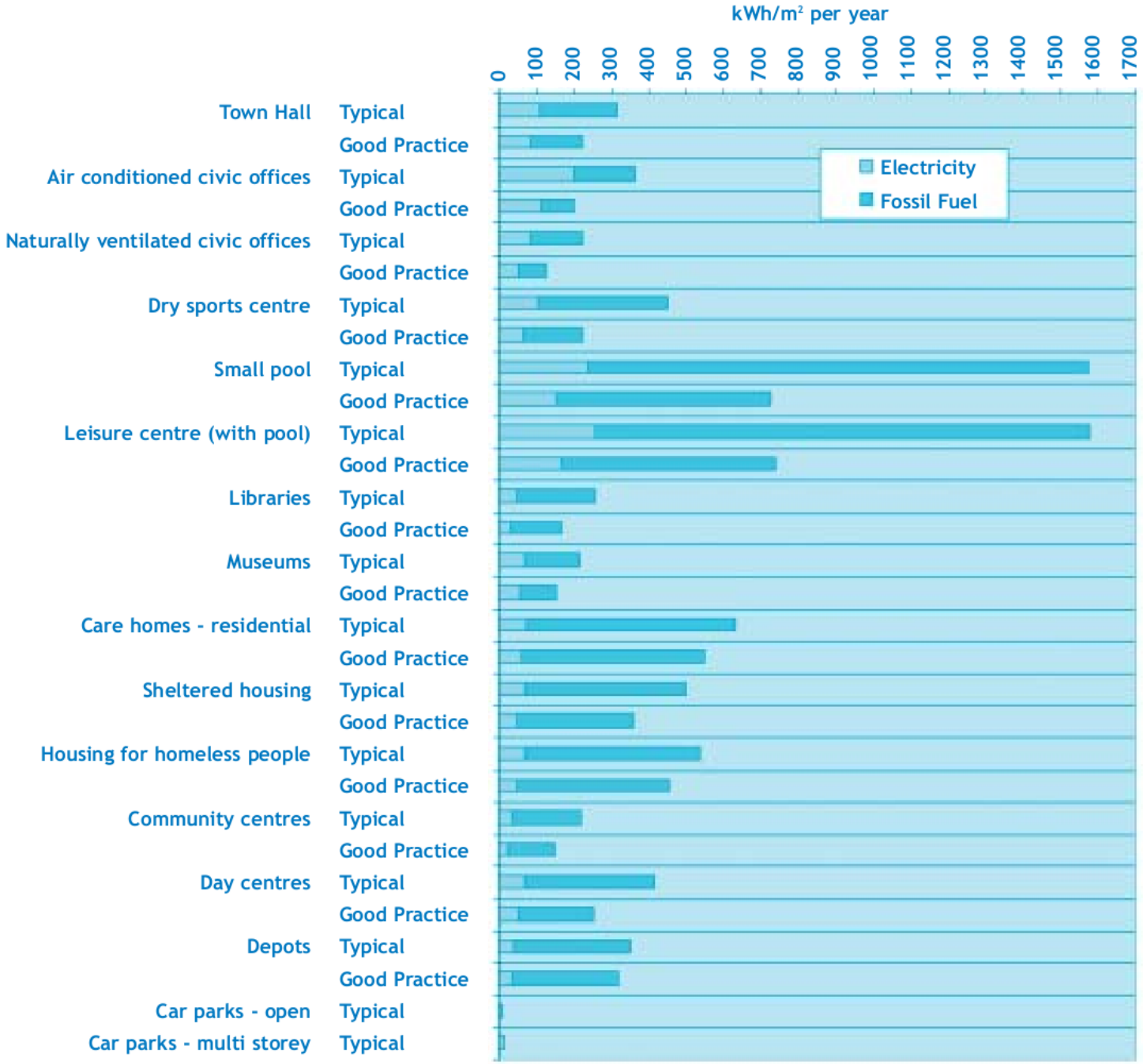
- Gather data
- Convert to kWh
- Adjust space heating energy to account for the weather
- Determine floor area (gross internal area)
- Apply weighting depending on treatment (heated, naturally ventilated, air conditioned etc)
- Calculate performance indicators

Step 4 Calculate performance indicators

Performance indicators for fossil fuel and electricity can now be calculated.

$$\text{Fossil-fuel performance indicator} = \frac{\text{Weather corrected annual fossil-fuel consumption for heating} + \text{uncorrected annual fossil-fuel consumption for hot water}}{\text{GIA floor area}} \quad (\text{kWh/m}^2\text{/annum})$$

$$\text{Electricity performance indicator} = \frac{\text{Annual electricity consumption}}{\text{GIA floor area}} \quad (\text{kWh/m}^2\text{/annum})$$


kWh/m² per year
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
Electricity
Fossil Fuel
Town Hall
Typical
Good Practice
Air conditioned civic offices
Typical
Good Practice
Naturally ventilated civic offices
Typical
Good Practice
Dry sports centre
Typical
Good Practice
Small pool
Typical
Good Practice
Leisure centre (with pool)
Typical
Good Practice
Libraries
Typical
Good Practice
Museums
Typical
Good Practice
Care homes - residential
Typical
Good Practice
Sheltered housing
Typical
Good Practice
Housing for homeless people
Typical
Good Practice
Community centres
Typical
Good Practice
Day centres
Typical
Good Practice
Depots
Typical
Good Practice
Car parks - open
Typical
Car parks - multi storey
Typical

Typical benchmarks

- The next few slides give examples of publically available benchmarking information

Category	Electricity kWh/m^2	Fossil Fuel kWh/m^2	
Town Hall	111	205	Typical
Town Hall	84	138	Good practice
Air conditioned civic offices *	203	160	Typical
Air conditioned civic offices *	115	87	Good practice
Naturally ventilated civic offices *	81	143	Typical
Naturally ventilated civic offices *	51	75	Good practice
Dry sports centre †	105	343	Typical
Dry sports centre †	64	158	Good practice
Small pool †	237	1336	Typical
Small pool †	152	573	Good practice
Leisure centre (with pool) †	258	1321	Typical
Leisure centre (with pool) †	164	573	Good practice
Libraries	46	210	Typical
Libraries	32	133	Good practice
Museums	70	142	Typical
Museums	57	96	Good practice
Care homes - residential	75	555	Typical
Care homes - residential	59	492	Good practice
Sheltered housing	68	432	Typical
Sheltered housing	46	314	Good practice
Housing units for homeless people	71	467	Typical
Housing units for homeless people	48	408	Good practice
Community centres	33	187	Typical
Community centres	22	125	Good practice
Day centres	68	349	Typical
Day centres	51	203	Good practice
Depots	39	311	Typical
Depots	37	283	Good practice
Car parks - open	1		Typical
Car parks - multi storey	15 §		Typical

Table 4 Typical and good practice energy performance benchmarks for different building types, related to Gross Internal Area

CIBSE TM46

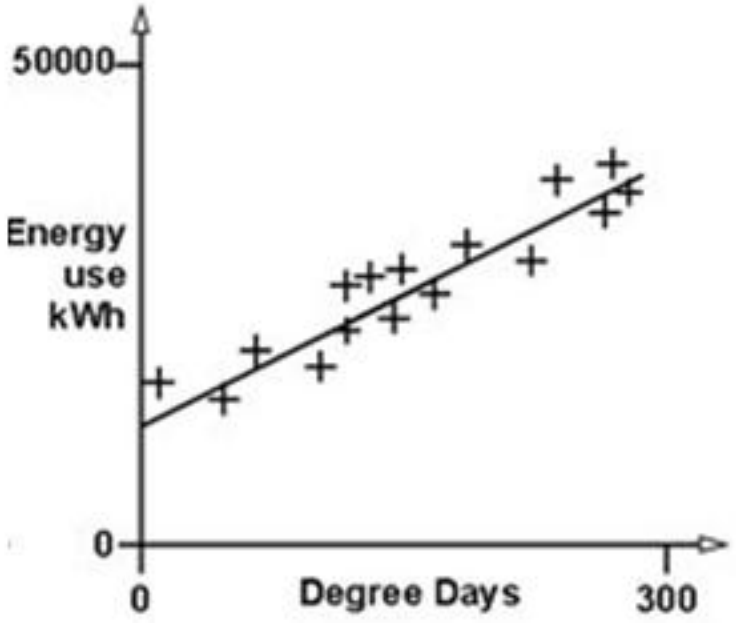
Table 1 Benchmark categories and values; (a) allocation guides and further category details

[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]
Name and description			Allocation guides			Further category details			
Category	Name	Brief description	Space usage	Operational schedule	Distinguishing features	Services included	May be part of mixed use with areas below	Summary of allowable special energy uses	Representative buildings
1	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 tea room	Covered car park, staff restaurant	Regional server room, 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
2	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 or 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 tea room			Bank branches, estate agents, travel agents, legal, insurance and advertising services, off-street professional services, Post Offices, betting shops
3	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 or local stores. Corner shops, amusement arcades, takeaways, hairdressers, laundries, launderettes, dry cleaners, hire premises, indoor markets
4	Large non-food shop	Retail warehouse or other large non-food store	Mainly by 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, hypermarkets, large showrooms
5	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
6	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
7	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 24/7 operation	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
8	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 and evening	Major activity is the bar and associated areas	Heating, lighting, cooling, some office appliances, snack provision			Pubs licensed clubs, members clubs, wine bars
9	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, laundry services	Swimming pool, fitness and health centre, restaurant, general office (for conference facility)		All hotel types, guest houses, motels
10	Cultural activities	Museum, art gallery or other public building with normal occupancy	Spaces for displaying and viewing objects, 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
11	Entertainment halls	Entertainment halls	Large assembly and seating areas, 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 used in evenings	Heating, lighting, cooling of main entertainment spaces, and circulation. Ticketing and snacks provision			Cinemas, theatres, concert halls. Bingo halls
12	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 further sports facilities
13	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
14	Dry sports and leisure facility	Dry sports and leisure facility	Dry sports and club house buildings — for a combined leisure centre include pool etc.	Ranges from occasional use to daily and evening	Provision of space 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 halls, sports grounds with changing rooms, tennis courts with office, speedway tracks, stadiums, pavilions
15	Covered car park	Car park with roof and side walls	Provision for car parking and access	Weekday or 24-hour	Lighting and mechanical ventilation when in use.	Lighting and ventilation	Office, public building in central urban location		

