



## **Warwickshire County Council**

### **Building Energy Consumption Review**

**April 2015 to March 2016**

Report prepared by WCC Resources Group: Physical Assets / Construction Services / Energy Team

<http://www.warwickshire.gov.uk/energyperformance>

<http://www.warwickshire.gov.uk/energyandwater>

#### **Version History**

| <b>Date</b> | <b>Document Version</b> | <b>Document Revision History</b>                                 | <b>Document Author / Reviser / Approver</b>   |
|-------------|-------------------------|--|---|
| July 2016   | 1                       | Basis of report prepared and sent out as draft for consultation. | Dr Jacky Lawrence, Energy Manager; Adam Wilkinson / Mathilde Robert, Energy Data Analysts |
| Jan 2016    | 2                       | AR amendments  | AW  |

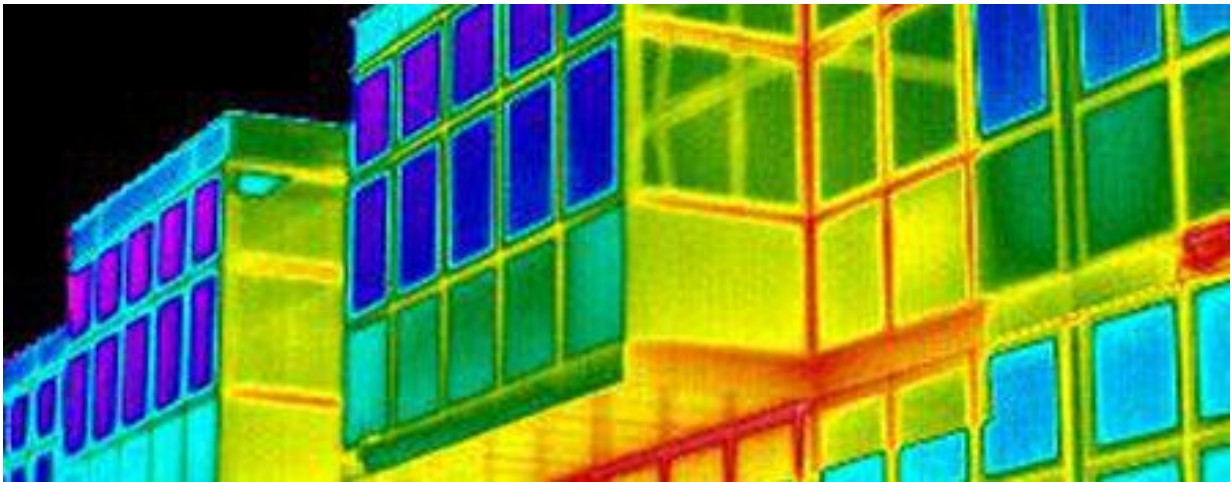
## Table of Contents

|   |    |
|---|----|
| Summary .....   | 4  |
| Introduction .....  | 4  |
| Commentary .....  | 5  |
| CO <sub>2</sub> Emissions .....   | 6  |
| Introduction .....  | 6  |
| Carbon Dioxide Emissions Data 2015/16 .....   | 8  |
| Carbon Dioxide Emission Factors .....   | 9  |
| Carbon Dioxide Equivalents .....  | 9  |
| Carbon Dioxide Tonnes per £million of Gross Revenue Expenditure .....                       | 10 |
| Combined Energy Consumption (Electricity & Gas) .....                                       | 11 |
| Introduction .....  | 11 |
| Combined Energy Consumption Data 2015/16 .....  | 12 |
| Combined Consumption Detail - 2015/16 .....   | 13 |
| Gas Consumption .....   | 15 |
| Introduction .....  | 15 |
| Gas Consumption Data 2015/16 .....  | 16 |
| Gas Consumption Detail 2015/16 .....  | 17 |
| Electricity Consumption .....   | 20 |
| Introduction .....  | 20 |
| Electricity Consumption Data 2015/16 .....  | 21 |
| Electricity Consumption Detail 2015/16 .....  | 22 |
| Water Consumption .....   | 25 |
| Introduction .....  | 25 |
| Water Metered Consumption Data 2015/16 .....  | 26 |
| Water Consumption Detail 2015/16 .....  | 27 |
| Notes On Analysis .....   | 29 |
| Introduction .....  | 29 |
| Energy Benchmarking .....   | 30 |
| Year On Year Changes .....  | 32 |
| Degree Day Summary 2015/16 .....  | 33 |
| Renewable Energy .....  | 34 |
| Introduction .....  | 34 |
| Display Energy Certificates (DECs) & Advisory Reports (ARs) 2015/16 .....                   | 37 |
| Introduction .....  | 37 |
| DEC/AR Background & Procurement .....   | 38 |
| DEC Corporate Profile & Performance .....   | 40 |
| Utility Costs .....   | 45 |
| Calculating Representative Average Utility Costs per Unit .....                             | 45 |
| Looking Forward .....   | 46 |
| Appendix .....  | 51 |
| Appendix 1: Combined Electricity & Gas Consumption 2015/16 (Corporate Buildings Only) ..... | 51 |
| Appendix 2 - WCC Corporate Property Display Energy Certificate Profile .....                | 53 |
| Appendix 3 - Links .....  | 54 |
| Historic Building Energy Review Reports .....   | 54 |
| Energy Web Pages .....  | 54 |
| Energy and Water Efficiency Performance .....   | 54 |

Energy Policy ..... 54

School Energy Management ..... 55

## Summary



### *Introduction*

This publication gives information about energy consumption (combined, then separate by utility) for buildings in the Warwickshire County Council (WCC) property portfolio for the financial year 2015/16 and compares it to data from previous years. (For property specific details - see Appendix).

Similar reports for previous years can be found on the internet on the WCC Energy Performance web page:  
<http://www.warwickshire.gov.uk/energyperformance>

## Summary

### *Commentary*

From 15/16 Schools and Academies can no longer subscribe to an Energy Traded Service with WCC. Without access to the school's energy consumption data granted by this relationship, this report is limited to Corporate buildings only from 15/16 onwards.

2016 is the sixth year WCC has undertaken annual building energy consumption reporting and benchmarking. With electronic invoice data, annual supplier statements, direct meter readings and voluntary automatic meter reading (AMR) installed, the data continues to improve. Even so, the data quality and accuracy can still be improved upon year on year. Common potential sources of data inaccuracy include:

- Meter read errors or meter faults.
- Paying invoices based on estimated readings.
- Uncorrected billing errors.
- Submitting customer reads in the wrong unit of measure (e.g. confusing m<sup>3</sup> with kWh).

The data in this report provides a basis for further more detailed investigations wherever it provokes questions about unexpected patterns of energy consumption. Both higher than average and lower than average energy consumption need to be investigated to:

- Find out why this is the case.
- Better understand energy consumption and cost in WCC properties.
- Gather more accurate data where necessary.
- Detect avoidable energy wastage that otherwise may remain hidden.
- Learn from best practice in order to know what to do to reduce costs where energy performance can be improved,
- Identify areas for investment,
- Quantify potential savings from energy saving projects,
- Improve budget forecasting,
- Develop up to date Warwickshire specific benchmarks, and
- Set targets.

## CO<sub>2</sub> Emissions



### *Introduction*

The UK is committed to reducing its greenhouse gas emissions relative to 1990 levels, by at least 80% by 2050.

WCC's corporate energy target is to achieve at least an average annual 2.5% reduction in total CO<sub>2</sub> emissions from the corporate property estate per £million gross revenue expenditure.

WCC maintains a robust energy, cost and CO<sub>2</sub> reporting system for the WCC estate to assess actions and progress towards meeting targets.

In this section:

- 1. Reporting on Carbon Emissions**  
Information on the UK Carbon Reduction Commitment CRC Energy Efficiency Scheme
- 2. Carbon Dioxide Emissions Data**  
Year on Year comparison table showing total tonnes of CO<sub>2</sub>, floor area and property numbers for each utility.
- 3. Emission Factors**  
Details on how CO<sub>2</sub> is calculated.
- 4. CO<sub>2</sub> Equivalents**  
Giving our emissions context.
- 5. CO<sub>2</sub> Tonnes per £million of Gross Revenue Expenditure**  
Our annual CO<sub>2</sub> emissions expressed in terms of the CRC reporting metric.

## *CO<sub>2</sub> Emissions*

### **Reporting on Carbon Emissions**

The Carbon Reduction Commitment CRC Energy Efficiency Scheme (also referred to as the 'CRC scheme' or 'CRC') is a mandatory carbon emissions reporting and pricing scheme designed to improve energy efficiency and cut carbon dioxide (CO<sub>2</sub>) emissions in private and public sector organisations in the UK that are high energy users.

Participants in the CRC need to measure and report on their electricity and gas supplies annually from which CRC emissions are calculated, measured in tonnes of CO<sub>2</sub>. Participants are required to buy allowances for every tonne of CO<sub>2</sub> they emit relating to electricity and gas reported under the scheme.

The scheme is divided into a number of phases, with each phase lasting five years. Currently, the scheme is in its second phase running from April 2014 to March 2019. The UK government announced in 2016 that the CRC energy efficiency scheme will be abolished following the 2018-19 compliance year.

WCC was a participant in phase 1, but is not a participant in Phase 2 as it did not meet the qualification threshold in this period. As such it is no longer required to purchase CO<sub>2</sub> allowances.

Whilst not a participant in Phase 2, the 15/16 energy data was collected the same as if formed part of the required CRC Evidence Pack. We maintain this structure as it provides a useful management tool for energy efficiency and also ensures continuity of reporting.

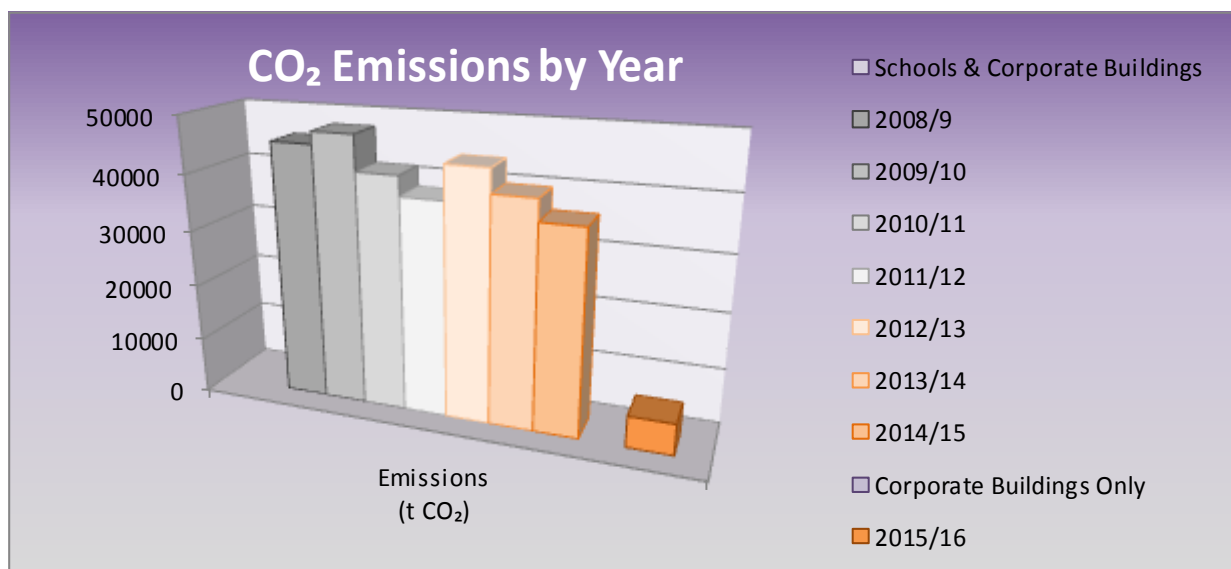
## Carbon Dioxide Emissions Data 2015/16

| Includes:                     | Year    | Fuel kWh    | No of properties | GIA (m <sup>2</sup> ) | Emissions (t CO <sub>2</sub> ) |
|-------------------------------|---------|-------------|------------------|-----------------------|--------------------------------|
| Corporate Buildings Only      | 2015/16 |             |                  |                       | 5,604                          |
|                               |         | Gas         | 64               | 90,062                | 1,969                          |
|                               |         | Electricity | 84               | 102,967               | 3,635                          |
| Schools & Corporate Buildings | 2014/15 |             |                  |                       | 36,026                         |
|                               |         | Gas         | 286              | 739,087               | 14,735                         |
|                               |         | Electricity | 334              | 779,409               | 21,291                         |
|                               | 2013/14 |             |                  |                       | 39,763                         |
|                               |         | Gas         | 287              | 759,663               | 16,832                         |
|                               |         | Electricity | 454              | 904,584               | 22,930                         |
|                               | 2012/13 |             |                  |                       | 43,902                         |
|                               |         | Gas         | 307              | 794,049               | 19,668                         |
|                               |         | Electricity | 412              | 842,899               | 24,234                         |
|                               | 2011/12 |             |                  |                       | 37,978                         |
|                               |         | Gas         | 289              | 716,196               | 15,819                         |
|                               |         | Electricity | 378              | 763,179               | 22,159                         |
|                               | 2010/11 |             |                  |                       | 41,472                         |
|                               |         | Gas         | 351              | 779,648               | 20,063                         |
|                               |         | Electricity | 420              | 827,632               | 35,479                         |
|                               | 2009/10 |             |                  |                       | 47,600                         |
|                               | 2008/9  |             |                  |                       | 45,467                         |

\* 55,541 Total including street lighting

\* Including additional corporate emissions identified and CRC report corrected in 13/14, previously the figure was 43,030 tonnes carbon dioxide.

\* Corporate Buildings only, operational for whole reporting period





## Carbon Dioxide Emission Factors

### Emission Factors:

To convert kilowatt hours of Gas & Electricity into CO<sub>2</sub>, the following CRC Phase 2 Conversion Factors v6 are used, published 09th June 2016:

Natural Gas: 0.18407 kg CO<sub>2</sub> / kWh

Electricity: 0.49636 kg CO<sub>2</sub> / kWh (including transmission and distribution losses)

## Carbon Dioxide Equivalents

### Equivalents:

What does 5604 tonnes of carbon dioxide actually mean?

The graphics below give context by illustrating equivalents for 5604 tonnes of CO<sub>2</sub>.

More information about these equivalents, how they are calculated and what assumptions are made, are available here: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

### Equivalency Results [How are they calculated?](#)

The sum of the greenhouse gas emissions you entered above is of Carbon Dioxide Equivalent. This is equivalent to:

5,604 Metric Tons

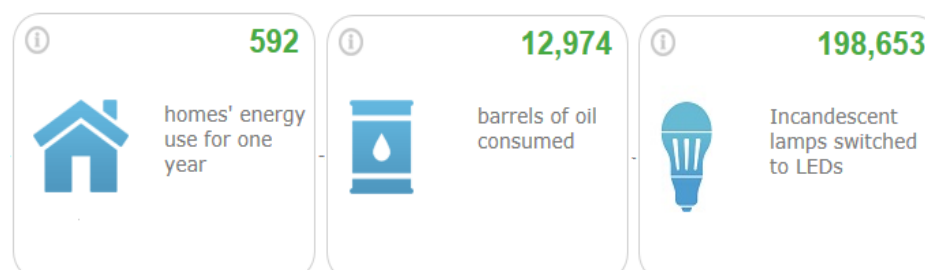
#### Greenhouse gas emissions from



#### Carbon sequestered by



#### CO<sub>2</sub> emissions from



## Carbon Dioxide Tonnes per £million of Gross Revenue Expenditure

### Tonnes of carbon dioxide per £million of gross revenue expenditure

The CRC reporting metric is tonnes of carbon dioxide per £million pounds of gross revenue expenditure. On this metric the lower the CO<sub>2</sub>/£million value, the better the performance. WCC will continue to report on this metric even though not a participant in Phase 2 of the CRC.