Effort has concentrated in the past on public buildings, service industry etc.
One thing we notice is that manufacturing, and SMEs are not yet widely covered
…which is where we come in

Some applications of energy data analysis

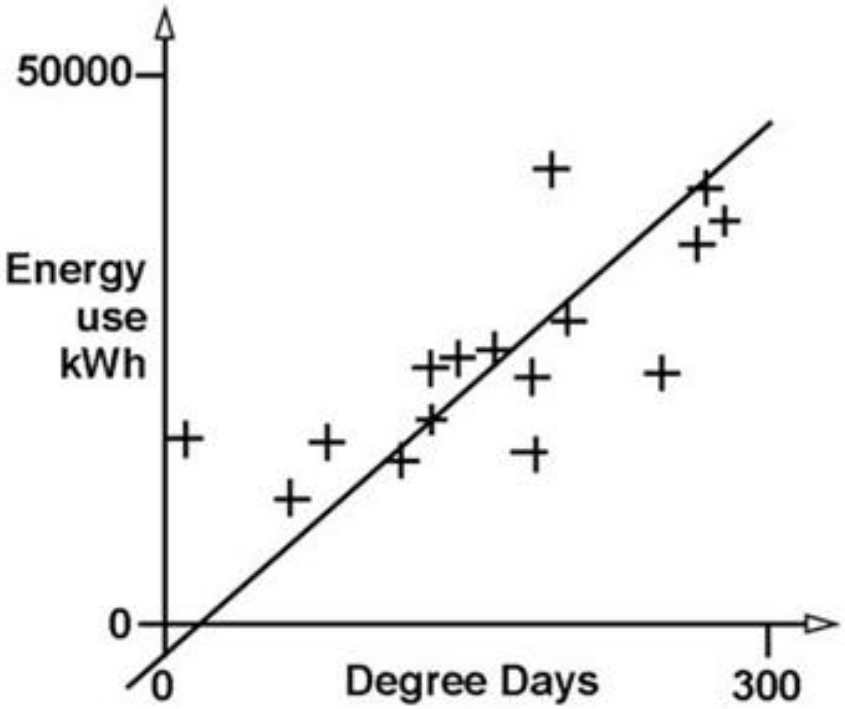
- Regression analysis using data gained from benchmarking
- Discovering energy faults and suggesting savings



$Q = c + m.\ D_d$

Where D_d = degree days, c = intercept, and m = slope

Internal gains



Formulated as

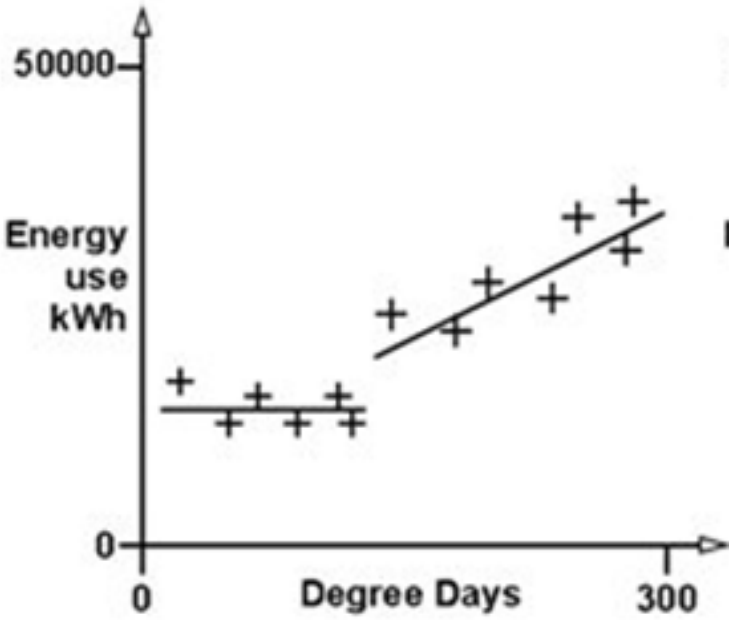
$Q\ (D_d > D_{dl}) = c + m.\ D_d$

$Q\ (D_d \leq D_{dl}) = 0$

D_{dl} = degree day level, Q = energy

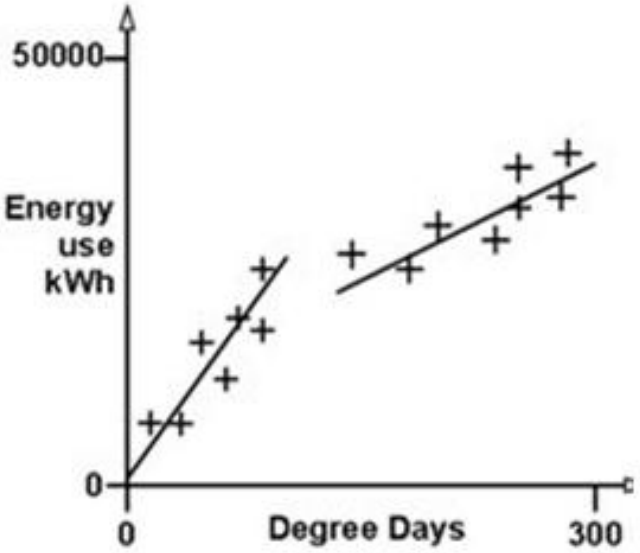
Where D_d = degree days, c = intercept, m = slope

Fixed loads outside the heating season



$$Q\ (D_d > D_{dl}) = c + m\ D_d$$
$$Q\ (D_d \leq D_{dl}) = c_2$$

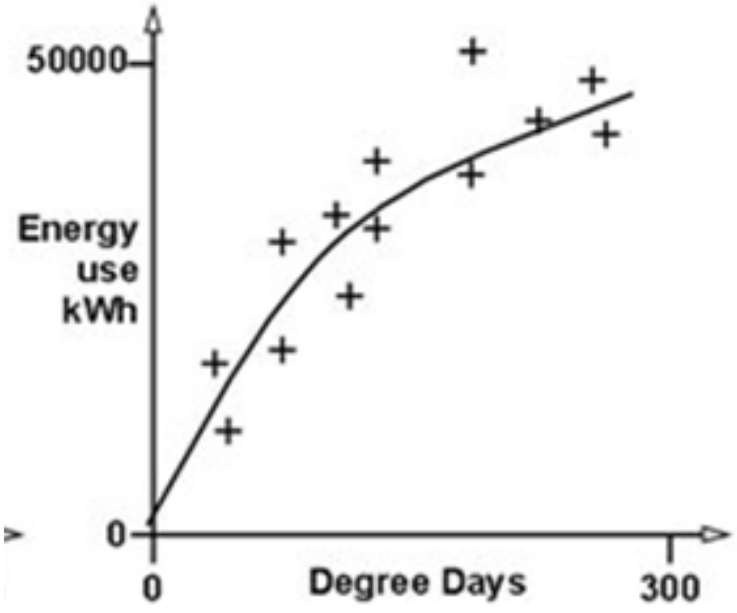
Heating and cooling running simultaneously



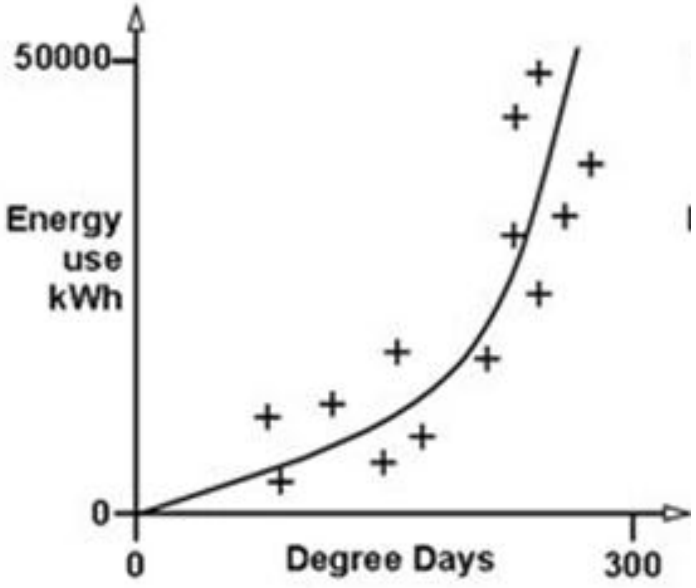
Formulated as two lines:

$$Q\ (D_d > D_{dl}) = c + m\ D_d$$
$$Q\ (D_d \leq D_{dl}) = c_2 + m_2\ D_d$$

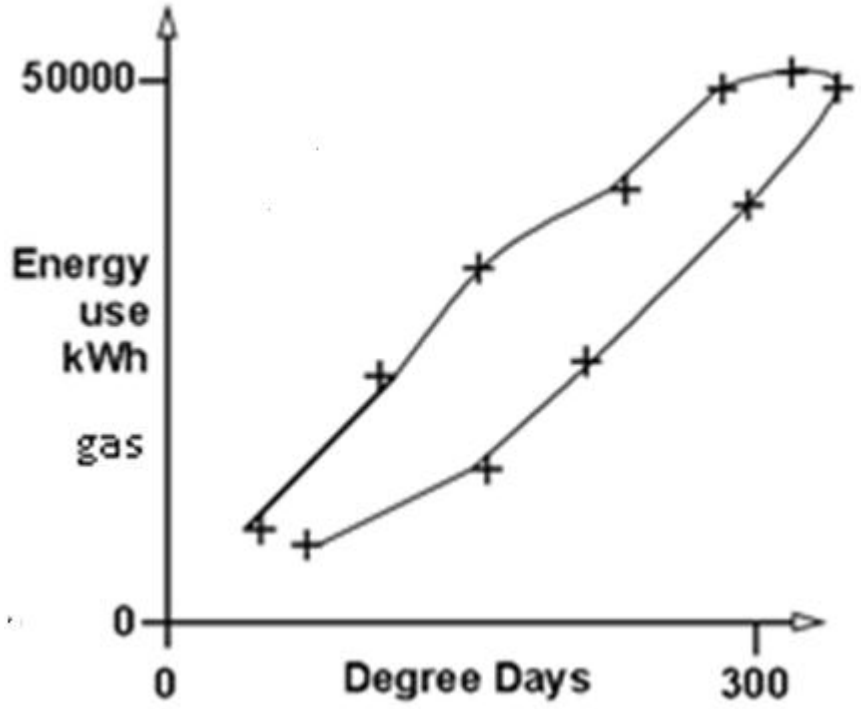
Efficiency increases with load



Upward curving polynomial - stratification



Hysteresis (Looping)



Energy Pathology

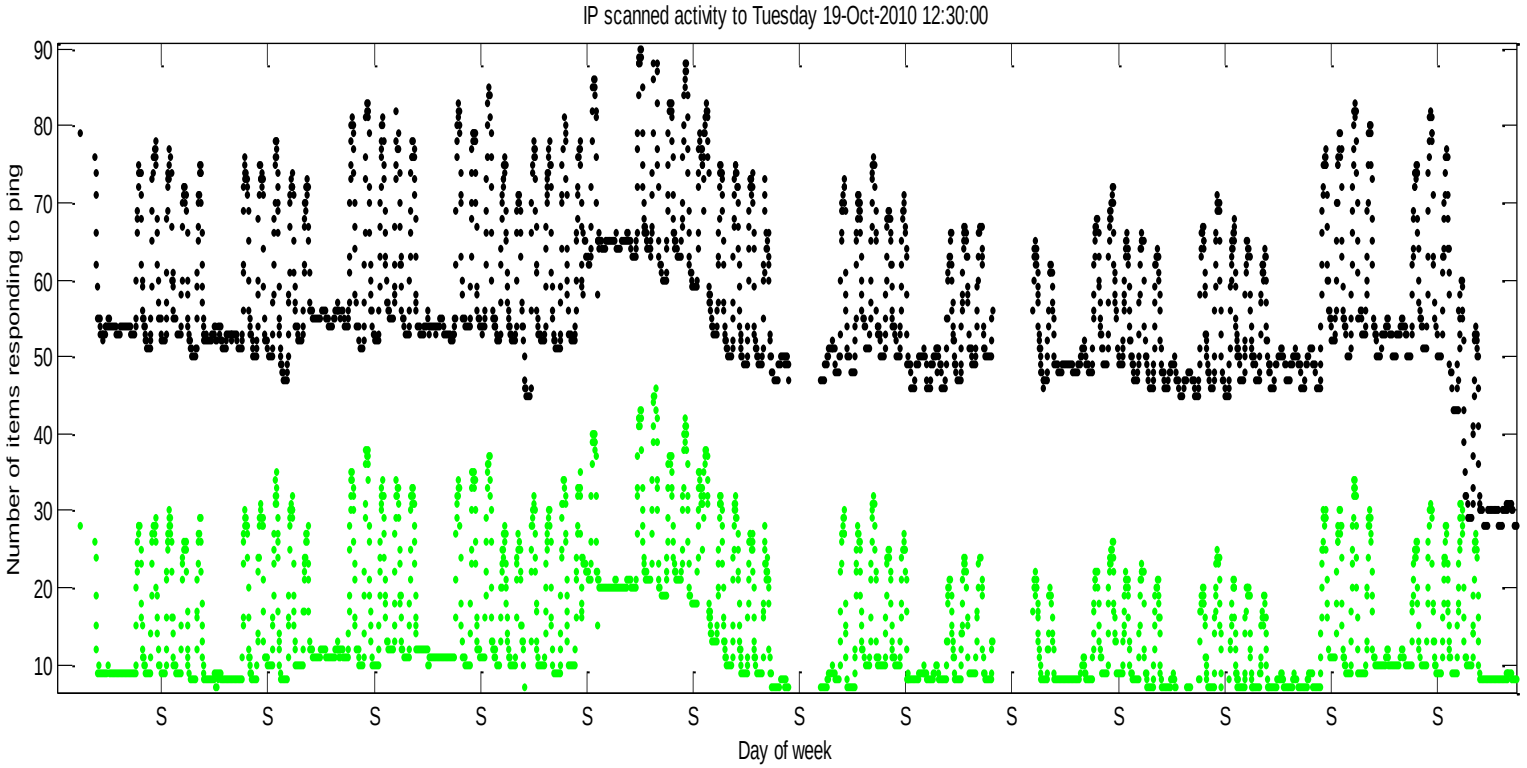
IT: out of hours switch off rates for IT can be as low as 30%.

Heating: incidents of heating of unoccupied non-domestic buildings at night and at weekends, were found to be as high as 30%

Lighting: unoccupied office lighting can amount for up to 23 – 30%

Electrical base-loads increasing annually at a rate of 9%

Energy savings identified from 30 minute data

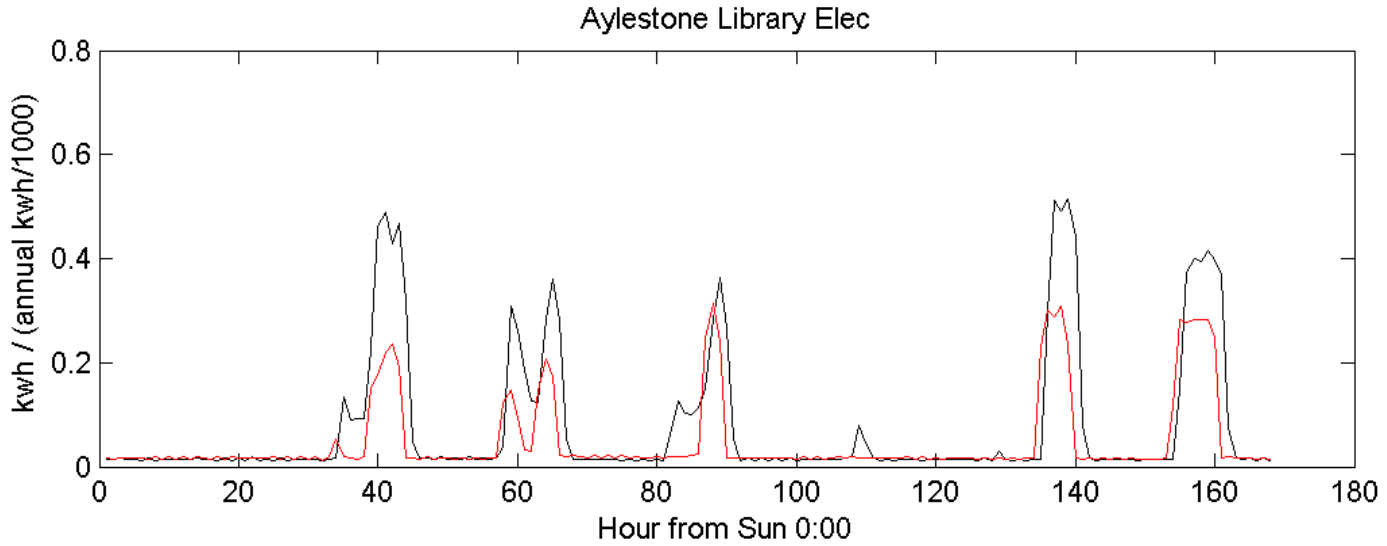


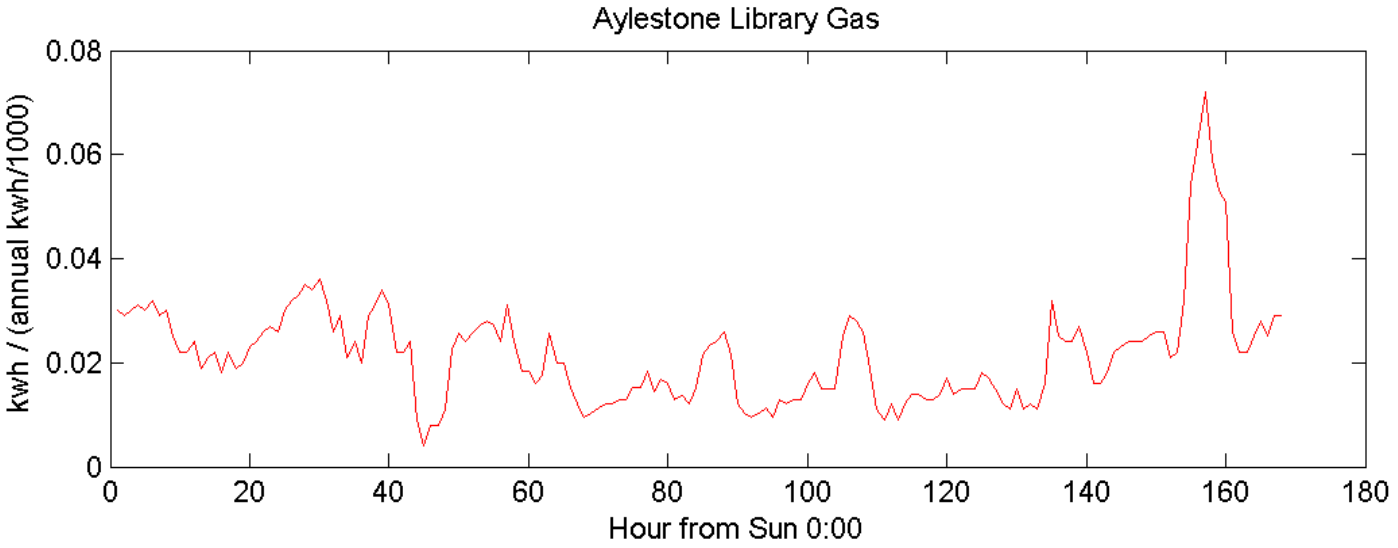
~50% switchoff rate for IT identified through pinging, one evening switchoff = 20kW baseload reduction from 100kW