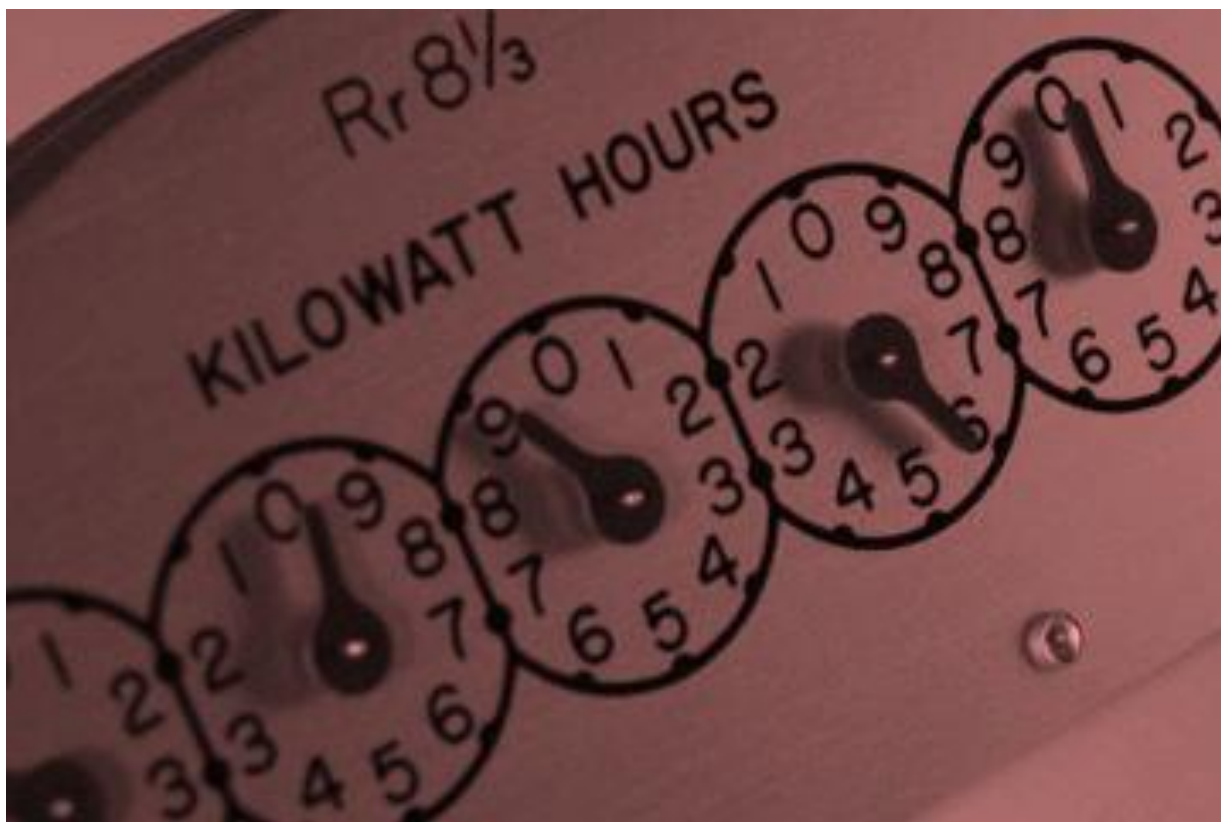
|   |      |             |
|---|------|-------------|
| For financial year 2015/16 WCC's Gross Revenue Expenditure was: | £530 | (£millions) |
|---|------|-------------|

| Year                                     | tonnes CO <sub>2</sub> /£million Gross Revenue Expenditure | % change:            |
|--|--|----------------------|
| <b>Schools &amp; Corporate Buildings</b> |  | <b>since 2010/11</b> |
| 2010/11                                  | 63.01  |                      |
| 2011/12                                  | 44.96  | ↑ -29%               |
| 2012/13                                  | 57.47  | ↓ -9%                |
| 2013/14                                  | 51.48  | → -18%               |
| 2014/15                                  | 48.16  | ↗ -24%               |
| <b>Corporate Buildings Only</b>          |  | <b>since 2014/15</b> |
| 2014/15                                  | 13.21  |                      |
| 2015/16                                  | 10.57  | ↑ -20%               |

### Why the tonnes CO<sub>2</sub>/£million Gross Revenue Expenditure metric drops significantly without schools

Public services delivered from Corporate buildings, such as Safeguarding, Fire & Rescue and Adult Social Care; account for approximately 60% of the total Gross Revenue Expenditure, but only around 25% of the total WCC buildings and 15% of the total CO<sub>2</sub> emissions.

## Combined Energy Consumption (Electricity & Gas)



### Introduction

This section details the combined electricity & gas consumption in kWh for WCC's buildings. It also identifies the largest contributing properties to the headline CO<sub>2</sub> figures from the previous section.

What's in this section:

1. **Combined Consumption Data**  
Year on Year comparison table showing total kilowatt hours, floor area, property numbers and a weighted average cost per m<sup>2</sup> for each utility.
2. **Highest Consumers**  
Chart showing the 20 highest consuming properties for the current year expressed in tonnes of CO<sub>2</sub>.
3. **Proportional Split**  
Chart showing the proportional contribution of gas & electricity towards our total combined consumption.
4. **Weighted average cost per metre squared of floor area**  
Explanation for how this metric is calculated

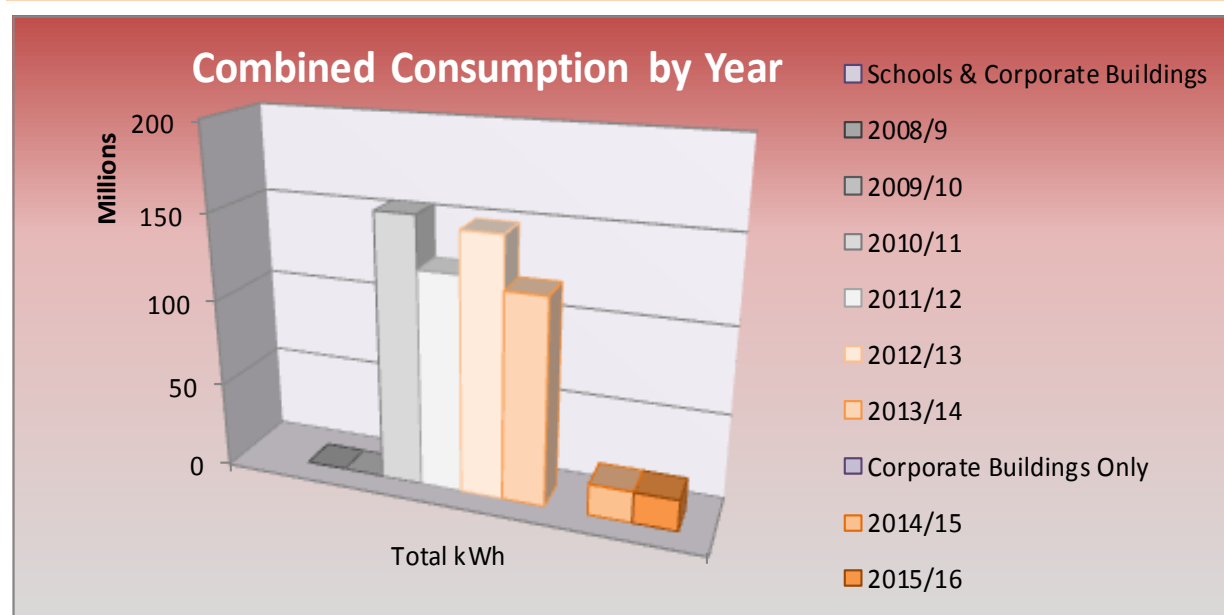
## Combined Energy Consumption Data 2015/16

| Includes:                     | Year    | No of properties | wgt'd Av £/m2 | GIA (m2) | Total kWh   |
|-------------------------------|---------|------------------|---------------|----------|-------------|
| Corporate Buildings Only      | 2015/16 | 88               | £10.03        | 105,307  | 18,021,835  |
|                               | 2014/15 | 94               | £10.50        | 110,431  | 18,207,278  |
| Schools & Corporate Buildings | 2013/14 | -                | -             | -        | 119,396,522 |
|                               | 2012/13 | -                | -             | -        | 149,055,878 |
|                               | 2011/12 | -                | -             | -        | 125,306,374 |
|                               | 2010/11 | -                | -             | -        | 154,939,304 |
|                               | 2009/10 | -                | -             | -        | -           |
|                               | 2008/9  | -                | -             | -        | -           |

\* No Data

\* Annual Review Weighted Average £/m2 data not available pre 2014/5

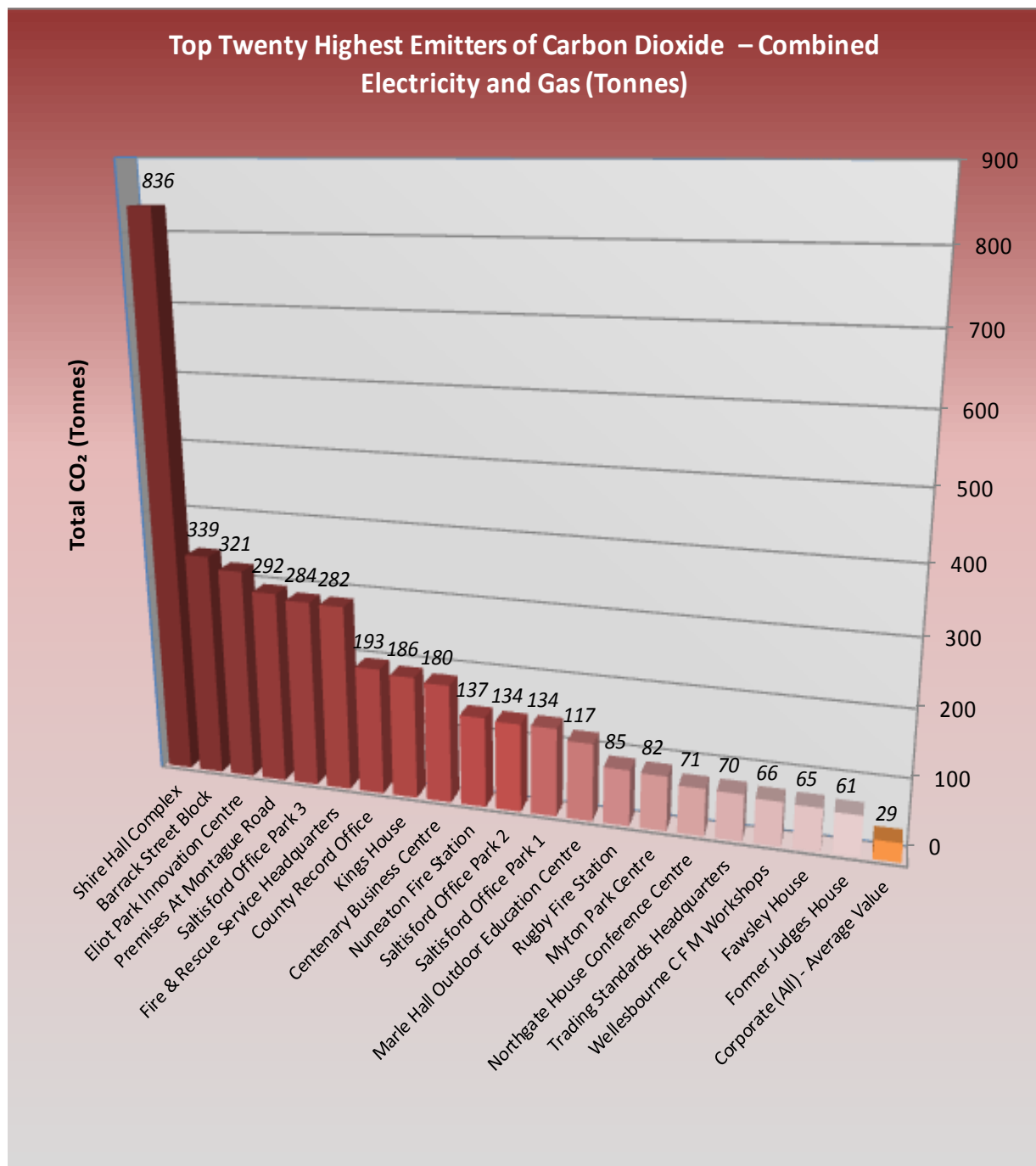
\* Corporate Buildings only, operational for whole reporting period



## Combined Consumption Detail - 2015/16

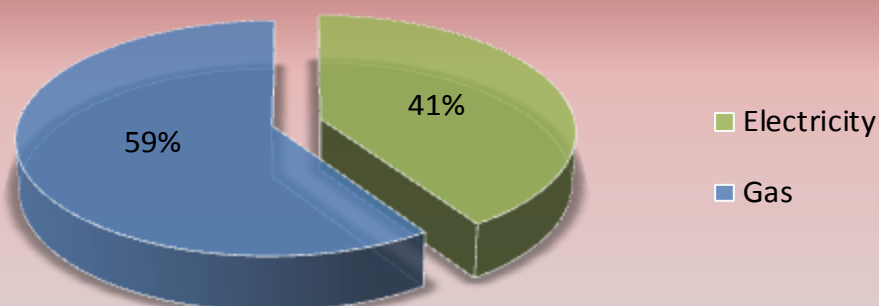
### Current Year Highest Consumers Overall:

The graph below shows the 20 highest emitters of Carbon Dioxide (in tonnes) for WCC's Corporate Portfolio. To give context to these values, the average across all properties is shown in orange (far right).



## Combined Consumption Detail - 2015/16

### Combined Consumption - Split by Utility



### Weighted average cost per square metre (£/m<sup>2</sup>)

WCC pays a range of tariff rates for gas and electricity across its portfolio relevant to the annual quantities supplied to each meter point.

In general terms, the cost per unit for gas is cheaper than the cost per unit of electricity, also the larger the annual quantity supply, the more preferential the unit rate.

To take account of these variances when generating a singular average cost value, a weighted average is used. The weighted average is calculated by dividing the total cost for the annual quantity of each gas and electricity supply by the gross internal area (GIA) in metres squared:

$$\text{£/m}^2 \text{ per utility} = \frac{\text{Total of annual costs per supply (£)}}{\text{Total floor area supplied (m}^2\text{)}}$$

As some properties are not connected to both utilities, (e.g. electrically or oil heated), the combined GIA is not the same as the individual GIA's for gas and electricity. As such the combined £/m<sup>2</sup> is not the same as simply adding the average costs for gas plus the average cost for electricity, and is calculated as:

$$\text{Combined £/m}^2 = \frac{(\text{Total £ Gas}) + (\text{Total £ Electricity})}{\text{Combined Floor area supplied (m}^2\text{)}}$$

## Gas Consumption



### Introduction

This section provides a more detailed insight for the gas consumption figures measured in kilowatt hours, (kWh) that comprise the headline CO<sub>2</sub> and combined consumption data above.

What's in this section:

- 1. Gas Consumption Data**  
Year on Year comparison table showing total kilowatt hours, floor area, property numbers and a weighted average cost per m<sup>2</sup> for gas.
- 2. Meter Statistics & Methodology**  
Details on the gas meters included in our analysis and data preparation.
- 3. Where We Use Our Gas**  
Illustration of the relationship between gas consumption and floor area served for each benchmark property type.
- 4. Quartile Distribution**  
Illustration of the ranges of gas consumption observed within each benchmark property classification.
- 5. Top Tens**  
This year's highest and lowest gas consuming properties per unit of floor area.

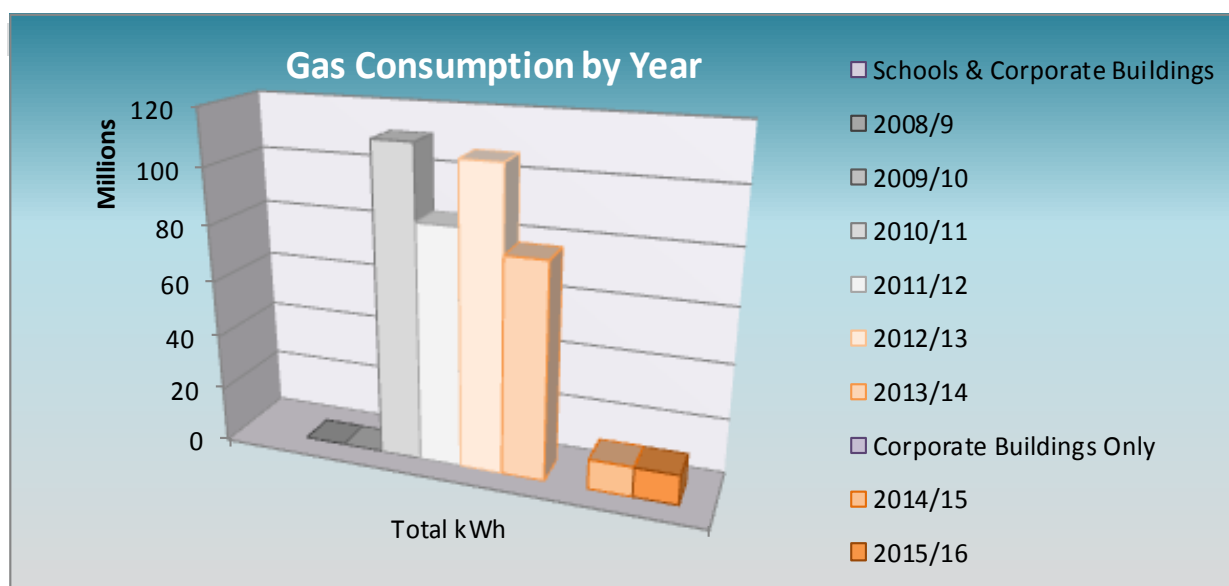
## Gas Consumption Data 2015/16

| Includes:                     | Year    | No of properties | wgt'd Av £/m <sup>2</sup> | GIA (m <sup>2</sup> ) | Total kWh   |
|-------------------------------|---------|------------------|---------------------------|-----------------------|-------------|
| Corporate Buildings Only      | 2015/16 | 64               | £3.45                     | 90,062                | 10,698,020  |
|                               | 2014/15 | 68               | £3.78                     | 94,934                | 10,784,233  |
| Schools & Corporate Buildings | 2013/14 | 287              | -                         | 759,663               | 77,265,868  |
|                               | 2012/13 | 307              | -                         | 794,049               | 106,880,545 |
|                               | 2011/12 | 289              | -                         | 716,196               | 85,119,147  |
|                               | 2010/11 | 351              | -                         | 779,648               | 111,122,081 |
|                               | 2009/10 | -                | -                         | -                     | -           |
|                               | 2008/9  | -                | -                         | -                     | -           |

\* No Data

\* Annual Review Weighted Average £/m<sup>2</sup> data not available pre 2014/5

\* Corporate Buildings only, operational for whole reporting period





## Gas Consumption Detail 2015/16

### Meter statistics and methodology

#### Gas Meter Statistics

|    |   |
|----|---|
| 77 | Total number of Meter Point Reference Numbers (MPRNs) included in our analysis. |
| 10 | Exclusions (Non-WCC responsibility   Disposal   Less than 12 months operation)  |

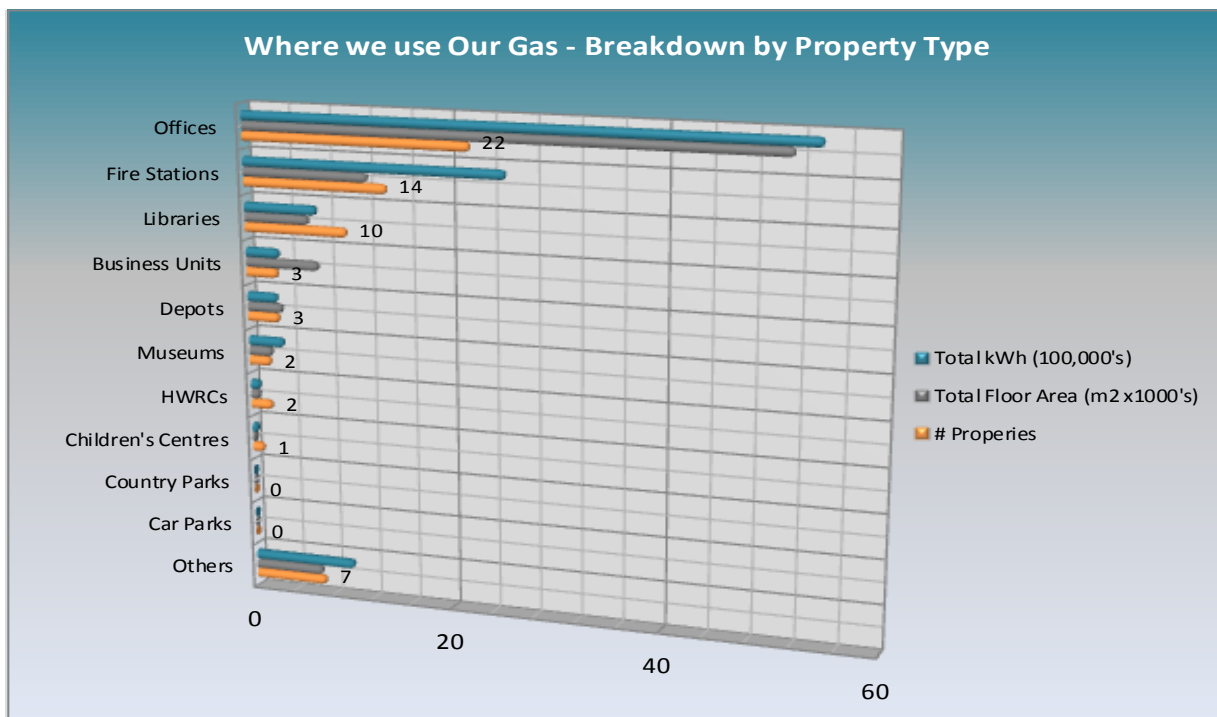
#### Gas Data Validation - Methodology

- Annual supply statements are requested from provider & compiled using a Date Range apportionment of statements for annual totals per meter and per property supplied.
- Where meters serve more than one property the consumption is apportioned between the properties based on floor area.
- Properties grouped by operational type for comparative performance
- Cleansing, validation & cross checks for anomalies against invoice data held in WCC Energy Database based on:
  - Exclusions (as above)
  - Quartile outliers (Highest & Lowest) by Comparative Property Type/Group
  - Top 10 properties with largest year on year increase in consumption
  - Top 10 properties with the largest year on year reduction in consumption

### Gas consumption by type of property and floor area

#### Where We Use Our Gas

The graph below shows comparative totals for the consumption (kWh) and the total floor areas (m<sup>2</sup>) for the different property types WCC operates. The data labels on the chart show the number of properties in each group.



## Gas Consumption Detail 2015/16

### Distribution of Gas Consumption per m<sup>2</sup> by property type

#### Quartiles by Property Type :

The quartiles chart below shows the expected ranges of consumption for each property type as a box & whisker plot.

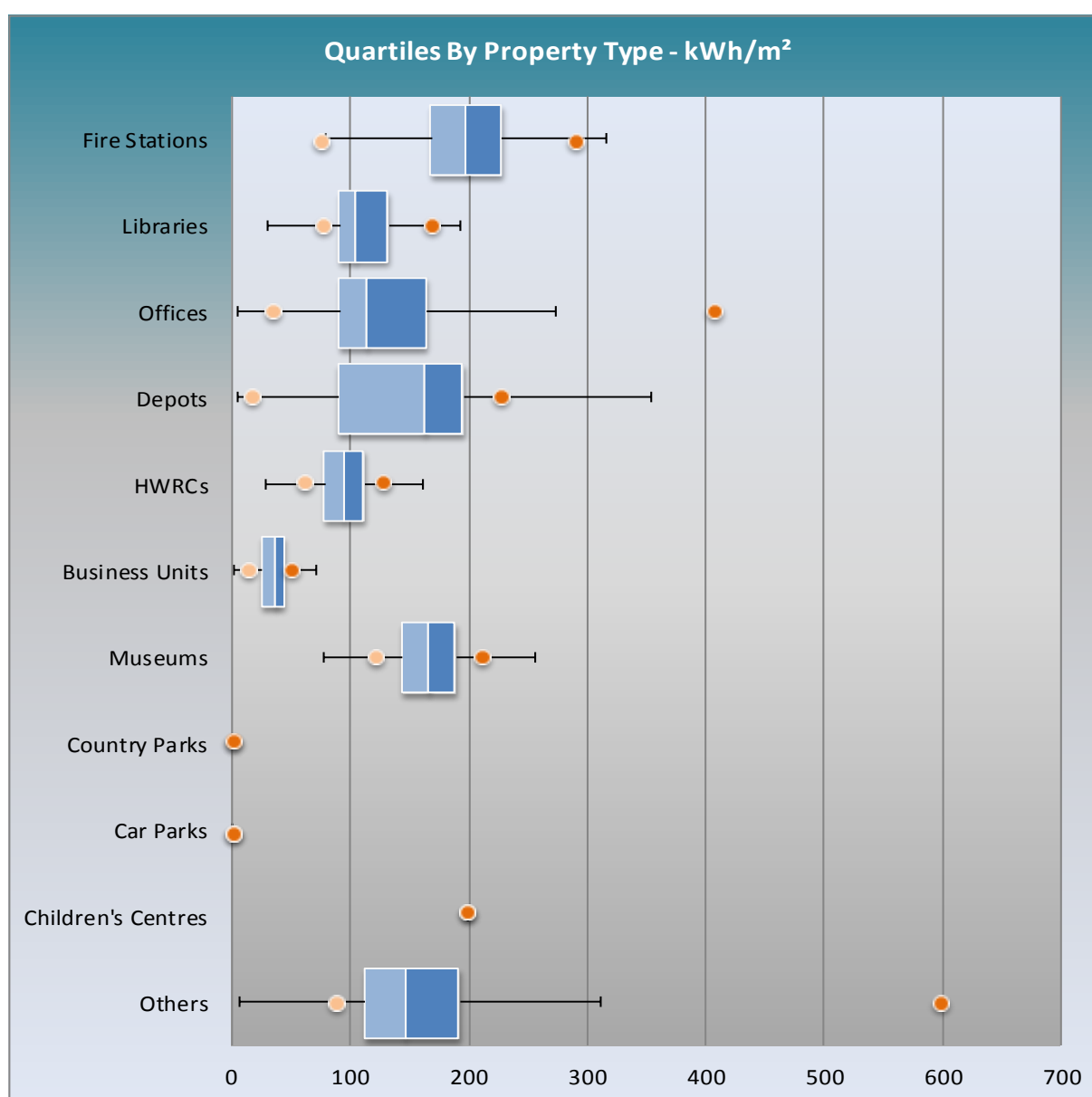
The most frequently occurring range is represented by the two coloured boxes.

The Median Value for each group occurs on the division line between the two colours.

The lines (whiskers) show the deviation range for the sample.

The coloured dots show the "Highest" and "Lowest" value for each group.

"Outliers" are defined as values that are outside the range of the "whiskers" for each group.



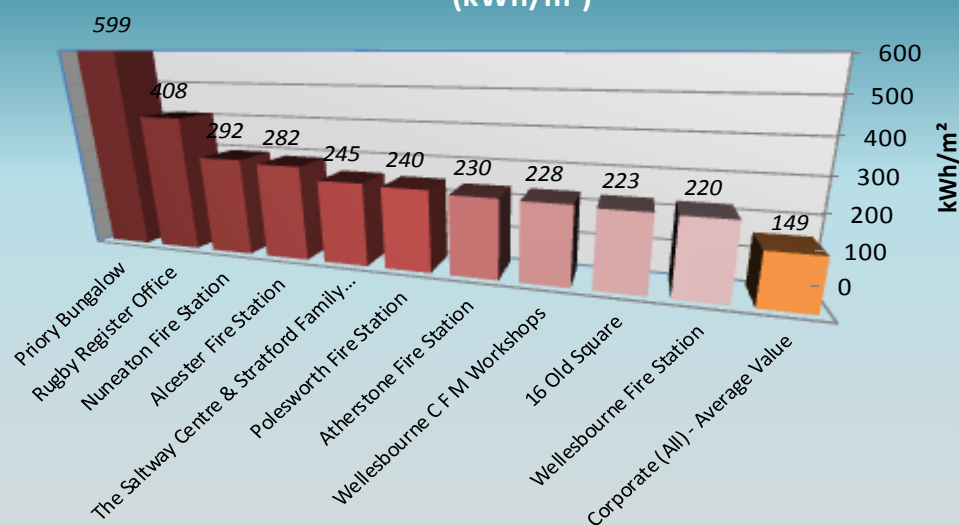
## Gas Consumption Detail 2015/16

### Top Ten Highest & Lowest Gas Consumers Per m<sup>2</sup>

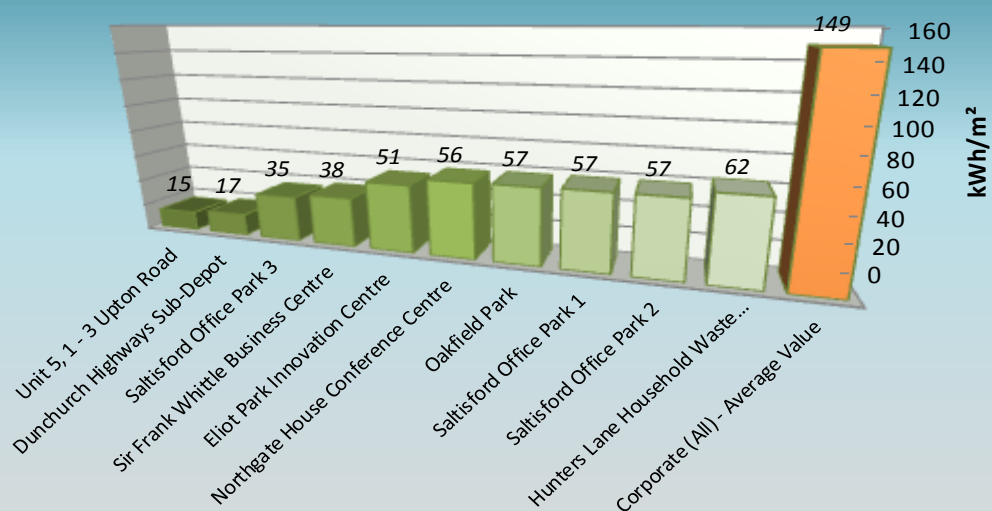
#### Current Year Highest & Lowest Consumers Overall

The graphs below show the 10 highest and 10 lowest consumers of gas per unit of floor area (kWh/m<sup>2</sup>). To give context to these values, the average across all properties is shown in orange (far right).

**Current Year Top Ten Highest Gas Consumers Per Unit of Floor Area – (kWh/m<sup>2</sup>)**



**Current Year Top Ten Lowest Gas Consumers Per Unit of Floor Area – (kWh/m<sup>2</sup>)**



## Electricity Consumption



### Introduction

This section provides a more detailed breakdown for electricity consumption figures measured in kilowatt hours, (kWh) that comprise the headline CO<sub>2</sub> and combined consumption data above.

What's in this section:

- 1. Electricity Consumption Data**  
Year on Year comparison table showing total kilowatt hours, floor area, property numbers and a weighted average cost per m<sup>2</sup>.
- 2. Meter Statistics & Methodology**  
Details on the electricity meters included in our analysis and data preparation.
- 3. Where We Use Our Electricity**  
Illustration of the relationship between gas consumption and floor area served for each benchmark property type.
- 4. Quartile Distribution**  
Illustration of the ranges of electricity consumption observed within each benchmark property classification.
- 5. Top Tens**  
This year's highest and lowest electricity consuming properties per unit of floor area.