Failure modes

- Heating (or cooling) out of season
  - Winter cooling or summer heating
- Heating when building unoccupied
  - Typically overnight, weekends
- Baseloads
  - Gas – lack of control
  - Water – usually a leak (not obvious in building)
  - Electricity – equipment, lights left on
- Excessive consumption (continuous)
  - Often gas with no time control and poor thermostatic control
- Most of these are much less likely in dwellings, because occupants would notice

Library: Heating control – gas on when clearly unoccupied



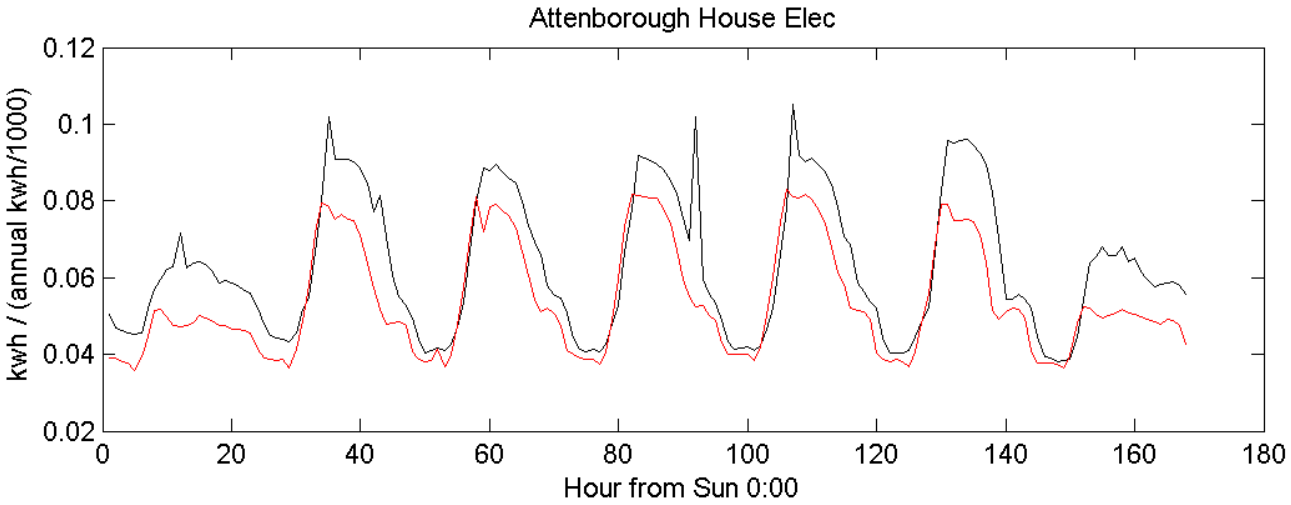


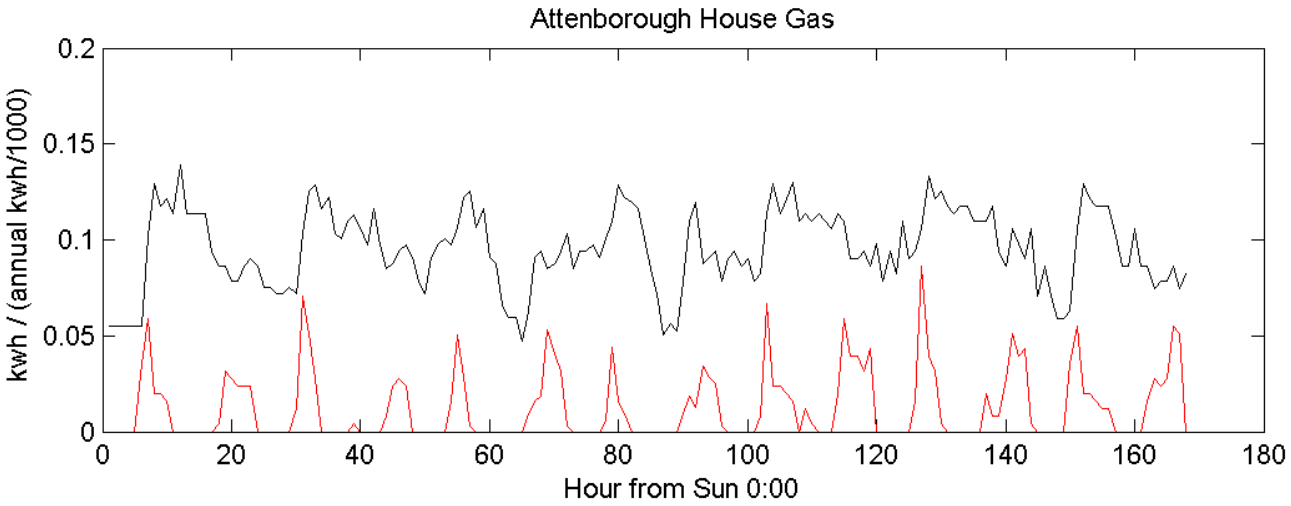
1 week:

red summer

black winter

Office: heating outside occupancy, high electricity baseload



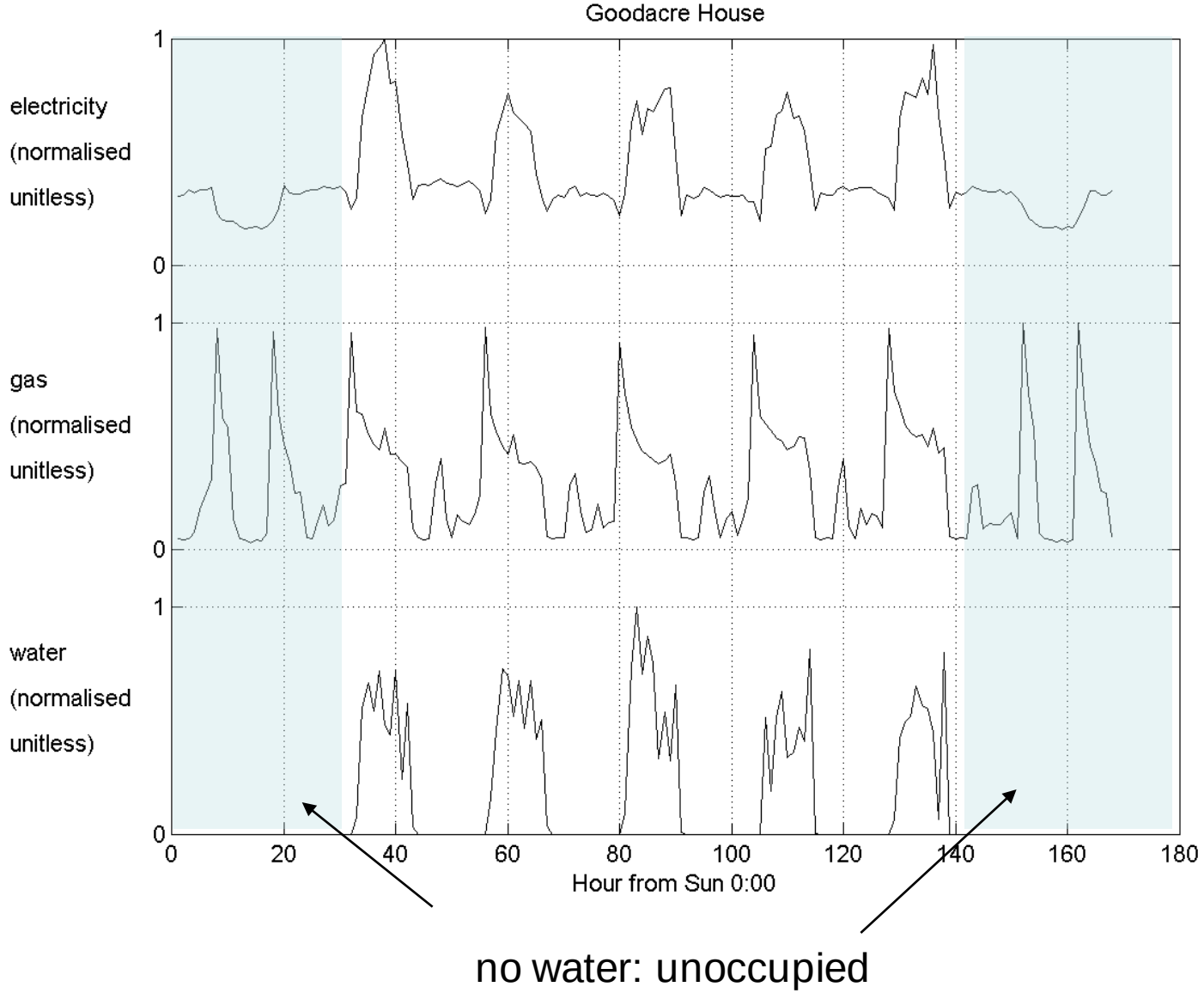


1 week:

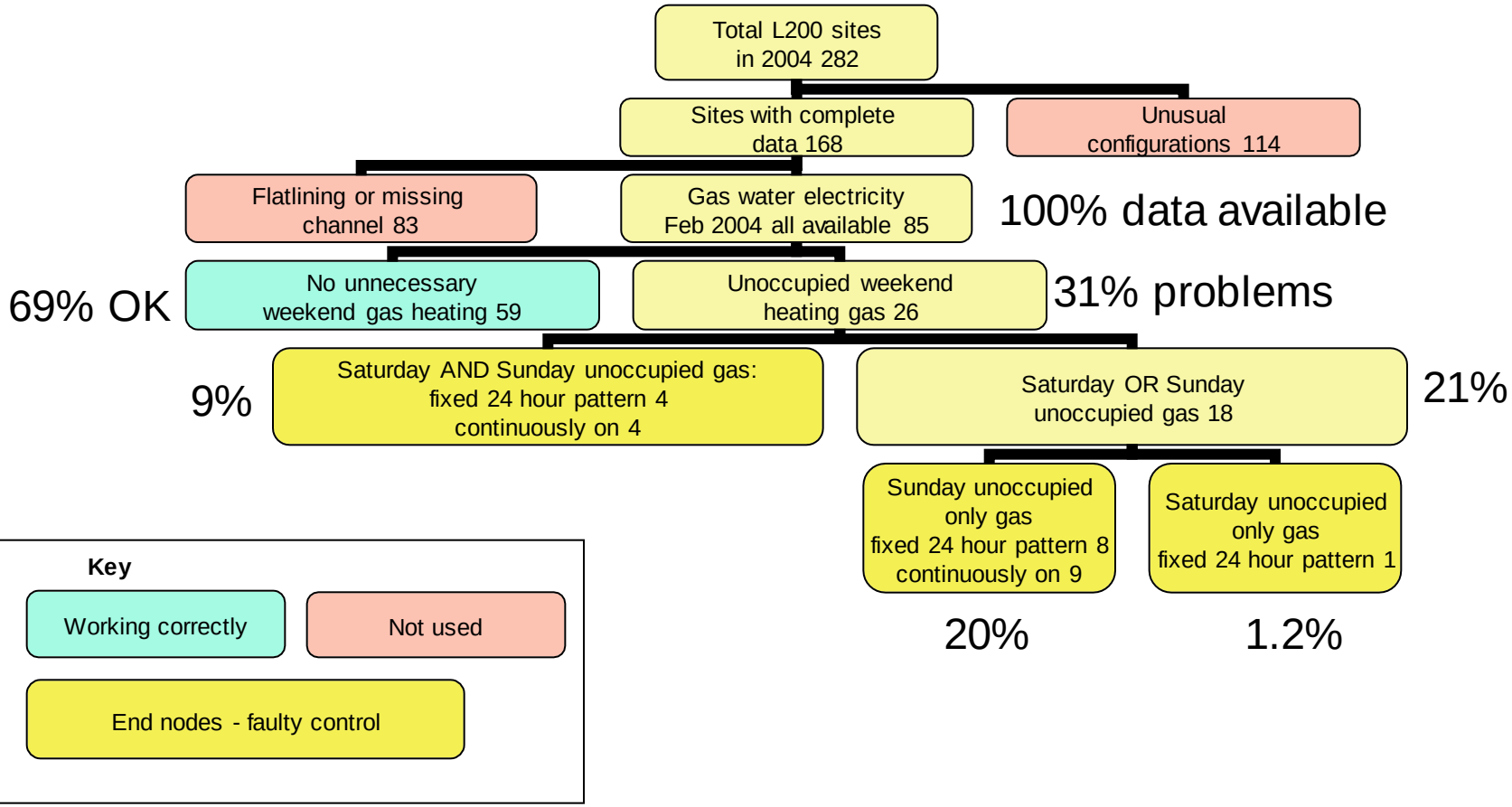
red summer

black winter

Office: water as occupancy proxy



Weekend control problems gas



Ambiguous text

```
gas - Abbey Primary School:
------------------------------
1 --- Abbey Primary Sch Main Gas
2 --- Abbey Prim Ross Walk Gas
3 --- Abbey Prim Community Gas


gas - Blackbird Road Depot:
------------------------------
1 --- Bl'bird Rd Gas Training Gas
2 --- B'bird Gas Training Water
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electricity - Blackbird Road Depot:
------------------------------
1 --- Blackbird Road Depot Elec



water - Blackbird Road Depot:
------------------------------
1 --- Blackbird Road Depot Water
2 --- B'bird Gas Training Water
```

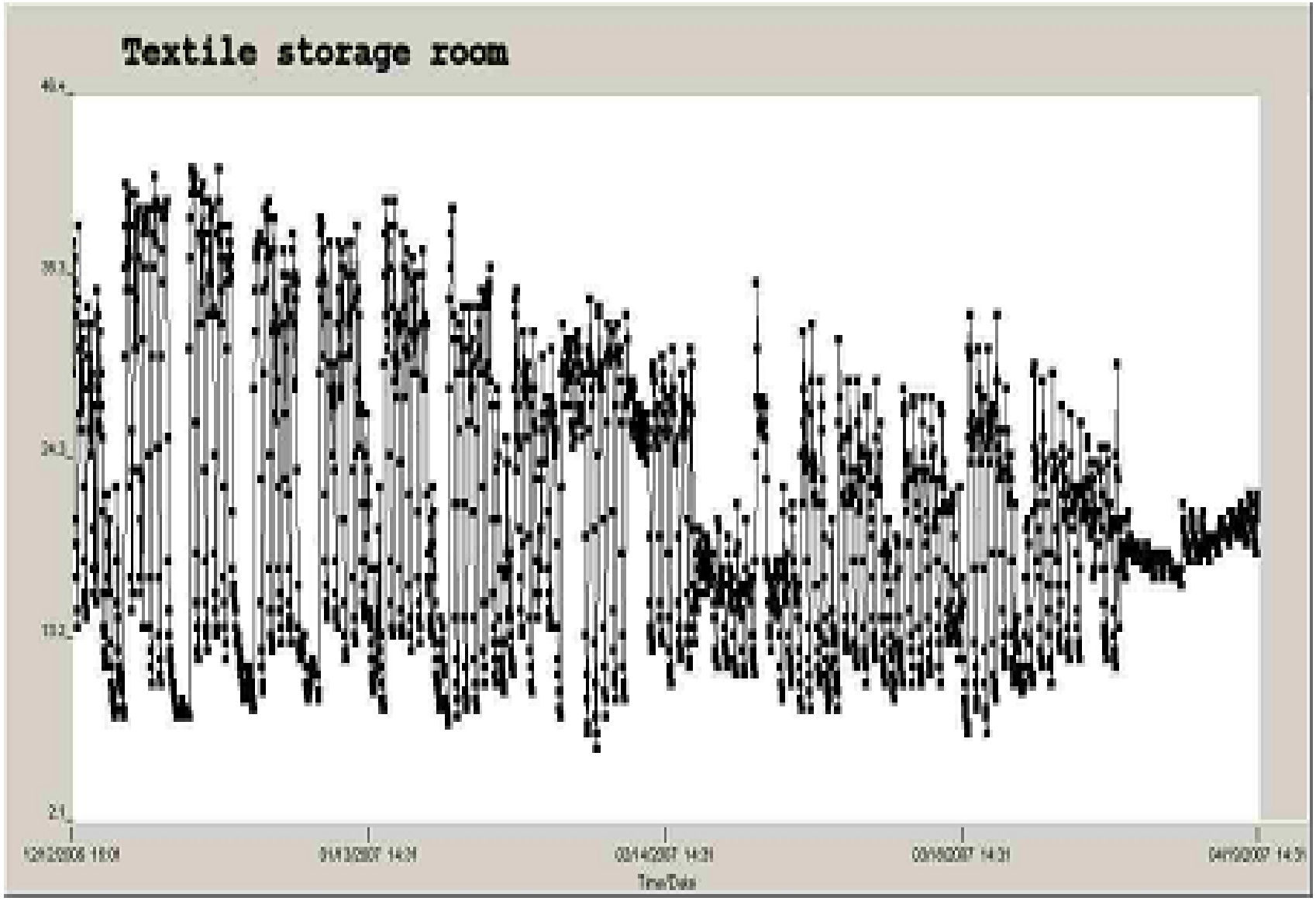
Such problems can be avoided by database design and linked tables, such that names are only stored once

Don’t forget the low hanging fruit

Saturday Evening around 6PM, Canary Wharf

Saturday Evening around 6PM, Paris


FIRE EXIT
FIRE EXIT


Textile storage room
Time/Date

Display Energy Certificate
How efficiently is this building being used?
HM Government
Certificate Reference Number:
Energy Performance Operational Rating
Total CO2 Emissions
More energy efficient
A 0-25
B 26-50
C 51-75
D 76-100
100 would be typical
E 101-125
F 126-150
G Over 150
755
Less energy efficient
Previous Operational Ratings
Technical information
Administrative information

Energy Pathology

IT: out of hours switch off rates for IT can be as low as 30%.

Heating: incidents of heating of unoccupied non-domestic buildings at night and at weekends, were found to be as high as 30%

Lighting: unoccupied office lighting can amount for up to 23 – 30%

Electrical base-loads increasing annually at a rate of 9%

Questionnaires for Participants

- Initial questionnaire

A detailed set of questions that establishes fundamental data such as attitudes to energy efficiency, plant and building types, nature of business

- Bi Monthly (or similar period) questionnaire

- Seven questions on energy use
- Gathers data on energy use and production/weather, any changes which may have affected energy use, and any other changes that participants want us to know about

First run of short questionnaire

1. Business ID (user) number: ☐

Password: ☐

2. Please enter your current meter readings:

Metering point number (any number you can use to refer to) ☐

Energy type ○ Electricity ○ Gas Other ☐

Units ○ kWh ○ m^3 Other ☐

Multiplier (e.g. x10 kWh, x5 m^3) ☐

Description ☐

Date Readings taken (mm/dd/yyy) ☐

Reading ☐

○ Enter another reading

○ Readings complete

Thank you. For subsequent readings we will ask fewer questions.