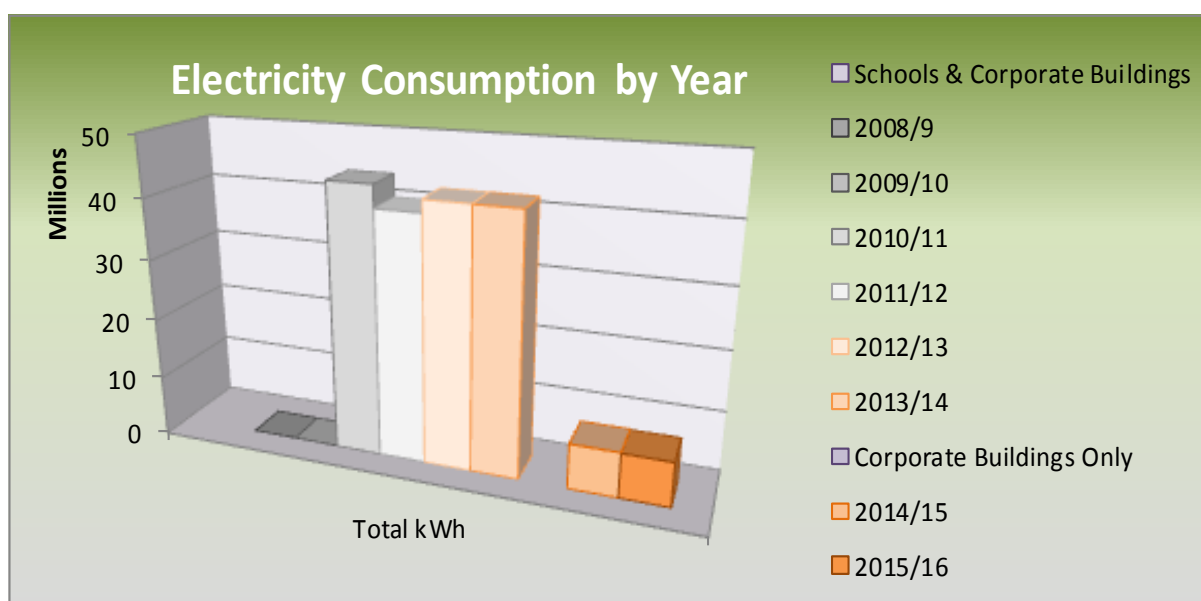
## Electricity Consumption Data 2015/16

| Includes:                     | Year    | No of properties | wgt'd Av £/m2 | GIA (m2) | Total kWh  |
|-------------------------------|---------|------------------|---------------|----------|------------|
| Corporate Buildings Only      | 2015/16 | 84               | £7.23         | 102,967  | 7,323,814  |
|                               | 2014/15 | 87               | £7.40         | 108,187  | 7,423,045  |
| Schools & Corporate Buildings | 2013/14 | 454              | -             | 904,584  | 42,130,654 |
|                               | 2012/13 | 412              | -             | 842,899  | 42,175,333 |
|                               | 2011/12 | 378              | -             | 763,179  | 40,187,227 |
|                               | 2010/11 | 420              | -             | 827,632  | 43,817,223 |
|                               | 2009/10 | -                | -             | -        | -          |
|                               | 2008/9  | -                | -             | -        | -          |

\* Annual Review # Properties data not available pre 2012/3

\* Annual Review Weighted Average £/m2 data not available pre 2014/5

\* Corporate Buildings only, operational for whole reporting period



## Electricity Consumption Detail 2015/16

### Meter statistics and methodology

#### Electricity Meter Statistics:

|     |  |
|-----|--|
| 123 | Total number of Meter Point Administration Numbers (MPANs) included in our analysis. |
| 13  | Exclusions (Non-WCC responsibility   Disposal   Less than 12 months operation)       |

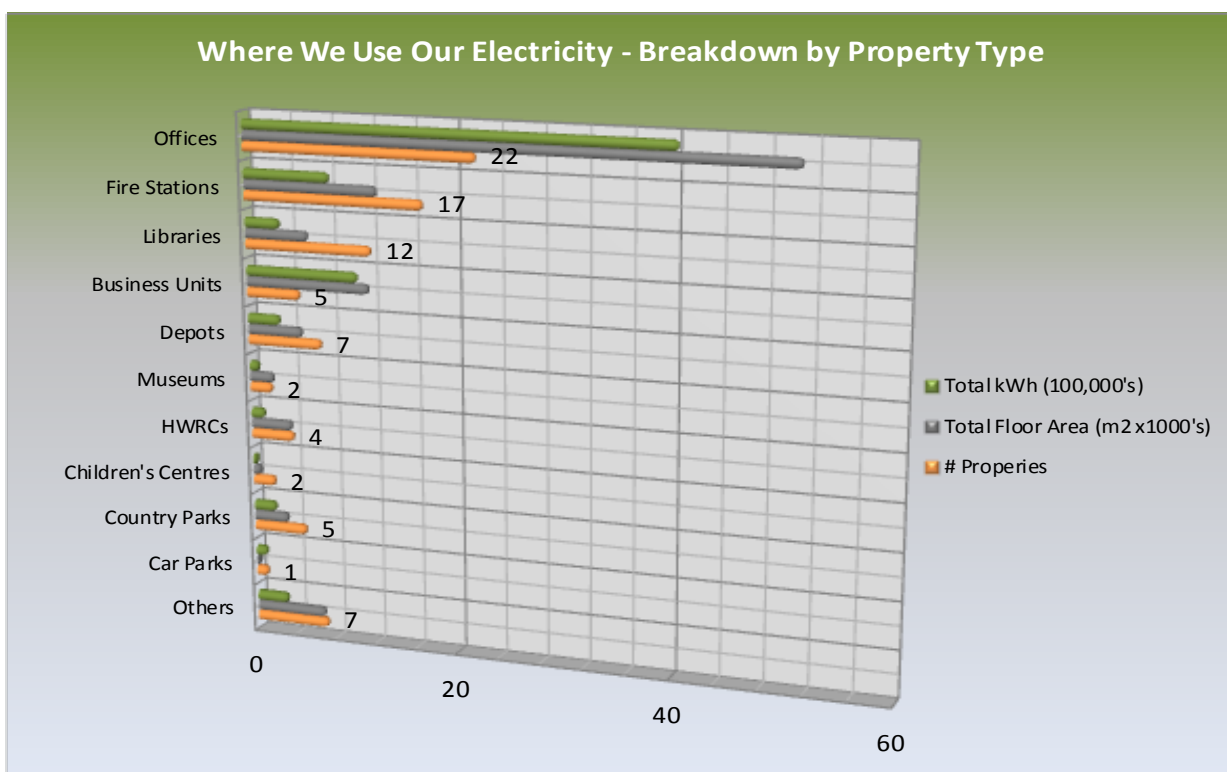
#### Electricity Data Validation - Methodology:

- Annual supply statements are requested from provider & compiled using a Date Range apportionment of statements for annual totals per meter and per property supplied.
- Where meters serve more than one property the consumption is apportioned between the properties based on floor area.
- Properties grouped by operational type for comparative performance
- Cleansing, validation & cross checks for anomalies against invoice data held in WCC Energy Database based on:
  - Exclusions (as above)
  - Quartile outliers (Highest & Lowest) by Comparative Property Type/Group

### Electricity consumption by type of property and floor area

#### Where We Use Our Electricity:

The graph below shows comparative totals for the consumption (kWh) and the total floor areas (m<sup>2</sup>) for the different property types WCC operates. The data labels on the chart show the number of properties in each group.



## Electricity Consumption Detail 2015/16

### Distribution of Electricity Consumption per m<sup>2</sup> by property type

#### Quartiles by Property Type :

The quartiles chart below shows the expected ranges of consumption for each property type as a box & whisker plot.

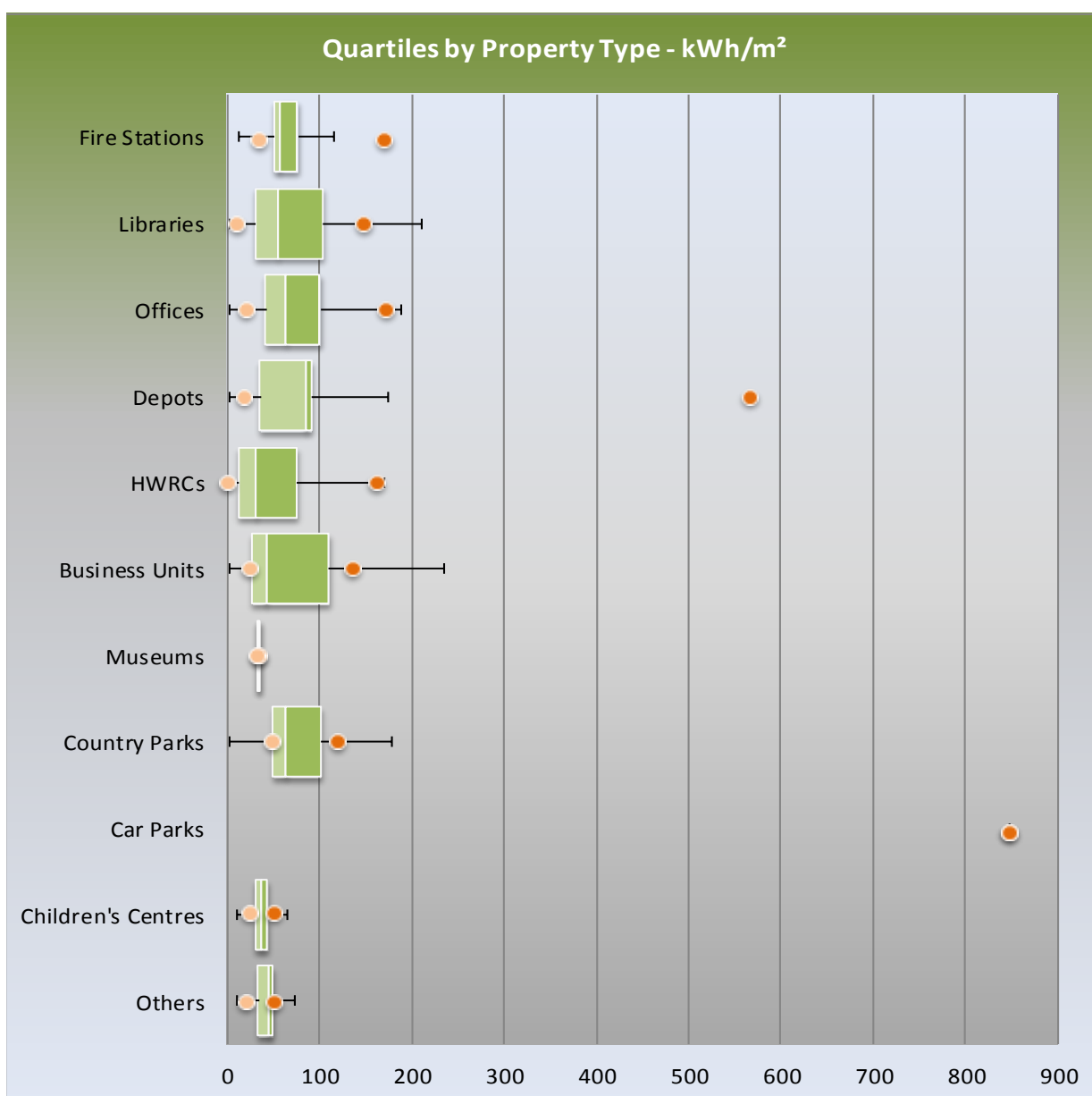
The most frequently occurring range is represented by the two coloured boxes.

The Median Value for each group occurs on the division line between the two colours.

The lines (whiskers) show the deviation range for the sample.

The coloured dots show the "Highest" and "Lowest" value for each group.

"Outliers" are defined as values that are outside the range of the "whiskers" for each group.



## Electricity Consumption Detail 2015/16

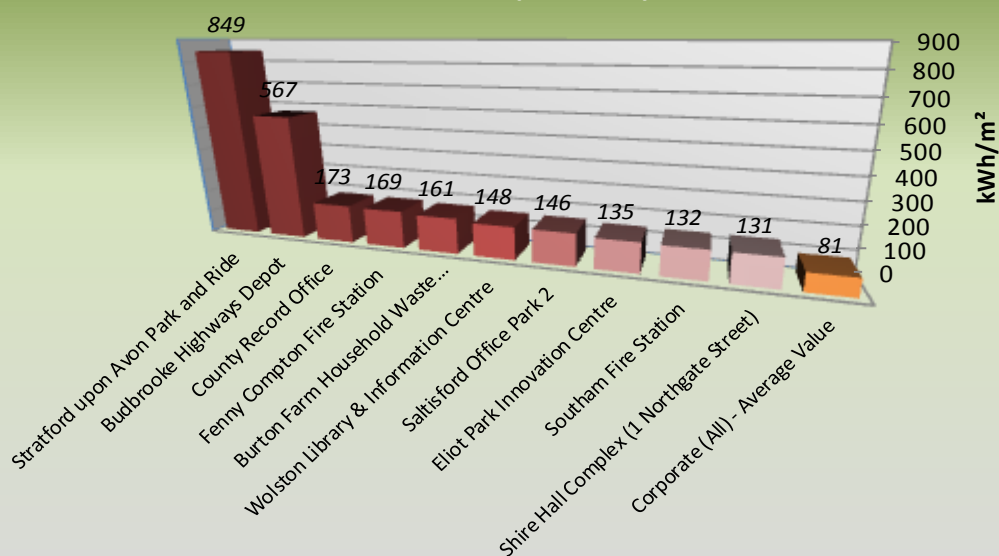
### Top Ten Highest & Lowest Electricity Consumers Per m<sup>2</sup>

#### Current Year Highest & Lowest Consumers Overall:

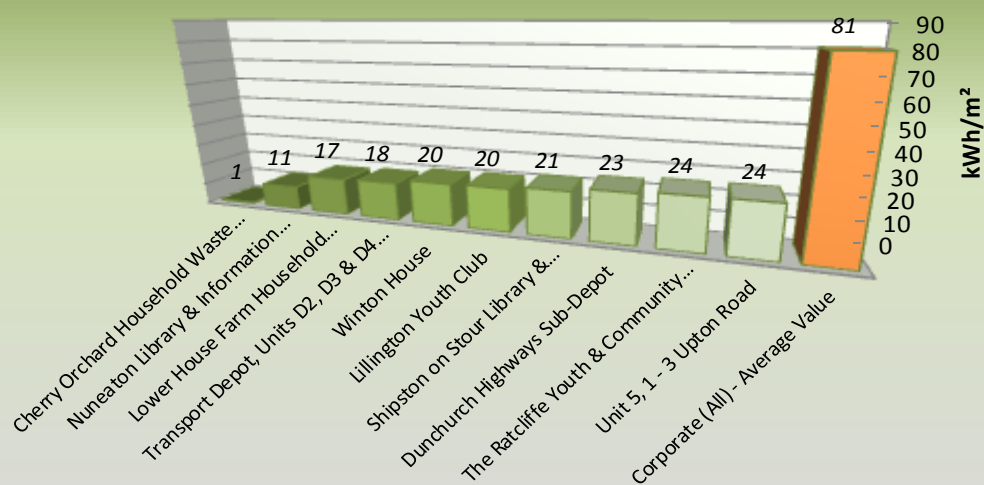
The graphs below show the 10 highest and 10 lowest consumers of electricity per unit of floor area (kWh/m<sup>2</sup>).

To give context to these values, the average across all properties is shown in orange (far right).

#### Current Year Top Ten Highest Electricity Consumers Per Unit of Floor Area – (kWh/m<sup>2</sup>)



#### Current Year Top Ten Lowest Electricity Consumers Per Unit of Floor Area – (kWh/m<sup>2</sup>)





# Water Consumption



## Introduction

Commercial water use is measured in litres and is split into three main elements; the fresh water consumed, sewerage and surface water drainage. This section provides a breakdown for the metered water consumption for the buildings WCC operates.

What's in this section:

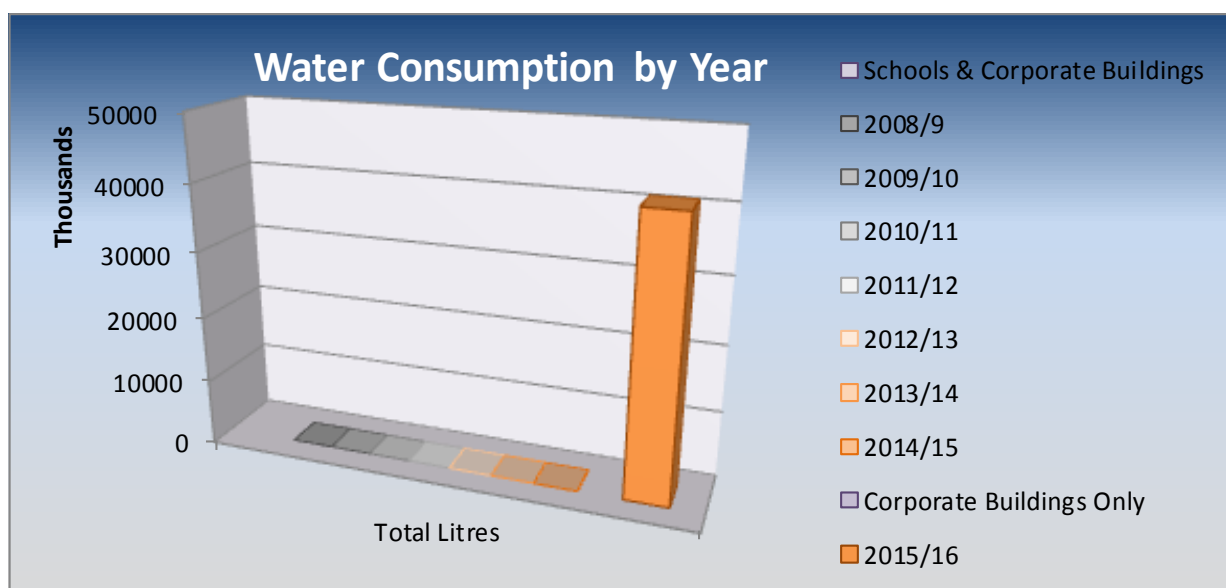
- 1. Water Consumption Data**  
Year on Year comparison table showing total cubic litres, floor area, property numbers and a weighted average cost per m<sup>2</sup>.
- 2. Meter Statistics & Methodology**  
Details on the water meters included in our analysis and data preparation.
- 3. Where We Use Our Water**  
Illustration of the relationship between water consumption and floor area served for each benchmark property type.
- 4. Quartile Distribution**  
Illustration of the ranges of water consumption observed within each benchmark property classification.