3. Please enter the type and units of any production values or other normalising figures, degree days or weather data, such as mean temperature. An example would be "Production" in "Tonnes" or "Weather" in "Degree Days"

Type

Units

4. Have any major changes been made, such as to building, address or business type recently?

○ Yes
○ No

Details of changes

5. Has any event happened which may affect the pattern of energy use (e.g. shut down or holiday, new item of plant, equipment failure, power cut, unusually busy, energy efficiency improvements)

○ Yes
○ No

Details of event

Any increased energy use, or energy savings made that you know about

6. Any other information about your recent operations which may have some effect on energy use or the energy readings you are entering

○ Yes
○ No

Please describe these

7. Would you like to change any other details that you filled in the first large questionnaire about your company?

○ Yes
○ No

Please describe the changes to be made

Thank you for your cooperation. If you have any further comments or suggestions please contact the project team using the addresses on the main project site.

Subsequent runs of short questionnaire

1. Business ID (user) number:

Password:

2. The last readings you entered were:

Vintu Fabricat Pattern Makers

Metering point	Description	Date	Value
1	Main Gas kWh	13-03-2015	2324 kWh
2	Main Electricity kWh	13-03-2015	4343 kWh

Please enter your current meter readings:

Metering point number

Description (optional)

Date Readings taken (mm/dd/yyy)

Reading

○ Enter another reading
○ Readings complete

3. Please enter your production values or other normalising figures, degree days or weather data, such as mean temperature, since you last completed this questionnaire.

Your last reading was:

Type	Units	Interval	Amount
Production	Kg	12-02-2015 to 13-03-2015	2321

Start date (leave blank if this was 13-03-2015)

Amount

4. Have any major changes been made, such as to building, address or business type during this period?

○ Yes
○ No

Details of changes

5. Has any event happened which may affect the pattern of energy use (e.g. shut down or holiday, new item of plant, equipment failure, power cut, unusually busy, energy efficiency improvements)?

○ Yes
○ No

Details of event

Any increased energy use, or energy savings made that you know about

6. Any other information about your operations during the previous period which may have some effect on energy use or the energy readings you are entering

○ Yes
○ No

Please describe these

7. Would you like to change any other details that you filled in the first large questionnaire about your company?

○ Yes
○ No

Please describe the changes to be made

Thank you for your cooperation. If you have any further comments or suggestions please contact the project team using the addresses on the main project site.

Sample completed questionnaire for 2nd and subsequent readings:

1. Business ID (user) number: 214

Password: ******

2. The last readings you entered were:

Vintu Fabricat Pattern Makers

Metering point	Description	Date	Value
1	Main Gas kWh	13-03-2015	2324 kWh
2	Main Electricity kWh	13-03-2015	4343 kWh

Please enter your current meter readings:

Metering point number: 1

Description (optional): Gas

Date Readings taken (mm/dd/yyy): 02/04/2015

Reading: 109315

● Enter another reading
○ Readings complete

Metering point number: 2

Description (optional): Elec

Date Readings taken (mm/dd/yyy): 13/03/2015

Reading: 08543

○ Enter another reading
● Readings complete

3. Please enter your production values or other normalising figures, degree days or weather data, such as mean temperature, since your last data entry.

Your last reading was:

Type	Units	Interval	Amount
Production	Kg	12-02-2015 to 13-03-2015	2321

Start date (please leave blank if this was 13-03-2015)

Amount 2954

4. Have any major changes been made, such as to building, address or business type during this period?

○ Yes
● No

5. Has any event happened which may affect the pattern of energy use (e.g. shut down or holiday, new item of plant, equipment failure, power cut, unusually busy, energy efficiency improvements)

● Yes
○ No

Details of event

Compressed air pipes were serviced and all leaks in connectors were fixed.

Any increased energy use, or energy savings made that you know about

Compressor is 8kW but is not seperately metered. It appears to be running less often.

6. Any other information about your operations during the previous period which may have some effect on energy use or the energy readings you are entering

○ Yes
● No

7. Would you like to change any other details that you filled in the first large questionnaire about your company?

● Yes
○ No

Please describe the changes to be made

Mario Avramutu is now the main contact on site, but same telephone number as before.

Thank you for your cooperation. If you have any further comments or suggestions please contact the project team using the addresses on the main project site.

Questions and answers

Spare slides

Thoughts on development of Benchmarking

1. Technical Building Services (TBS) as high users of energy, are likely to be as important, if not more for benchmarking as production e.g. compressed air, fume extraction. This means for benchmarkign beyond established methodologies (e.g. TM46) production data and degree day data may be needed for best results.
2. Similarly, being able to disaggregate between production and TBS is beneficial.
3. Manufacturing benchmarking source references are easily accessible. e.g. Good guidance on specific energy use KPIs can be found in ("KAP EU Project http://www.kap-project.eu/,")

Thoughts on development of Benchmarking

4. Similarly, useful methodologies for energy benchmarking for buildings by vertical sector are numerous, perhaps a best known example being ("CIBSE TM46 Energy Benchmarks," n.d.)
5. A huge amount of meta analysis has been undertaken in the EU, ("Energy efficiency in the European Union: trends and policies Lessons from the ODYSSEE MURE project," although further work is needed to establish if calculations are top down or bottom up.
6. Appropriate benchmarking using current techniques depends on a robust taxonomy, e.g. (Bruhns & Wyatt, 2011) ("CIBSE TM46 Energy Benchmarks,") But as we look into fine grained data (15,30 min) the sample sizes reduce further. small sample numbers for some industries make comparisons difficult. A more robust approach could be to benchmark on process type

16	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
17	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, computers	Restaurant (dining hall), swimming pool		Primary and secondary schools, nurseries, creches, youth centres and community centres
18	University campus	University campus	Lecture theatres, offices, workshops, eating places, laboratories and other activities	Weekdays and evenings	Large floor space and variety of activities	Heating, lighting, cooling, office and teaching equipment	Laboratory, restaurant	Furnace or forming process	Typical campus mix for further and higher education universities and colleges
19	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
20	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 process	Acute hospital, specialist hospital, teaching hospital and maternity hospital
21	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 centres and prisons
22	General accommodation	General accommodation	Space for sleeping, showers, basic domestic services	Non-continuous occupancy, often only used in 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
23	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 categories in other parts of the non-domestic stock (e.g. accommodation, offices and vehicle garaging)	Heating, lighting, cooling, food services, office and training equipment			Police, fire and ambulance stations
24	Laboratory or operating theatre	Laboratory or operating theatre	Special equipment and conditions in at least 30% of floor area	Either weekday or 24-hour multi-shift	Spaces requiring controlled ventilation and conditions	Heating lighting, ventilation		Furnace or forming process	Research chemical laboratory, hospital operating theatre
25	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
26	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 handlings	Retail, restaurant, covered car park		Large train stations, airport terminals
27	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 process	Workshops, vehicle repair
28	Storage facility	Storage warehouse or depot	Storage and goods handling areas	Continuous storage with weekday or multi-shift goods handling	Lightly serviced long term storage areas	Low level lighting and heating in storage areas			Distribution warehouse without public areas, and local authority depot
29	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

Table 1 Benchmark categories and values; (b) benchmarks and building size metrics

[A]	[B]	[C]	[K]	[L]	[M]	[N]	[O]	[P]	[Q]	[R]
Name and description			Energy benchmarks		Illustrative CO_2 benchmarks calculated from the energy benchmarks (see Table 3)			Building size metric for use by assessors		
Category	Name	Brief description	Electricity typical benchmark (kWh/m^2)	Fossil-thermal typical benchmark (kWh/m^2)	Illustrative electricity typical benchmark (kgCO_2/m^2)	Illustrative fossil-thermal typical benchmark (kgCO_2/m^2)	Illustrative total typical benchmark (kgCO_2/m^2)	Primary metric (as in energy benchmarks)	Approved alternate metric	Default multiplier (applied to alternate metric to obtain primary metric)
1	General office	General office and commercial working areas	95	120	52.3	22.8	75.1	Gross floor area measured as RICS gross internal area (GIA)	Net lettable area (NLA) measured as RICS	1.25
2	High street agency	High street agency	140	0	77.0	0.0	77.0	Gross floor area measured as RICS gross internal area (GIA)	(none)	
3	General retail	General street retail and services	165	0	90.8	0.0	90.8	Gross floor area measured as RICS gross internal area (GIA)	Sales floor area (SFA)	1.80
4	Large non-food shop	Retail warehouse or other large non-food store	70	170	38.5	32.3	70.8	Gross floor area measured as RICS gross internal area (GIA)	Sales floor area (SFA)	1.80
5	Small food store	Small food store	310	0	170.5	0.0	170.5	Gross floor area measured as RICS gross internal area (GIA)	Sales floor area (SFA)	1.35
6	Large food store	Supermarket or other large food store	400	105	220.0	20.0	240.0	Gross floor area measured as RICS gross internal area (GIA)	Sales floor area (SFA)	2.00
7	Restaurant	Restaurant	90	370	49.5	70.3	119.8	Gross floor area measured as RICS gross internal area (GIA)	(none)	
8	Bar, pub or licensed club	Bar, pub or club	130	350	71.5	66.5	138.0	Gross floor area measured as RICS gross internal area (GIA)	(none)	
9	Hotel	Hotel or boarding house	105	330	57.8	62.7	120.5	Gross floor area measured as RICS gross internal area (GIA)	(none)	
10	Cultural activities	Museum, art gallery or other public building with normal occupancy	70	200	38.5	38.0	76.5	Gross floor area measured as RICS gross internal area (GIA)	(none)	
11	Entertainment halls	Entertainment halls	150	420	82.5	79.8	162.3	Gross floor area measured as RICS gross internal area (GIA)	(none)	
12	Swimming pool centre	Swimming pool hall, changing and ancillaries	245	1130	134.8	214.7	349.5	Gross floor area measured as RICS gross internal area (GIA)	(none)	
13	Fitness and health centre	Fitness centre	160	440	88.0	83.6	171.6	Gross floor area measured as RICS gross internal area (GIA)	(none)	
14	Dry sports and leisure facility	Dry sports and leisure facility	95	330	52.3	62.7	115.0	Gross floor area measured as RICS gross internal area (GIA)	(none)	
15	Covered car park	Car park with roof and side walls	20	0	11.0	0.0	11.0	Gross floor area measured as RICS gross internal area (GIA)	(none)	