## Water Metered Consumption Data 2015/16

| Includes:                     | Year    | No of properties | wgt'd Av £/m <sup>2</sup> | GIA (m <sup>2</sup> ) | Total Litres |
|-------------------------------|---------|------------------|---------------------------|-----------------------|--------------|
| Corporate Buildings Only      | 2015/16 | 65               | £1.76                     | 87,203                | 40,976,566   |
|                               |         |                  |                           |                       |              |
| Schools & Corporate Buildings | 2014/15 | -                | -                         | -                     | -            |
|                               | 2013/14 | -                | -                         | -                     | -            |
|                               | 2012/13 | -                | -                         | -                     | -            |
|                               | 2011/12 | -                | -                         | -                     | -            |
|                               | 2010/11 | -                | -                         | -                     | -            |
|                               | 2009/10 | -                | -                         | -                     | -            |
|                               | 2008/9  | -                | -                         | -                     | -            |
|                               |         |                  |                           |                       |              |

\* No data available pre 2015/16

\* Corporate Buildings only, operational for whole reporting period



# Water Consumption Detail 2015/16

## Meter statistics and methodology

### Water Meter Statistics:

|     |  |
|-----|--|
| 108 | Total number of Meters at properties included in our analysis.                                     |
| 33  | Exclusions:<br>( Non-Metered   Non-WCC responsibility   Disposal   Less than 12 months operation ) |

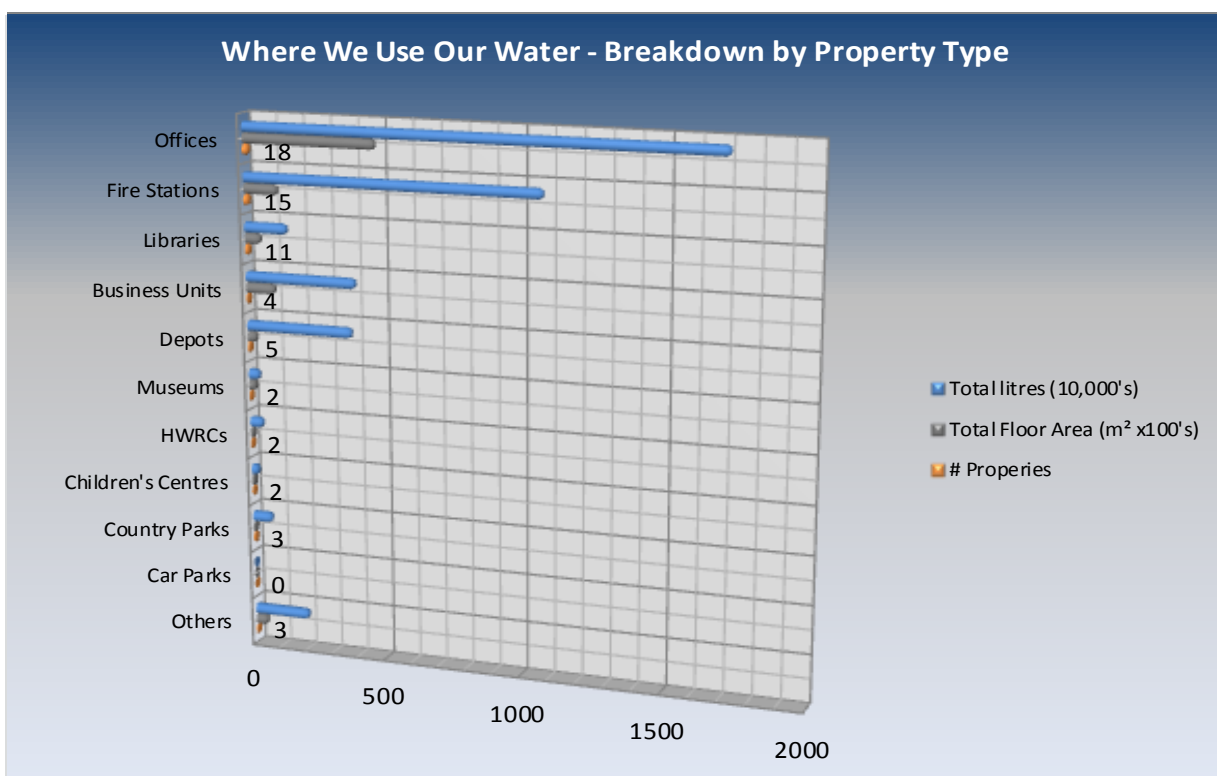
### Water Data Validation - Methodology:

- Annual supply statements requested from provider.
- Where meters serve more than one property the consumption is apportioned between the properties based on floor area.
- Properties grouped by operational type for comparative performance
- Cleansing & validation based on:
  - Exclusions (as above)
  - Quartile outliers (Highest & Lowest) by Comparative Property Type/Group

## Water consumption by type of property and floor area

### Where We Use Our Water:

The graph below shows comparative totals for the consumption (Litres) and the total floor areas (m<sup>2</sup>) for the different property types WCC operates. The data labels on the chart show the number of properties in each group.



## Water Consumption Detail 2015/16

### Distribution of Water Consumption per m<sup>2</sup> by property type

#### Quartiles by Property Type :

The quartiles chart below shows the expected ranges of consumption for each property type as a box & whisker plot.

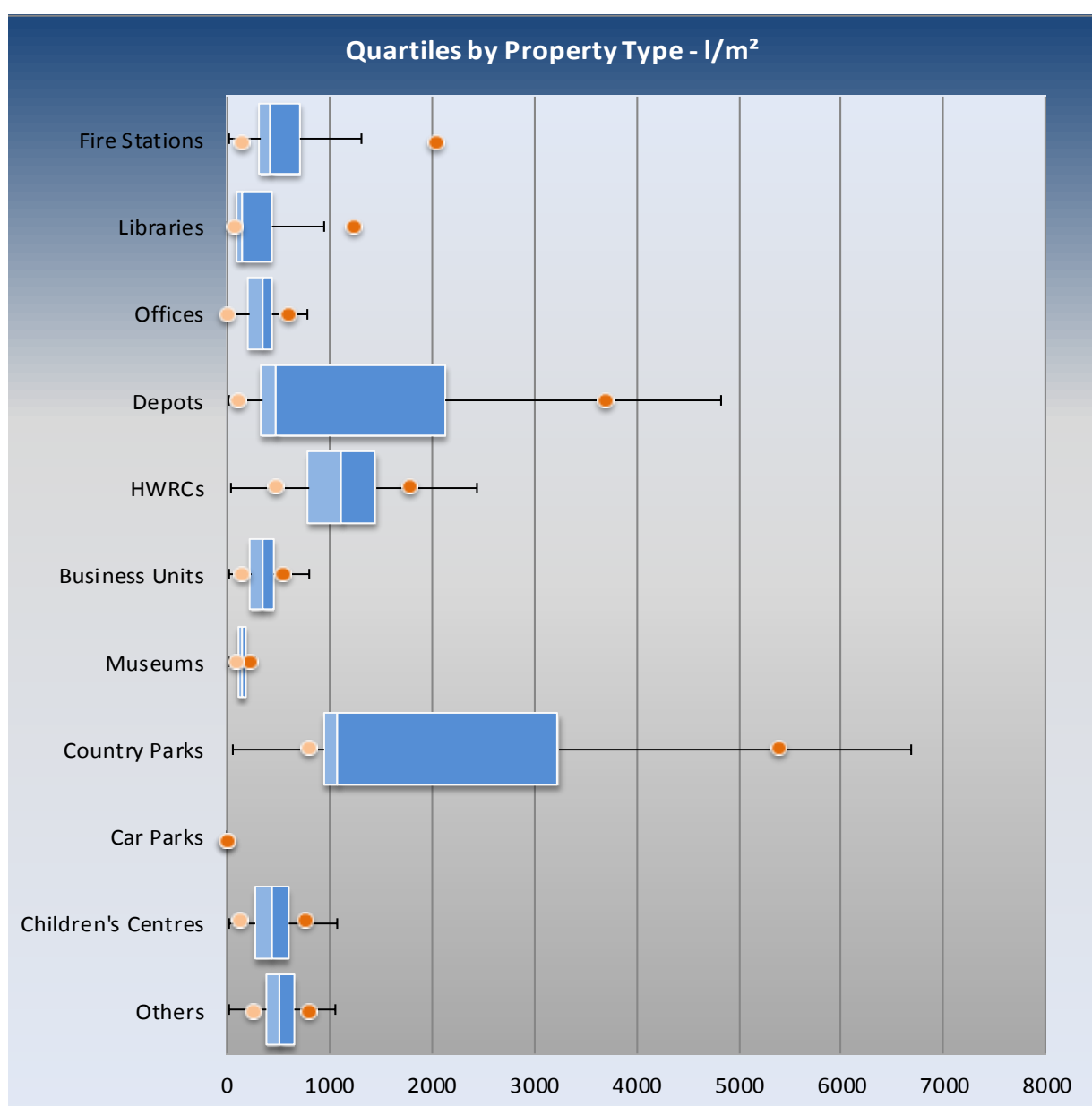
The most frequently occurring range is represented by the two coloured boxes.

The Median Value for each group occurs on the division line between the two colours.

The lines (whiskers) show the deviation range for the sample.

The coloured dots show the "Highest" and "Lowest" value for each group.

"Outliers" are defined as values that are outside the range of the "whiskers" for each group.



## Notes On Analysis



### *Introduction*

Here we provide more background information for some of the overarching concepts that relate to the preparation of the figures for this annual building energy consumption review.

In this section...

- 1. Energy Benchmarking**  
Information on why we split our portfolio into different property type categories for comparative analysis.
- 2. Year on Year Changes**  
Contributory factors that influence the differences in consumption values reported year on year.
- 3. Degree Day Summary**  
An explanation of what degree days are and how they can be used.
- 4. Calculating Energy Specific Costs**  
Methodology used to derive a property specific cost value

## Energy Benchmarking

### What are Energy Benchmarks?

The utility consumption sections of this report make reference to Energy benchmarking categories. Energy benchmarking means tracking a building's energy use and using a standard metric to compare the building's performance against past performance.

WCC conducts a range of public services from its corporate portfolio, and logically, any comparison between properties with different functions; such a household waste recycling centre and library, wouldn't be particularly meaningful.

Therefore, the buildings are split into categories based on their mode of operation, generating a standard metric for each type, so that meaningful comparisons between buildings can be made.

These comparisons can be used to drive energy efficiency upgrades, increase occupancy rates or improve property values. Benchmarks for smaller buildings may not necessarily be the same as for large buildings, even though they may be used for the same purpose.

Benchmarks are only a guide to help more fully understand energy performance of a building – not an exact indication of either good or poor performance.

The lowest and highest outliers in each WCC category were investigated (for missing data, billing on estimates and consumption versus previous years) and excluded from developing these benchmarks if there were obvious reasons to do so.

### WCC's Energy Benchmarks Categories

The Operational Categories used for Benchmarking WCCs Corporate Portfolio are:

- Fire Stations
- Libraries
- Offices
- Depots
- Household Waste Recycling Centres
- Business Units
- Museums
- Country Parks
- Car Parks
- Children's Centres
- Others

## Energy Benchmarking

### Energy Benchmark Values

The benchmark for each operational category is the median value identified in the quartiles chart within each utility section.

When interpreting these benchmarks consideration needs to be given to:

- The number of samples on which they are based (Benchmark values based on categories with fewer properties will be less robust)
- How closely comparable the operational parameters of the buildings within each category are likely to be (e.g. buildings within the “Libraries” group are more likely to have common function and hours of operation than those within the, “Depots” or “Others” categories.
- Buildings used for the same purpose vary in age and construction type and therefore energy performance.
- Buildings used for the same purpose may be open plan or cellular.
- WCC are only responsible for reporting energy consumption in communal areas of business centres, not units used by private businesses.
- Building user behaviour varies considerably from highly motivated to be energy efficient to very wasteful depending on the social norms within the building and leadership from above.
- Hours of use for buildings used for the same purpose may vary widely. For instance, some may be open for clubs at night time or for community purposes at weekends and holiday periods.
- Some buildings used for the same purpose may be fully air conditioned; others may only have natural ventilation, others a combination.
- Some buildings in the south of the county where there is no gas network may have only electric heating or oil heating or a combination of oil and electricity etc.

### WCC Energy Benchmarks

| Operational Category              | Utility                   |                                   |                           |
|-----------------------------------|---------------------------|-----------------------------------|---------------------------|
|                                   | Gas (kWh/m <sup>2</sup> ) | Electricity (kWh/m <sup>2</sup> ) | Water (l/m <sup>2</sup> ) |
| Fire Stations                     | 199                       | 57                                | 435                       |
| Libraries                         | 105                       | 56                                | 157                       |
| Offices                           | 115                       | 64                                | 355                       |
| Depots                            | 163                       | 85                                | 487                       |
| Household Waste Recycling Centres | 95                        | 32                                | 1126                      |
| Business Units                    | 38                        | 43                                | 347                       |
| Museums                           | 167                       | 34                                | 151                       |
| Country Parks                     | -                         | 64                                | 1092                      |
| Car Parks                         | -                         | 849                               | -                         |
| Children's Centres                | 199                       | 38                                | 442                       |
| Others                            | 147                       | 46                                | 521                       |
| Range                             | 38 to 199                 | 32 to 849                         | 151 to 1126               |

## Year On Year Changes

### Reasons for the Range of Values and Year on Year Changes in Energy Consumption and Cost

Factors for consideration on the wide range of Year on Year values include:

**Practical:**

- Exclusion of schools due to cessation of the Energy Traded Service.

**Invoicing:**

- There may be billing issues such as corrections, overcharges and refunds between years.
- There could be a high number of under-estimates or over-estimates on which invoices were paid rather than being based on customer reads where an actual read was not taken.

**Physical:**

- Corporate emissions will change due to property disposal and acquisition; the property rationalisation programme; works to improve the building fabric, insulation, heating, lighting and controls; increased use of IT etc.
- The property may have been vacated during the year resulting in low consumption.

**Data:**

- The meter may supply more properties than the supply address (e.g. Shire Hall supplies Barrack St). Where the buildings are not of similar construction and operation, the apportioning by m<sup>2</sup> methodology may not accurately reflect consumption for each building.
- The data sets that have been made available to us may be incomplete.
- Partial data availability due to property sale, purchase or change of supplier during the year.
- Meters accidentally read or reported in the wrong units (e.g. confusing gas ft<sup>3</sup> & m<sup>3</sup> units).

**Legislative:**

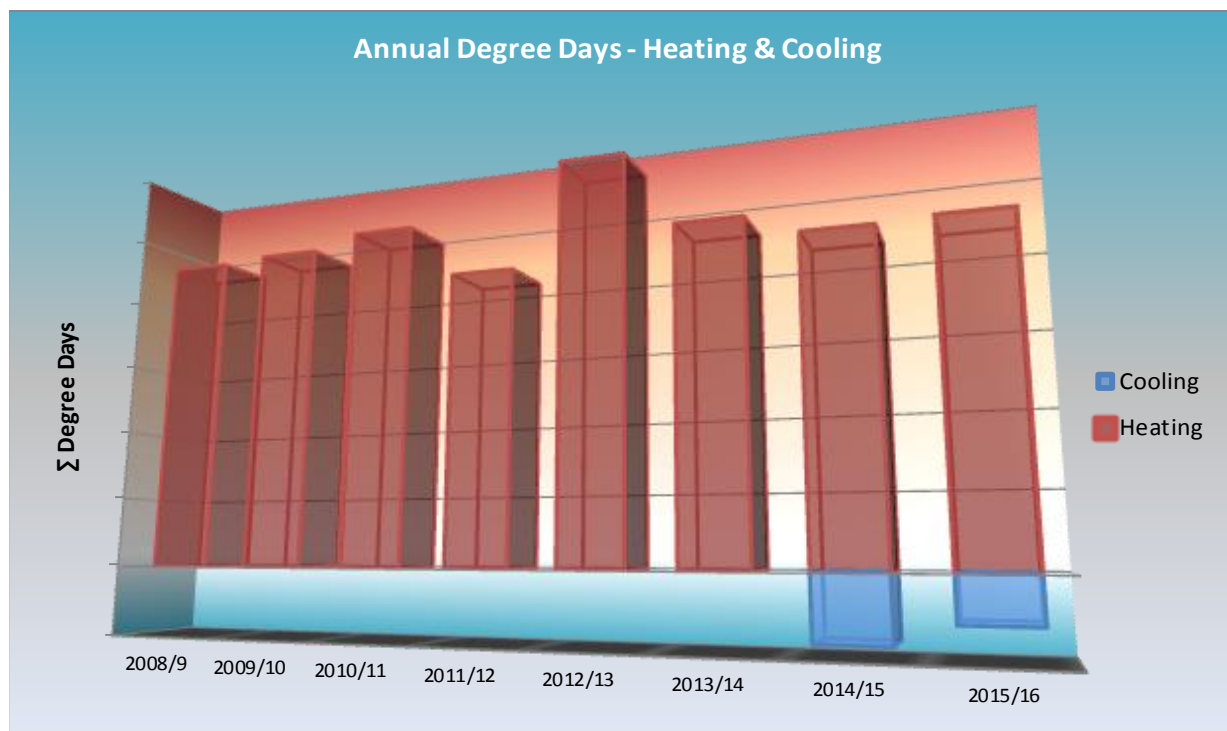
- In 10/11 and 11/12 WCC was allowed to report on a total of only 93% of its total CO<sub>2</sub> emissions from electricity, gas and heating oil consumption. WCC were permitted to exclude some residual CO<sub>2</sub> emissions.
- Properties that were excluded in the 7% of emissions classed as residual and not reported. These were properties on the sensitive property list (to make future years more comparable as properties were disposed of) and all the ones with oil fired heating (due to difficulties in obtaining robust and accurate oil consumption data).
- Estimated supplies had to have a 10% uplift on reported emissions for the CRC Phase 1. In 13/14 - 4.6% of school electricity consumption and 6% of school gas consumption was from estimated readings.
- In 13/14 – 11.6% of non-school electricity consumption and 14.7% of non-school gas consumption was from estimated readings. Estimated readings artificially inflate reported emissions.
- In 12/13 the CRC rules changed and WCC had to report on 100% of its total CO<sub>2</sub> emissions, but from only electricity and gas rather than all fuels. This resulted in having to report on electricity and gas consumption for an extra 8% of property by floor area, an extra 38 corporate properties and 7 academies.

**Environmental:**

- The winter of 12/13 was the second worst winter in 20 years. (*note - See Degree Days*)
- The rules about CRC reporting allowed for no weather correction of consumption data for heating purposes.



## Degree Day Summary 2015/16



### What Are Degree Days & What Does This Graph Mean?:

- Put simply, Colder temperatures require Heating & Warmer temperatures, Cooling.
  - Degree Days are used to give an index of how hot or cold the local weather is relative to a UK baseline of 15.5°Celsius.
  - The chart above shows the total degree days in each year.
  - The Red Bars show Heating degree days and the the Blue Bars, Cooling. *[note - Only Heating data is shown pre 2014/15]*
  - As both space heating and cooling require energy, we can infer a relationship between the total size of the Degree Day bars in the graph and the demand for energy used in Heating and Cooling Year on Year.
  - In the commentary for factors affecting the year on year energy consumption; we noted that the winter of 12/13 was the second worst for record for 20 years. This is reflected in the height of the 12/13 heating bar in the graph above being largest of those shown.
- Thus, with no other variables, you would expect the total energy consumption to be higher in years with larger bars and potentially a different mix of energy types consumed depending on the systems used for space heating & cooling (Electricity or Gas).

## Renewable Energy



### Introduction

Renewable energy refers to energy generated by sustainable means, i.e. from resources that are naturally replenished on a human timescale, such as sunlight, wind, bio and hydro rather than fossil fuels.

The UK is committed to reducing its greenhouse gas emissions by at least 80% by 2050 relative to 1990 levels.

The key EU targets for 2020 are:

- 20% cut in greenhouse gas emissions compared with 1990.
- 20% of total energy consumption to come from renewable sources.
- 20% increase in efficiency.

In this section...

**1. Renewable Energy Generation**

Information on WCC's current investment in renewable technologies.

**2. Outlook**

A look at what WCC is planning for renewables and how its capacity might change.

## Renewable Energy

### Renewable Energy Generation

WCC's Energy Policy is to increase the use of low and zero carbon technologies.

Alongside the non-polluting environmental benefits renewables offer, generating sustainable energy locally has additional potential benefits in terms of:

- Energy security (reducing our dependence on finite resources of fossil fuel);
- Economic benefits:
  - Protection against energy market volatility;
  - Reduction in carbon tariffs;
  - Local economic infrastructure and job creation borne of generating the energy we consume, rather than importing it via traditional means.

Since 2010/11 WCC has invested in a series of renewable energy technologies at a number of sites, including building integrated photovoltaic solar panels, wind turbine and biomass, generating some 200,000kWh annually.

In financial year 2015/16 WCC added another building integrated photovoltaic solar panel array, adding a further 10% (19,984 kWh), annually to its suite of renewable energy installations.

Set against the energy consumed annually within WCC's corporate building portfolio for 15/16, WCC's current generation from renewable sources is less than 5% of the total electrical energy and around 1% of combined consumption (electricity and gas); meaning there is still some ground to cover relative to the key EU target of 20% of total energy by 2020.

In line with its commitment to reduce carbon emissions, central government created a number of incentives to encourage the adoption of renewable technologies, such as the Feed in Tariff (FiT).

As the industry surrounding renewables matures and the available technologies evolve, central government has been progressively reducing the value of these incentives schemes for new installations.

The withdrawal of these financial incentives, coupled with other financial factors such as the EU minimum import prices (EU MIP) for solar panels manufactured in China, has had a negative impact on the viability and approval of small scale renewable projects within WCC's estate in the short term.

However improvements in efficiency and cost of renewable technologies, the anticipated lifting of the EU MIP by the end of 2017 and developments in battery storage incorporation, potentially offer improved viability to projects for renewable energy generation going forward.

## Renewable Energy

### Outlook

As suggested, there are several market led factors that determine scale and timeline for WCC's developing its commitment to renewable energy generation.

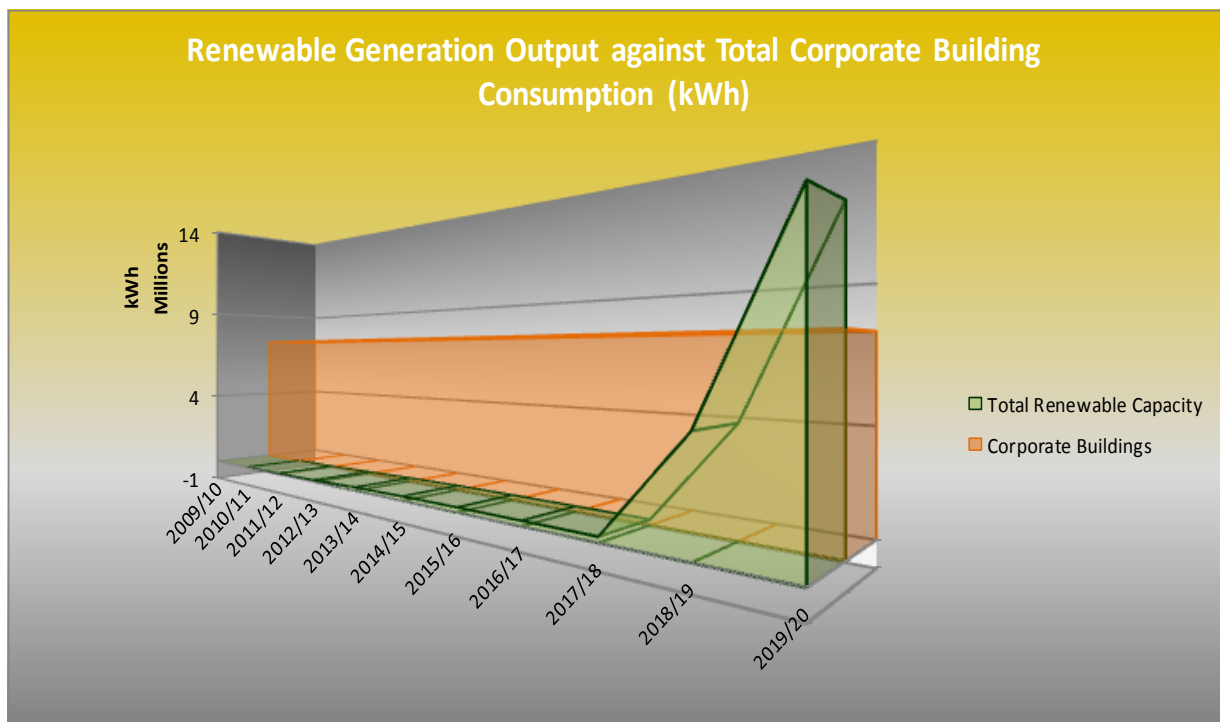
Looking forward with these considerations in mind, WCC is working towards increasing its renewable generation capacity (kW) by investing in some larger scale Ground Mounted Solar (GMS) installations at sites across the county.

The graph below shows WCC's historical output (kWh) from renewable energy generation and its projection in the years ahead based on the GMS projects currently under consideration coming to fruition.

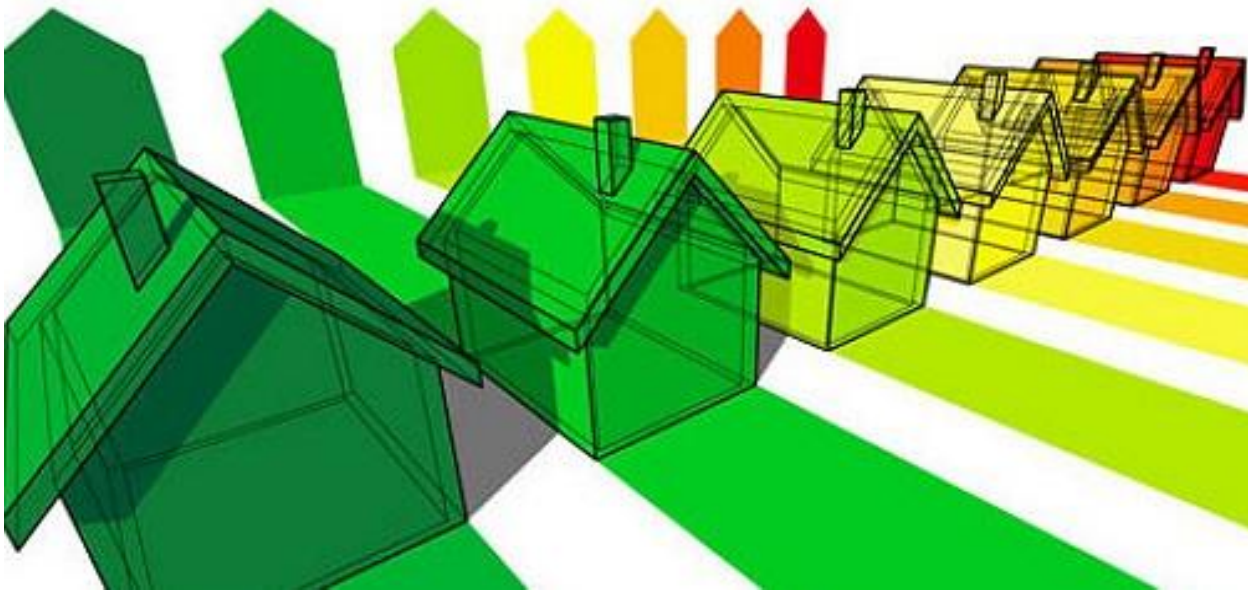
For context this projection of total annual generation (in Green) is set against a backdrop of the total annual consumption (kWh) for electricity in WCC's corporate buildings for FY 15/16 (in Orange).

Currently WCC generates less than 5% of the total electrical energy it consumes in its corporate building portfolio locally from renewables.

Projecting forward, we hope to have increased that figure to over 55% by 2018/19 and further to over 150% by 2019/20, or enough to cover the equivalent of all our corporate building electricity consumption and over 20% of current county street lighting demand.



## Display Energy Certificates (DECs) & Advisory Reports (ARs) 2015/16



### Introduction

In order to comply with the Energy Performance of Buildings Directive 2007 (EPBD), all buildings occupied by a public authority, with a useful floor area of over 250 m<sup>2</sup> and frequently visited by the public (i.e. every week they are open) are required to have a Display Energy Certificate (DEC).

In this section:

- 1. What are DECs & ARs?**  
Background information on content, legal requirements and production
- 2. Production Procurement & Statistics**  
Information on how our DECs & ARs are produced.
- 3. Corporate Property Profile**  
Statistics on the ratings achieved by WCC Corporate Buildings
- 4. Performance Measuring**  
How we measure the performance of our buildings
- 5. Improving DEC Ratings of Corporate Properties**  
Methods for improving the energy performance of our building stock

## DEC/AR Background & Procurement

### What are DEC's & ARs?

A Display Energy Certificate (DEC), provides an overview of the energy performance of a building based upon its actual recorded energy consumption (electricity, gas, heating oil, biomass, solid fuel) and the CO<sub>2</sub> emissions that result from that energy use.

This is shown as a banded performance rating on the certificate from A to G, where A has the lowest CO<sub>2</sub> emissions (best) and G the highest CO<sub>2</sub> emissions (worst).

The rating is also shown as a number. A typical building of its type would have a rating of 100.

A building with twice the typical CO<sub>2</sub> emissions would have a rating of 200 (or G).



The DEC must be displayed in colour at A3 size in a prominent place, usually the main entrance area.

- Those buildings with a floor area of 1,000 m<sup>2</sup> + need a DEC every year
- Those buildings with a floor area of between 250 m<sup>2</sup> and 1,000 m<sup>2</sup> require a DEC every ten years.

The Advisory Report accompanies the DEC and highlights recommendations to improve the energy performance of the building categorised by their potential short, medium and long term payback periods.

Advisory Reports issued before 09/01/14 for a building over 1000m<sup>2</sup> are valid for a period of 7 years, all Advisory Reports issued after this date are valid for 10 years regardless of building size.

Energy assessors must be a member of an approved accreditation scheme. Energy assessors are responsible for conducting an energy assessment, producing a DEC and AR and lodging the DEC and AR with their accreditation scheme. The accreditation scheme is responsible for checking and lodging certificates on the national register. Accreditation schemes are also responsible for monitoring the quality of the certificates energy assessors produce.

## DEC/AR Background & Procurement

### WCC DEC & AR Procurement

Following decommissioning of the WES traded energy efficiency service to schools in early 2015; WCC is no longer able to produce its own DEC/ARs but commissions them through the ESPO framework 343.

<https://www.espo.org/Frameworks/Energy/343-Energy-Performance-of-Buildings-Surveying,-Ass>

ESPO is a public sector owned professional buying organisation committed to pursuing best practice in procurement, sourcing, supply chain partner support and management, contract management and ensuring EU compliance.

ESPO was established in 1981 and is jointly owned by the following member authorities:

1. Leicestershire County Council
2. Lincolnshire County Council
3. Cambridgeshire County Council
4. Norfolk County Council
5. Warwickshire County Council
6. Peterborough City Council

From September 2015 onwards WCC will only be commissioning DEC / ARs for its own corporate property stock. Schools and academies will be responsible for commissioning their own DEC / ARs.