16	Public buildings with light usage	Light use public and institutional buildings	20	105	11.0	20.0	31.0	Gross floor area measured as RICS gross internal area (GIA)	(none)		
17	Schools and seasonal public buildings	Public buildings nominally used for part of the year	40	150	22.0	28.5	50.5	Gross floor area measured as RICS gross internal area (GIA)	(none)		
18	University campus	University campus	80	240	44.0	45.6	89.6	Gross floor area measured as RICS gross internal area (GIA)	(none)		
19	Clinic	Health centres, clinics and surgeries	70	200	38.5	38.0	76.5	Gross floor area measured as RICS gross internal area (GIA)	(none)		
20	Hospital (clinical and research)	Clinical and research hospital	90	420	49.5	79.8	129.3	Gross floor area measured as RICS gross internal area (GIA)	(none)		
21	Long term residential	Long term residential accommodation	65	420	35.8	79.8	115.6	Gross floor area measured as RICS gross internal area (GIA)	(none)		
22	General accommodation	General accommodation	60	300	33.0	57.0	90.0	Gross floor area measured as RICS gross internal area (GIA)	(none)		
23	Emergency services	Emergency services	70	390	38.5	74.1	112.6	Gross floor area measured as RICS gross internal area (GIA)	(none)		
24	Laboratory or operating theatre	Laboratory or operating theatre	160	160	88.0	30.4	118.4	Gross floor area measured as RICS gross internal area (GIA)	(none)		
25	Public waiting or circulation	Bus or train station, shopping centre mall	30	120	16.5	22.8	39.3	Gross floor area measured as RICS gross internal area (GIA)	(none)		
26	Terminal	Regional transport terminal with concourse	75	200	41.3	38.0	79.3	Gross floor area measured as RICS gross internal area (GIA)	(none)		
27	Workshop	Workshop or open working area (not office)	35	180	19.3	34.2	53.5	Gross floor area measured as RICS gross internal area (GIA)	(none)		
28	Storage facility	Storage warehouse or depot	35	160	19.3	30.4	49.7	Gross floor area measured as RICS gross internal area (GIA)	(none)		
29	Cold storage	Refrigerated warehouse	145	80	79.8	15.2	95.0	Gross floor area measured as RICS gross internal area (GIA)	(none)		

Table 1 Benchmark categories and values; (c) weather adjustment, separable energy uses and occupancy adjustment

[A]	[B]	[C]	[S]	[T]	[U]	[V]	[W]	[X]	[Y]	[Z]
Name and description			Weather adjustment		Separable energy uses	Occupancy adjustment for days and hours of use				
Category	Name	Brief description	Percent of electricity benchmark pro-rated to degree-days	Percent of fossil-thermal benchmark pro-rated to degree-days	Separable energy uses	Definition of annual occupancy hours in this sector	Reference hours per year	Maximum allowed hours per year	Percentage increase in electricity benchmark at maximum allowed hours per year	Percentage increase in fossil-thermal benchmark at maximum allowed hours per year
1	General office	General office and commercial working areas	0%	55%	S1 — Regional server room S2 — Trading floor	Number of hours when the recorded number of occupants exceeds 25% of the nominal maximum number.	2040	8760	107%	44%
2	High street agency	High street agency	20%	0%		Number of hours when the premises are fully open to customers according to published hours.	2448	3672	22%	0%
3	General retail	General street retail and services	15%	0%		Number of hours when the premises are fully open to customers according to published hours.	2448	3672	22%	0%
4	Large non-food shop	Retail warehouse or other large non-food store	0%	55%		Number of hours when the premises are fully open to customers according to published hours.	2448	4284	32%	19%
5	Small food store	Small food store	15%	0%		Number of hours when the premises are fully open to customers according to published hours.	2448	3672	22%	0%
6	Large food store	Supermarket or other large food store	0%	55%	S3 - Bakery oven	Number of hours when the premises are fully open to customers according to published hours.	2983	4284	20%	9%
7	Restaurant	Restaurant	20%	30%		Number of hours when the premises are fully open to customers according to published hours.	3060	5712	37%	17%
8	Bar, pub or licensed club	Bar, pub or club	0%	40%		Number of hours when the premises are fully open to customers according to published hours.	3060	5712	37%	17%
9	Hotel	Hotel or boarding house	0%	45%			—	—	0%	0%
10	Cultural activities	Museum, art gallery or other public building with normal occupancy	0%	55%		Number of hours when the premises are fully open to customers according to published hours.	2040	4284	45%	20%
11	Entertainment halls	Entertainment halls	0%	55%		Number of hours when the premises are fully open to customers according to published hours.	2856	5712	41%	19%
12	Swimming pool centre	Swimming pool hall, changing and ancillaries	0%	55%		Number of hours when the premises are fully open to customers according to published hours.	2856	4641	27%	13%
13	Fitness and health centre	Fitness centre	0%	40%		Number of hours when the premises are fully open to customers according to published hours.	2754	5355	39%	18%
14	Dry sports and leisure facility	Dry sports and leisure facility	0%	55%	S4 - Sports flood lighting	Number of hours when the premises are fully open to customers according to published hours.	2754	5355	39%	18%
15	Covered car park	Car park with roof and side walls	0%	0%		Number of hours when the premises are fully open to customers according to published hours	4284	8568	41%	0%

16	Public buildings with light usage	Light use public and institutional buildings	0%	55%		Number of hours when the premises are fully open to customers according to published hours.	2040	3672	34%	16%
17	Schools and seasonal public buildings	Public buildings nominally used for part of the year	0%	55%		Number of hours when the premises are fully open to customers according to published hours.	1,400	3,672	62%	27%
18	University campus	University campus	0%	55%	S5 — Furnace, heat treatment or forming process	Number of hours when the premises are fully open to customers according to published hours.	2,450	5,355	48%	22%
19	Clinic	Health centres, clinics and surgeries	0%	55%		Number of hours when the premises are fully open to customers according to published hours.	2,040	4,284	45%	20%
20	Hospital, clinical and research	Clinical and research hospital	0%	55%	S5 — Furnace, heat treatment or forming process		-	-	0%	0%
21	Long term residential	Long term residential accommodation	0%	55%			-	-	0%	0%
22	General accommodation	General accommodation	0%	55%		Number of hours when the premises are fully open to customers according to published hours.	2,940	4,284	21%	10%
23	Emergency services	Emergency services	0%	55%			-	-	0%	0%
24	Laboratory or operating theatre	Laboratory or operating theatre	0%	55%	S5.Furnace, heat treatment or forming process	Number of hours when the recorded number of occupants exceeds 25% of the nominal maximum number.	2,040	8,568	105%	43%
25	Public waiting or circulation	Bus or train station, shopping centre mall	0%	55%			-	-	0%	0%
26	Terminal	Regional transport terminal with concourse	0%	55%			-	-	0%	0%
27	Workshop	Workshop or open working area (not office)	0%	55%	S5.Furnace, heat treatment or forming process	Number of hours when the recorded number of occupants exceeds 25% of the nominal maximum number.	2,040	3,672	34%	16%
28	Storage facility	Storage warehouse or depot	0%	70%		Number of hours when the recorded number of occupants exceeds 25% of the nominal maximum number.	2,040	4,284	45%	20%
29	Cold storage	Refrigerated warehouse	0%	55%	S6.Blast chilling or freezing		-	-	0%	0%

Table 2 Allocation of building types to benchmark categories

No.	Building type	Benchmark category	Category name
1	Adult education centre	1	General office
2	Air traffic control	1	General office
3	Bank office	1	General office
4	Building society office	1	General office
5	Business units	1	General office
6	Call centre	1	General office
7	Central government office	1	General office
8	Commercial office	1	General office
9	Conference centre	1	General office
10	Courts	1	General office
11	Crown and county courts	1	General office
12	Crown court	1	General office
13	Financial service office	1	General office
14	Flight crew facility	1	General office
15	Guardroom	1	General office
16	Law facilities	1	General office
17	Legal/financial services	1	General office
18	Local government office	1	General office
19	Office showroom	1	General office
20	Office with industry	1	General office
21	Offices	1	General office
22	Offices, cellular, naturally ventilated	1	General office
23	Offices, mechanically ventilated and/or air conditioned	1	General office
24	Offices, open plan, naturally ventilated	1	General office
25	Professional/design	1	General office
26	Professional services, off-street	1	General office
27	Public sector offices	1	General office
28	Simulator	1	General office
29	Studio office	1	General office
30	Town hall	1	General office
31	Warehouse office	1	General office
64	Warehouse shop	4	Large non-food shop
65	Warehouse showroom	4	Large non-food shop
66	Corner food shops, butchers	5	Small food store
67	Corner food shops, greengrocers and delicatessens	5	Small food store
68	Supermarket	6	Large food store
69	Cafe	7	Restaurant
70	Canteen	7	Restaurant
71	Eating place	7	Restaurant
72	Food courts	7	Restaurant
73	Mess, junior ranks (accommodation only)	7	Restaurant
74	Mess, junior ranks (catering only)	7	Restaurant
75	Mess, officers (catering only)	7	Restaurant
76	Mess, warrant officers and sergeants (catering only)	7	Restaurant
77	Motorway service areas	7	Restaurant
78	NAAFI	7	Restaurant
79	Restaurant	7	Restaurant
80	Takeaway restaurant	7	Restaurant
81	Discotheque	8	Bar, pub or licensed club
82	Night club	8	Bar, pub or licensed club
83	Public house	8	Bar, pub or licensed club
84	Wine bar	8	Bar, pub or licensed club
85	Hotel	9	Hotel
86	Art gallery	10	Cultural activities
87	Arts centre	10	Cultural activities
88	Library	10	Cultural activities