### WCC DEC & AR Production Statistics 2015/16

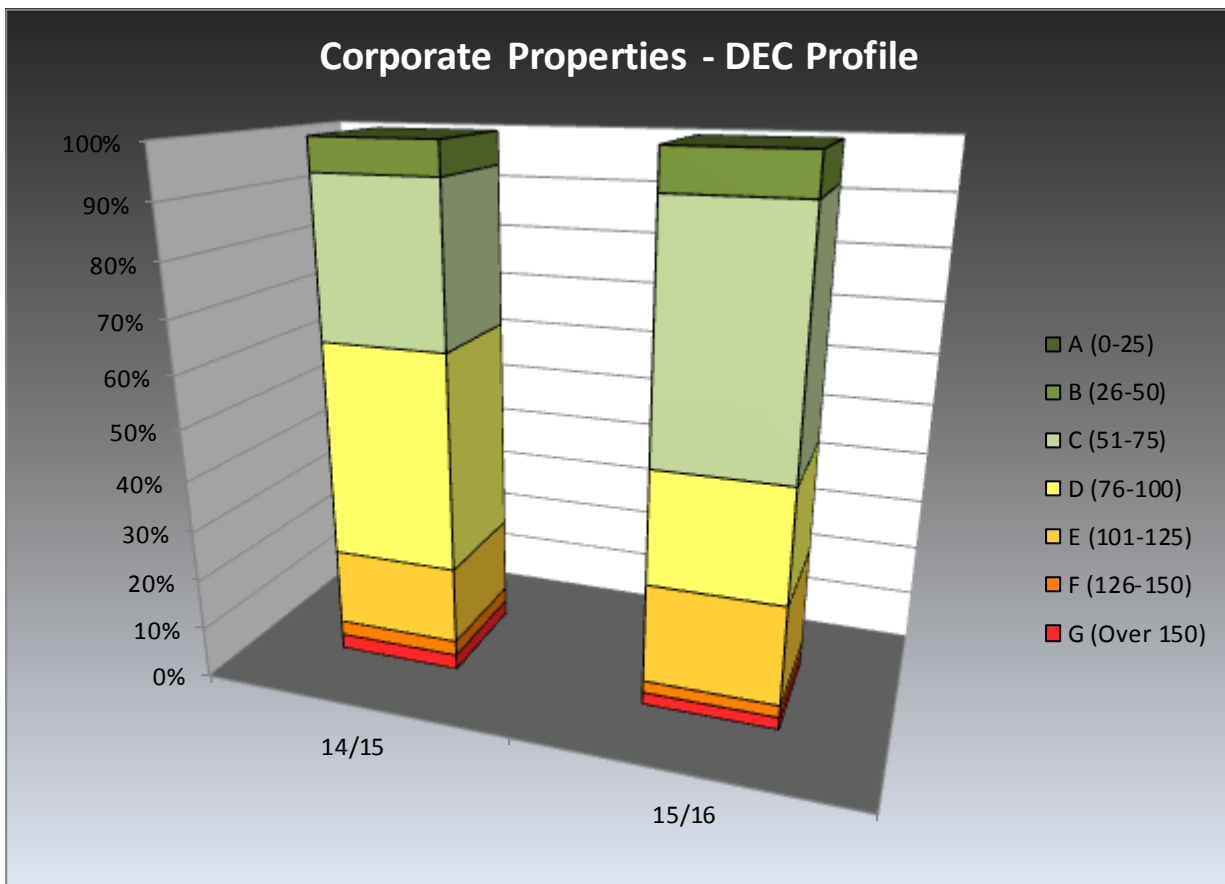
| Property Type: | DECs       | ARs       |
|----------------|------------|-----------|
| Academy        | 56         | 1         |
| Maintained     | 78         | 6         |
| Corporate      | 28         | 9         |
| <b>Total</b>   | <b>162</b> | <b>16</b> |



## DEC Corporate Profile & Performance

### Corporate Properties - DEC Profile

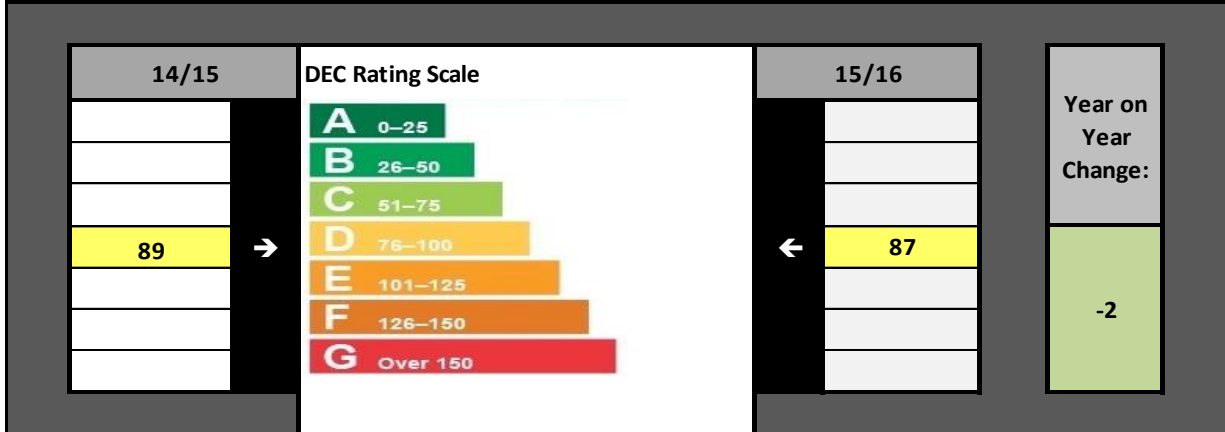
| 14/15 | 15/16 | DEC Rating Scale                  | Year on Year Change |
|-------|-------|-----------------------------------|---------------------|
| 0.0%  | 0.0%  | <b>A</b> 0-25                     | 16.0%               |
| 6.1%  | 7.1%  | <b>B</b> 26-50                    | -21%                |
| 30.3% | 45.2% | <b>C</b> 51-75                    | 3%                  |
| 42.1% | 21.4% | <b>D</b> 76-100                   |                     |
| 15.2% | 19.0% | <b>E</b> 101-125                  |                     |
| 3.0%  | 2.4%  | <b>F</b> 126-150                  |                     |
| 3.0%  | 2.4%  | <b>G</b> Over 150                 |                     |
| 21.3% | 24.4% | % Total E, F & G Rated Properties | 3%                  |





## DEC Corporate Profile & Performance

### Corporate Properties - Average Rating per m<sup>2</sup>



### Performance Measuring

- WCC used the E, F and G DEC rating of all properties (including schools and academies) as a quarterly performance reporting measure when a WES traded energy service was in place. The target was maintaining the percentage of all E, F and G rated DECs at below 30.6% of all valid DECs.
- From 2015 WCC will use the E, F and G rating of just corporate properties as a quarterly performance reporting measure. The baseline for 33 corporate properties of E, F and G rated DECs is therefore 21% of all valid DECs.
- WCC expects the average DEC rating to improve over time: as the quality of the data improves; as inefficient properties are disposed of through property rationalisation and as more investment is made in energy efficiency in the properties that are retained.

## DEC Corporate Profile & Performance

### Improving DEC Ratings of Corporate Properties

Improving the energy performance of buildings that will be kept for the medium to long term could be achieved through projects such as:

- Implementing an effective maintenance and minor works programme to ensure optimum operational efficiency,
- Intelligent use of the Building Energy Management System (BMS),
- Improving insulation, heating & lighting systems, voltage control and server rooms,
- Improving the thermal performance of the building envelope,
- Implementing renewable and micro-generation energy systems,
- Low carbon whole building retrofits,
- Reducing the size of the WCC estate (property rationalisation) [note that moving to new benchmarks for increased space occupancy will increase energy use per unit of floor area, even though overall it may be better use of space],
- Procuring only buildings that fall into the top quartile of energy performance,
- Ensuring all new builds and major refurbishments (with a contract value of over £1M) achieve a BREEAM 'very good' rating,
- Ensuring all projects (with a contract value of between £350k to £1M) achieve minimum BREEAM credits in energy use / carbon reduction, water use, materials / waste minimisation and ecology,
- Rolling out smart metering ensuring accurate data, and
- Resourcing effective awareness raising and behaviour change campaigns.

Delivering such projects will have a positive effect on reducing the average DEC rating of the corporate estate and reduce carbon emissions.

## Energy Saving Improvements – Case Study

### *Leamington Spa Fire & Rescue Service Headquarters*



#### **Project Description**

As part of the Construction Services Engineering planned maintenance program, major works were undertaken at the Fire & Rescue Service Headquarters in Leamington Spa to update the building's heating system.



The installation was designed by WWC's in house engineering team and installed by our M&E framework partner Dodd Group Ltd. The project was undertaken in two phases with three original boilers being replaced with new, more efficient models, alongside new heating and primary pumps, pipework and zone controls.

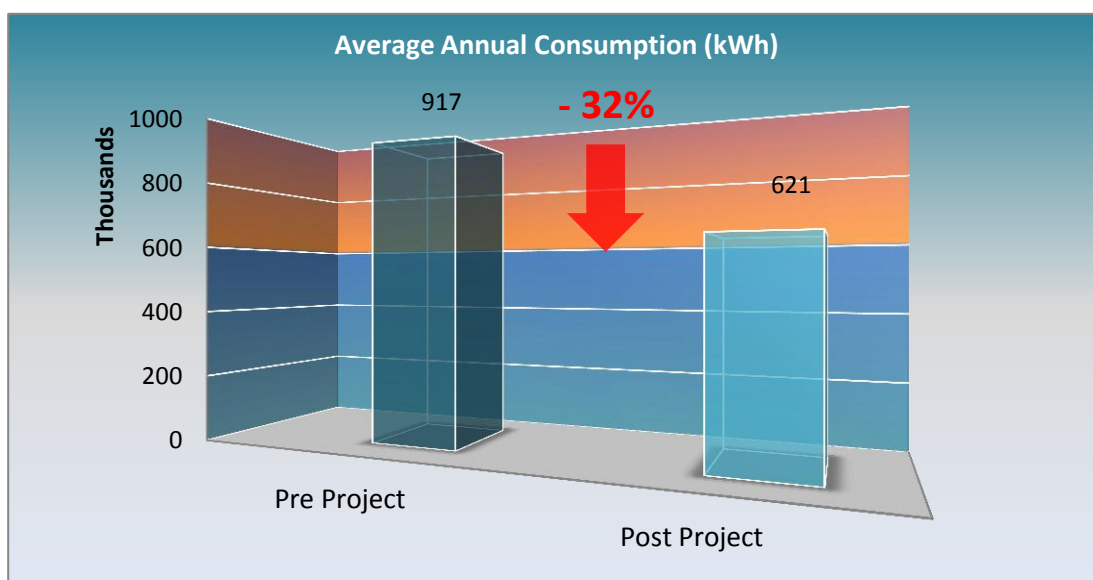


The installation projects were completed May 2015.

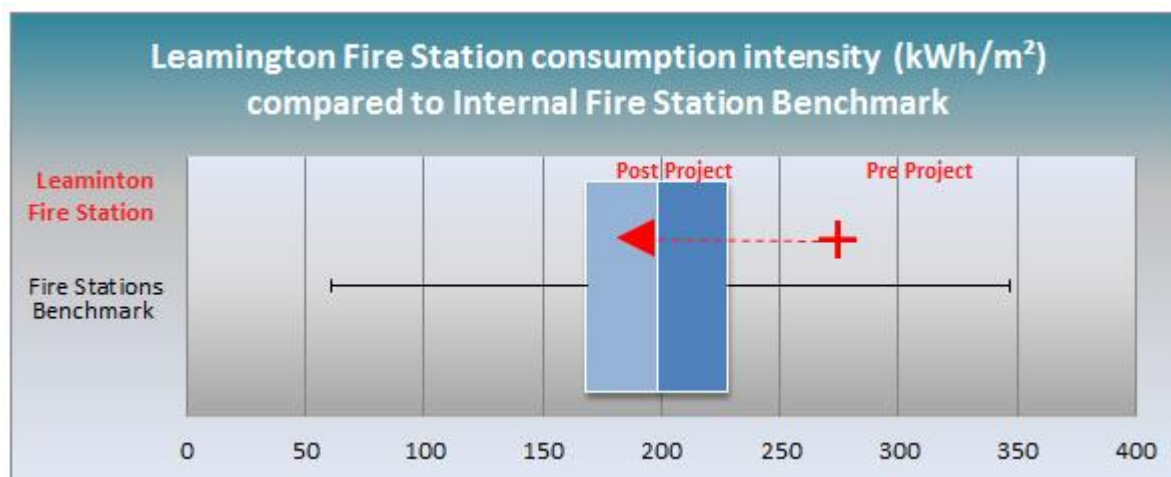
## Leamington Spa Fire & Rescue Service Headquarters

### Project Outcome

When comparing the annual gas consumption figures from before and after the installations, we can observe that the increased plant efficiency, coupled with zone controls to ensure that areas of the station headquarters aren't heated whilst not in use, have as a package yielded a 30% (296,000 kWh) reduction in the site's annual gas consumption. The financial saving made by these improvements will equate to more than £8,500 each year.



As a result, the consumption per square metre has improved from 270 kWh/m<sup>2</sup> to 194 kWh/m<sup>2</sup>. The performance of this building is now on the average of our internal typical benchmark of fire stations.



## Utility Costs

### *Calculating Representative Average Utility Costs per Unit*

#### **Methodology**

Reporting the cost per square metre (£/m<sup>2</sup>) for a specific property presents a challenge if:

- The invoice data isn't complete or available in WCC's finance system (the ledger).
- The site doesn't procure through the Eastern Shires Purchasing Organisation (ESPO). [The WCC Energy Team only receives invoice consumption and cost data from sites that procure through ESPO, and annual CRC statements provided by suppliers focus only on consumption rather than cost.]
- The energy supply is shared between different properties on a site, or between sites.

Where invoice data is missing the WCC Energy Team can derive a cost based on data given in the CRC supplier statements. CRC statements give an annual consumption figure per supply, with the caveat that estimation and apportioning is used to generate a consumption figure where the billing cycle does not align naturally to the financial year.

The cost per kWh charged to each site will vary based on level of consumption, meter type and tariff. In light of this, we establish representative single costs per unit (pence/kWh) for gas and electricity based on a weighted average using the following approach:

- Using the WCC portfolio that procures through ESPO as a representative sample range of meter types, consumptions and tariffs.
- Using the contract rate for each supply, including billing factors such as standing charge and feed in tariff recovery charge, but excluding VAT; multiplied by annual consumption values per supply.
- Aggregating all the costs per supply then dividing this figure by the total consumption to achieve a weighted average cost per kWh consumed across the entire portfolio.

For water, the same basic principle was applied to establish a representative single cost per unit (pence/litre). Here the combined charges for fresh water, surface water drainage and sewerage (costs per supply) was divided by the Rolling Megalitres per Year (annual consumption).

## Calculating Representative Average Utility Costs per Unit

### Weighted Average Costs per Unit

This approach results in values of:

- **Gas: 2.903 pence/kWh**
- **Electricity: 10.181 pence/kWh**  
(including billing factors such as standing charge and feed in tariff recovery charge, but not VAT.)
- **Water: 0.353 pence/litre of fresh water**  
(including billing factors such as surface water drainage and sewerage, but not VAT.)

## Looking Forward

### Market Energy Prices

Over the last year, the wholesale cost of energy for WCC dropped with ESPO contract.

However the 'Non Energy Costs', that already represents half of the total bill, continues to increase significantly (See Focus on Electricity Prices below).

This section provides an overview of the main energy price drivers in UK and how prices are expected to evolve.