32	Bank or building society	2	High street agency
33	Betting shop	2	High street agency
34	Estate agents	2	High street agency
35	Insurance brokers	2	High street agency
36	Legal/insurance/accountants high street premises	2	High street agency
37	Post Office	2	High street agency
38	Public services	2	High street agency
39	Travel agent	2	High street agency
40	Undertakers	2	High street agency
41	Amusement arcade	3	General retail
42	Beauty salon	3	General retail
43	Confectioners, tobacconists, newsagents, off licences	3	General retail
44	Dry cleaner	3	General retail
45	Garden centres	3	General retail
46	Hairdressing salon	3	General retail
47	Indoor markets	3	General retail
48	Laundrette	3	General retail
49	Personal services	3	General retail
50	Pet shops	3	General retail
51	Petrol filling stations	3	General retail
52	Department store	4	Large non-food shop
53	Departmental and general stores	4	Large non-food shop
54	Factory shop	4	Large non-food shop
55	Factory showroom	4	Large non-food shop
56	Hypermarket	4	Large non-food shop
57	Large shop	4	Large non-food shop
58	Retail showroom	4	Large non-food shop
59	Retail warehouse	4	Large non-food shop
60	Shop with industry	4	Large non-food shop
61	Showroom	4	Large non-food shop
62	Superstore	4	Large non-food shop
63	Vehicle showroom	4	Large non-food shop
89	Museum	10	Cultural activities
90	Auditorium	11	Entertainment halls
91	Bingo hall	11	Entertainment halls
92	Casino	11	Entertainment halls
93	Cinema	11	Entertainment halls
94	Concert hall	11	Entertainment halls
95	Dancing school	11	Entertainment halls
96	Entertainment hall	11	Entertainment halls
97	Theatre	11	Entertainment halls
98	Swimming pool	12	Swimming pool centre
99	Fitness centre	13	Fitness and health centre
100	Gymnasium	13	Fitness and health centre
101	Health club	13	Fitness and health centre
102	Ice skating rinks	14	Dry sports and leisure facility
103	Indoor bowling	14	Dry sports and leisure facility
104	Leisure centre	14	Dry sports and leisure facility
105	Pavilion/sports clubhouse	14	Dry sports and leisure facility
106	Racecourse	14	Dry sports and leisure facility
107	Roller skating rinks	14	Dry sports and leisure facility
108	Snooker club	14	Dry sports and leisure facility
109	Sports centre with pool	14	Dry sports and leisure facility

Sidenote – the UCL Primary Classifications

Code	Pcla25t
C	Commercial division
CO	Offices
CO1	Commercial office
CO10	Commercial office
CO101	Studio office
CO11	Financial service office
CO111	Bank/bldg society office
CO112	Bank office
CO113	Building society office
CO114	Legal/financial services
CO12	Office with industry
CO121	Warehouse office
CO122	Factory office
CO2	Local government office
CO3	Central government office
CO9	Other commercial
CR	Retail premises
CR1	Small or general shop
CR10	Small shop - general
CR11	Showroom
CR111	Retail showroom
CR112	Office showroom
CR12	Shop with industry
CR121	Factory showroom
CR122	Factory shop
CR123	Warehouse showroom
CR124	Warehouse shop
CR13	Kiosk
CR14	Market stall
CR141	Indoor markets
CR142	Outdoor markets
CR2	Large shop
CR20	Large shop
CR22	Supermarket
CR23	Superstore
CR24	Department store
CR25	Hypermarket
CR26	Retail warehouse
CR27	Food courts
CR3	Commercial services
CR31	Bank or building society
CR311	Bank
CR312	Building society
CR313	Bank/building society
CR32	Legal/insurance/acc etc
CR33	Post Office
CR34	Estate agent
CR35	Betting shop
CR36	Travel agent
CR4	Personal services
CR41	Hairdressing/beauty salon
CR410	Hairdressing/beauty salon
CR411	Hairdressing salon
CR412	Beauty salon
CR42	Laundrette
CR43	Dry cleaner
CR6	Professional services
CR7	Public services
CR9	Garden centres
H	Hospitality and leisure
HA	Hotels and catering
HA1	Takeaway
HA11	Takeaway - pure
HA2	Eating place
HA20	Restaurant/cafe
HA201	Takeway restaurant
HA21	Restaurant
HA22	Cafe
HA23	Wine bar
HA3	Public house
HA4	Hotel or motel
HA41	Hotel
HA42	Motel
HA5	Boarding/guesthouse
HA6	Holiday accommodation
HA60	Holiday centre
HA61	Caravan/camping site
HA62	Holiday let
HL	Leisure
HL1	Collection and display
HL11	Museum, art gallery
HL12	Library
HL2	Entertainment hall
HL20	Arts centre
HL21	Theatre/hall - public
HL211	Theatre
HL212	Concert hall
HL22	Theatres/hall - private
HL23	Cinema
HL24	Bingo hall
HL3	Leisure & fitness centre
HL30	Leisure centre
HL31	Sports centres or hall
HL311	Sports centre with pool
HL312	Sports centre pool LA
HL313	Sports centre pool private
HL314	Sports centre - no pool
HL315	Sports centre - no pool LA
HL316	Sports centre - no pool private
HL32	Swimming pool
HL321	Swimming pool LA
HL322	Swimming pool priv
HL33	Health club
HL34	Squash club
HL35	Rinks
HL351	Ice skating rinks
HL352	Roller skating rinks
HL36	Beach huts
HL37	Tennis courts etc
HL4	'Gentler' sports
HL41	Snooker club
HL42	Indoor bowling
HL43	Dancing school
HL5	Night life / high life
HL51	Night club, disco
HL52	Casino
HL53	Amusement arcade
HL6	Outdoor sports & leisure
HL60	Pavilion/sports clubhouse
HL61	Sports ground
HL610	Sports ground and/or premises
HL611	Sports ground (pure)
HL612	Sports ground buildings
HL62	Racecourse
HL620	Racecourse
HL621	Horse racecourse
HL622	Totalisators etc
HL623	Dogs racecourse
HL624	Speedway
HL63	Marina or sailing club
HL64	Leisure park
HL640	Leisure park theme park
HL641	Pier
HL642	Zoo
HL643	Hunting and fishing
HL69	Other outdoor
I	Industrial division

IF	Manufacture
IF1	Workshop
IF2	Factory
IF21	Factory
IF211	Sorting office
IF22	Mill
IF23	Works
IF27	Process dominant premise
IF271	Brickworks
IF272	Concrete batching plant
IF29	Other
IF3	Laboratories, studios etc
IF31	Laboratories
IF32	Recording studios
IF37	Observatories
IF39	Other
IF4	Business units
IF9	Contractors sheds etc
IG	Storage
IG1	Commercial warehouse
IG11	Cold store
IG12	Large distribution whse
IG2	Government warehouse
IG3	Store
IG4	Storage depot
IG41	Road haulage depot
IG5	Storage land
IT	Transport
IT1	Vehicle services
IT11	Petrol filling station
IT12	Vehicle repair workshop
IT13	Garage
IT14	Vehicle showroom
IT18	Motorway service areas
IT19	Other
IT2	Parking
IT20	General parking
IT21	Parking building
IT22	Bus depot
IT28	Open car parks
IT3	Railway premise
IT30	Railway mixed use
IT31	Railway station
IT4	Dock, wharf
IT5	Airport
IT6	Telecommunications
IT61	Telephone exchange
IT62	Transmitting station
IU	Utilities and minerals
IU1	Coal fired power station
IU2	Gas power station
IU3	Mine or quarry
IU31	Mine
IU32	Quarry
IU4	Water works
IU5	Sewage works
IU6	Disposal site
IY	Agriculture and animals
IY1	Farm building
IY11	Silo
IY12	Poultry house
IY13	Glasshouse
IY2	Animal accommodation
IY21	Stable
IY22	Kennel or cattery
IY3	Livestock market
S	Social division
SE	Education
SE1	Pre-school facility
SE11	Nursery or kindergarten
SE12	Creche
SE2	State primary school
SE3	State school
SE31	State secondary school
SE32	Special school
SE4	Private school
SE5	Further, higher education
SE51	Higher education college
SE52	Higher, further, 6th form
SE6	University
SE7	Adult education centre
SM	Medical facilities
SM1	Surgery or clinic
SM11	Doctor's surgery
SM12	Clinic or health centre
SM13	Dentist's surgery
SM14	Veterinary surgery
SM2	Hospital
SQ	Community facilities
SQ1	Community meeting place
SQ10	Community centre
SQ11	Hall
SQ12	Clubhouse
SQ13	Scout or Guide hut
SQ2	Care
SQ21	Hostel, home
SQ211	Hostel
SQ212	Home
SQ22	Nursing home
SQ3	Sacred place
SQ30	Church with cemetery
SQ31	Place of worship
SQ32	Cemetery or crematorium
SQ33	Mortuary
SQ34	Funeral home
SV	Emergency services & law
SV1	Emergency services
SV11	Fire station
SV12	Ambulance station
SV13	Lifeboat station
SV14	Public lavatory
SV2	Law facilities
SV21	Police station
SV22	Courts
SV23	Crown court
SV3	Detention
SV31	Young offenders instit'n
SV311	Detention centre
SV312	Remand centre