## Looking Forward

| Energy Price Drivers in the UK Market |  |
|---------------------------------------|--|
| <b>Geo Political Risk</b>             | Conflicts involving oil producers and supply routes are major risks to energy supply and prices<br>- Disruption in Libya and Nigeria have cut oil supply and are offering support to market prices<br>- Future possible political rapprochement between Russia and the USA and increasing tensions with China may change geo-political environment in short term   |
| <b>Oil Supply</b>                     | Oil contracts have been volatile during 2015/2016, dropping below \$30 a barrel at one point in 2016 (partly due to increased production from Saudi Arabia, in order to secure greater market share). However, in December 2016 OPEC and Non OPEC producers agreed to restrict production in order to reduce supplies and increase prices. As a result prices rose of over \$50 barrel by the end of 2016. World Bank projections for oil prices in 2017 average \$55 / barrel.  |
| <b>EU Carbon Market</b>               | Carbon credit market aims at regulating CO <sub>2</sub> emissions worldwide. Carbon credit is a tradable certificate or permit representing the right to emit one tonne of CO <sub>2</sub> . Over the last few years, a large volume of carbon credit has been available and prices were low.<br>The EU has accepted methods to reduce the number of surplus carbon credits within the market. This will tighten the supply /demand balance, forcing carbon prices/costs upwards, which in turn will put pressure on UK electricity prices in the longer term.   |
| <b>Energy Generation</b>              | A number of nuclear power stations have closed in recent years, and some coal / gas power plants have announced early closure dates in 2016 due to their inability to meet environmental standards and make favorable economic returns. Replacement new build gas and nuclear plants are also facing financing issues due to current commodity and world market conditions.  |
| <b>Supply Security</b>                | During winter 2016-17 - 'Rough Storage', the UK's largest and strategic gas storage site (under the North Sea) was only 40% full due to leakage at higher pressures.<br>The UK may not be able to meet shortfalls from EU / UK interconnector supplies of gas and electricity - as Dutch gas production has also reduced and a third of French nuclear stations have shut for safety purposes.<br>This will impact on prices, with or without a cold snap, and will increase UK reliance on shipped liquid natural gas from the Middle East and potentially the USA.   |
| <b>Currency Exchange Rates</b>        | The price of importing commodities has increased due to a weaker pound post-brexite. (Both oil and gas are traded in US dollars).  |
| <b>Non Energy Costs</b>               | Non-energy costs in 2015/16 accounted for around 50% of a customer bill and are expected to increase further.<br>These obligatory charges, levies and taxes from third parties cover for network costs, delivery cost to the meter, and balancing the power system. They are also government policy costs which aim at reducing carbon emissions and supporting renewable energy development, increasing national diversity and security of supply.<br>These charges include the Climate Change Levy (CCL) along with subsidy schemes such as Renewables Obligation (RO), Feed-in-tariff (FiT) and – more recently – Contracts for Difference (CfD). |
| <b>Global Gas Supply</b>              | Gas reserves are comfortable worldwide, keeping prices quite low. However Oil and Gas prices tend to be linked so rising oil prices will lead to gas price increases.<br>In UK, 45% of gas is domestic production;<br>55% was imported in 2015: 38% from Europe (1/3 from Russia and 20% from Norway) and 17% from LNG tankers. (Therefore, maintaining good relationships with Russia is important for UK/UE price stability)<br>Support for shale gas exploration is in part designed to reduce external dependency and increase UK revenues.  |
| <b>Demand Forecasts</b>               | Energy demand is continuing at lower than normal levels against the forecasted average requirements. This reflects low growth in the economy and to some extent increased energy efficiency.   |
| <b>Renewable Generation</b>           | Increased wind and solar generation is reducing the reliance on other energy sources.  |

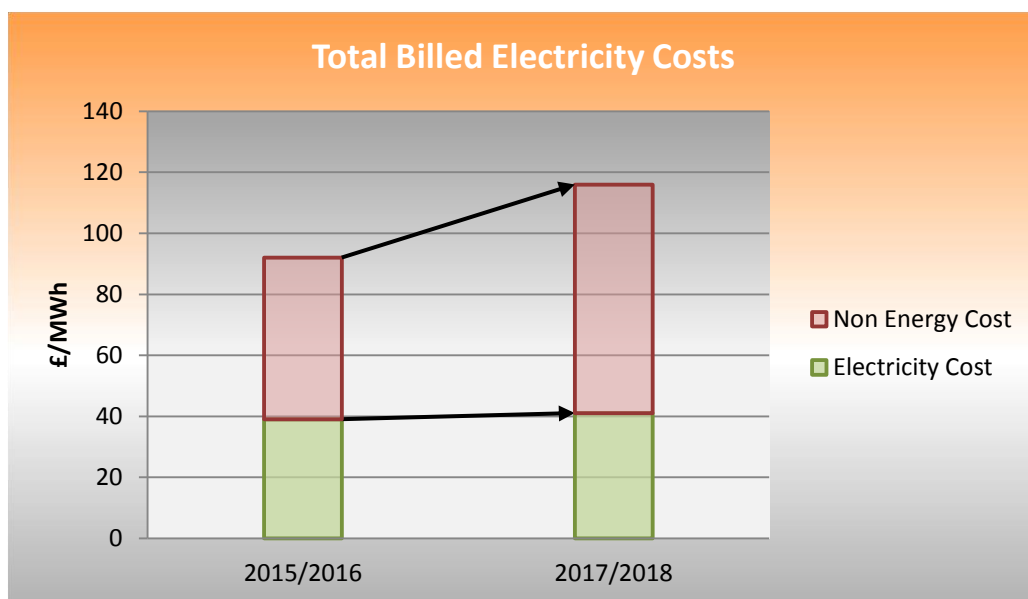
## Looking Forward

### Focus On Electricity Price: Half of the bill is 'Non Energy Costs'.

In 2016, the proportion of an electricity bill made up the wholesale price has dropped below 50%.

This means that, 'Non Energy Costs' now represent more than half of the total bill and are planned to increase further in the future to fund system investments.

'Non Energy Costs' comprise regulatory network and 3rd party cost elements of a bill linked to the transmission and metering & Government legislation to provide investment in new electricity generation.



Source: Ameresco 2016



## Looking Forward

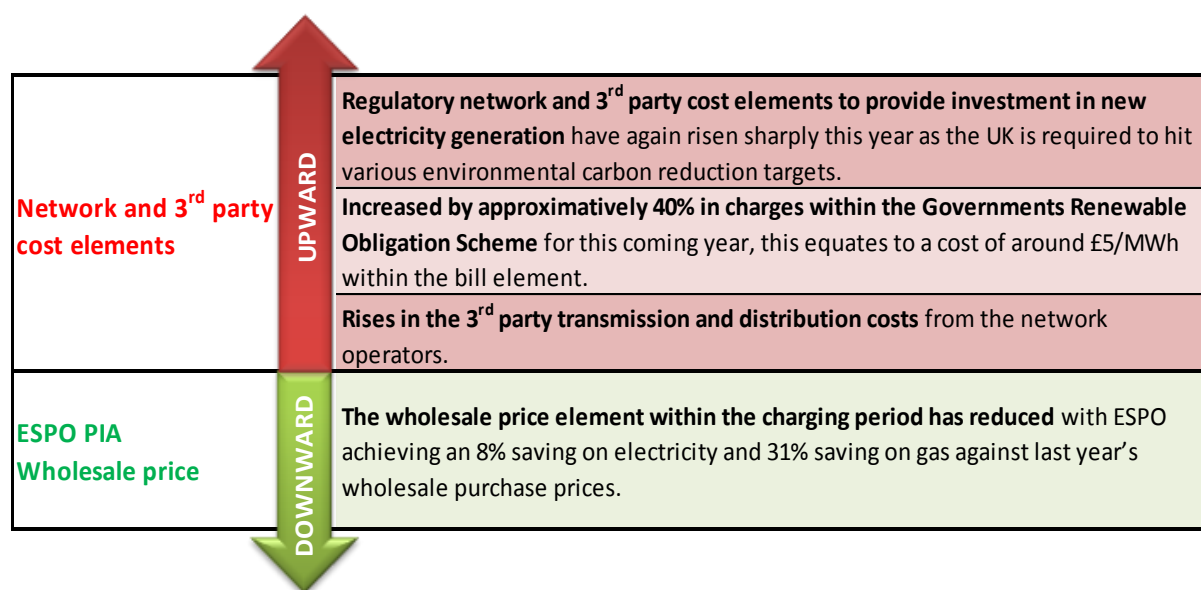
### WCC's Energy Contracts with ESPO

ESPO's Energy procurement is undertaken in accordance with a price risk strategy developed in consultation with the Governance Panel, a stakeholder group comprising of representatives from the main member authorities and other key stakeholders.

#### ESPO Price Risk Strategy – Pricing in Advance (PIA)

ESPO run a flexible procurement model for the supply of both gas and electricity, which requires small volumes to be bought periodically against wholesale market rates. Buying upfront at a fixed price aids budget security, but carries the risk that energy costs will be locked in when it might not be the opportune time to do so. The strategy of purchasing over a number of transactions, rather than all of the volume at once, spreads the risk over a longer period to achieve best blend of cost avoidance and cost certainty.

During next year, despite the wholesale price reductions secured by ESPO for the charging period, WCC expects to see prices rise in line with estimated 3<sup>rd</sup> party charge increases of between 0-5% for gas and electricity (dependent on volumes and standing charges). High demand users within the peak charging periods may see higher cost increases.



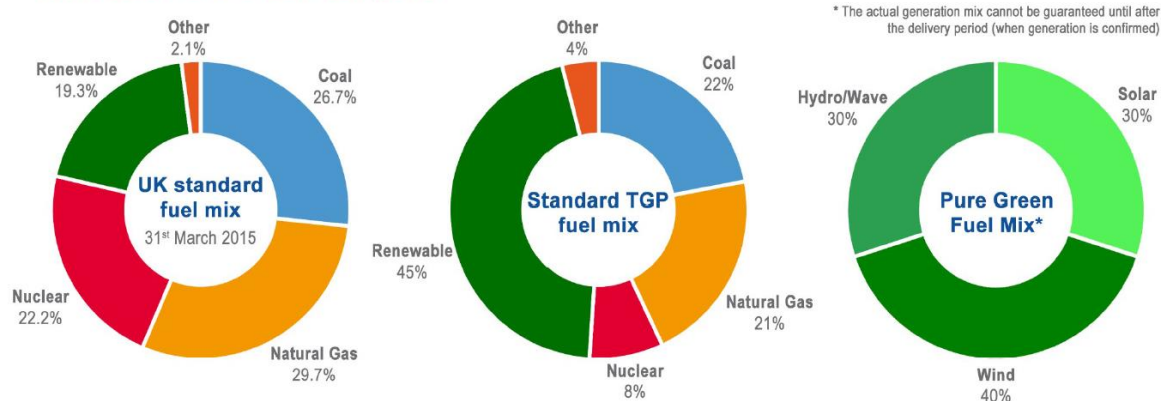
## Looking Forward

### WCC's Electricity is 100% Renewable Energy from October 2016

WCC signed a new contract with ESPO for electricity procurement from October 2016. Total Gas & Power supplies electricity for this contract.

Through this new contract WCC procures 'Pure Green Energy' for an extra 0.02p/kWh (this charge will be reviewed annually and is subject to change). Pure Energy comes from 100% renewable sources (solar, wind, and hydro/wave but doesn't include biomass).

#### How does Pure Green compare?



Using Pure Green energy means that WCC can report zero emissions for electricity from the commencement of this contract as the electricity we use can be matched to Renewable Energy Guarantees of Origin (REGOs). Electricity accounted for 65% of the total CO<sub>2</sub> emissions detailed in this report for financial year 15/16.

## Appendix

### Appendix 1: Combined Electricity & Gas Consumption 2015/16 (Corporate Buildings Only)

| UPRN | Name   | kWh/m <sup>2</sup> | £/m <sup>2</sup> | Total CO <sub>2</sub> (Tonnes) |
|------|--|--------------------|------------------|--------------------------------|
| 1128 | Nuneaton Training Centre                           | 57                 | £5.77            | 6                              |
| 1033 | Bedworth Library & Information Centre              | 238                | £14.37           | 56                             |
| 1034 | Former Bedworth Heath Library                      | 126                | £5.51            | 4                              |
| 1037 | Warwickshire Fire & Rescue Training & Dev. Centre  | 256                | £13.01           | 46                             |
| 1050 | Bedworth Fire Station                              | 206                | £10.11           | 29                             |
| 1097 | Centenary Business Centre                          | 110                | £11.22           | 180                            |
| 1157 | Hatters Space Community Centre                     | 174                | £8.77            | 45                             |
| 1161 | Nuneaton Library & Information Centre              | 153                | £5.27            | 47                             |
| 1184 | Nuneaton Fire Station                              | 338                | £13.18           | 137                            |
| 1188 | The Hilary Road Centre                             | 167                | £8.98            | 52                             |
| 1242 | Kings House  | 205                | £12.14           | 186                            |
| 1259 | Transport Depot, Units D2, D3 & D4 Greenwood Court | 18                 | £1.81            | 3                              |
| 1270 | Eliot Park Innovation Centre                       | 186                | £15.21           | 321                            |
| 1287 | Camp Hill Education Sports & Social (CHESS)        | 135                | £7.27            | 52                             |
| 1313 | Units 1A, 1B, 2 and adj. land at Opport. Centre    | 43                 | £4.35            | 28                             |
| 2017 | The Ratcliffe Youth & Community Centre             | 223                | £8.23            | 11                             |
| 2027 | Atherstone Library & Information Centre            | 127                | £7.06            | 22                             |
| 2036 | Atherstone Fire Station                            | 298                | £13.55           | 36                             |
| 2080 | Coleshill Fire Station                             | 237                | £9.42            | 53                             |
| 2129 | Hartshill Hayes Country Park                       | 120                | £12.24           | 3                              |
| 2143 | Kingsbury Water Park                               | 50                 | £5.12            | 50                             |
| 2168 | Polesworth Library & Information Centre            | 123                | £12.49           | 13                             |
| 2171 | Polesworth Fire Station                            | 302                | £13.29           | 19                             |
| 2214 | Pooley Country Park                                | 64                 | £6.47            | 8                              |
| 2224 | Coleshill Library & Information Centre             | 247                | £12.86           | 15                             |
| 2232 | Kingsbury Water Park Outdoor Education Centre      | 51                 | £5.21            | 9                              |
| 2233 | Lower House Farm Household Waste Recycling Centre  | 17                 | £1.76            | 24                             |
| 2239 | The Arden Centre                                   | 175                | £8.25            | 20                             |
| 3037 | Dunchurch Highways Sub-Depot                       | 40                 | £2.84            | 31                             |
| 3119 | Hunters Lane Household Waste Recycling Centre      | 62                 | £1.81            | 3                              |
| 3144 | Rugby Fire Station                                 | 258                | £11.24           | 85                             |
| 3148 | Fawsley House                                      | 182                | £8.83            | 65                             |
| 3152 | The Bridge   | 173                | £7.29            | 16                             |
| 3205 | Ryton Pools Country Park                           | 101                | £10.32           | 34                             |
| 3225 | Wolston Library & Information Centre               | 148                | £15.09           | 11                             |
| 3243 | Oakfield Park                                      | 121                | £8.13            | 55                             |
| 3260 | Sir Frank Whittle Business Centre                  | 65                 | £3.89            | 55                             |
| 3261 | Rugby Register Office                              | 449                | £16.04           | 16                             |
| 3288 | Unit 5, 1 - 3 Upton Road                           | 39                 | £2.90            | 3                              |
| 4016 | Alcester Fire Station                              | 347                | £14.82           | 38                             |
| 4055 | Bidford On Avon Fire Station                       | 203                | £9.03            | 18                             |

| UPRN   | Name   | kWh/m² | £/m2   | Total CO <sub>2</sub><br>(Tonnes) |
|--------|--|--------|--------|-----------------------------------|
| 4074   | Fenny Compton Fire Station                       | 169    | £17.25 | 12                                |
| 4099   | Henley-In-Arden Highways Sub-Depot               | 97     | £9.88  | 32                                |
| 4185   | Southam Fire Station                             | 132    | £13.47 | 11                                |
| 4194   | Shipston on Stour Library & Information Centre   | 110    | £4.74  | 6                                 |
| 4199   | Shipston-On-Stour Fire Station                   | 126    | £7.26  | 9                                 |
| 4204   | Shipston-On-Stour Highways Sub-Depot             | 49     | £4.94  | 16                                |
| 4234   | Stratford-Upon-Avon Library & Information Centre | 159    | £8.76  | 56                                |
| 4245   | Stratford-Upon-Avon Fire Station                 | 221    | £10.54 | 48                                |
| 4255   | The Saltway Centre & Stratford Family Centre     | 276    | £10.29 | 44                                |
| 4305   | Wellesbourne Library & Information Centre        | 162    | £8.64  | 12                                |
| 4308   | Wellesbourne Divisional Highways Depot           | 249    | £13.44 | 33                                |
| 4309   | Wellesbourne C F M Workshops                     | 313    | £15.32 | 66                                |
| 4367   | Wellesbourne Fire Station                        | 274    | £11.90 | 22                                |
| 4388   | Stratford upon Avon Park and Ride                | 849    | £86.42 | 48                                |
| 4389   | Winton House                                     | 201    | £7.27  | 14                                |
| 5010   | Trading Standards Headquarters                   | 171    | £9.62  | 70                                |
| 5012   | Budbrooke County Highways Head Office            | 159    | £9.29  | 24                                |
| 5013   | Budbrooke Highways Depot                         | 567    | £57.73 | 19                                |
| 5042   | Kenilworth Library & Information Centre          | 77     | £2.24  | 13                                |
| 5043   | Cherry Orchard Household Waste Recycling Centre  | 1      | £0.07  | 0                                 |
| 5058   | Kenilworth Fire Station                          | 274    | £13.67 | 20                                |
| 5097   | Pound Lane Training Centre                       | 129    | £6.10  | 45                                |
| 5105   | Lillington Youth Club                            | 123    | £5.03  | 15                                |
| 5106   | Leamington STEPS - 43 Rugby Road                 | 235    | £10.33 | 8                                 |
| 5110   | Lillington Library & Information Centre          | 154    | £6.87  | 19                                |
| 5111   | Leamington Household Waste Recycling Centre      | 47     | £4.80  | 19                                |
| 5124   | Fire & Rescue Service Headquarters               | 276    | £13.93 | 282                               |
| 5182   | Myton Sports Ground and Pavillion                | 49     | £4.98  | 5                                 |
| 5187   | Shire Hall Complex                               | 172    | £10.96 | 836                               |
| 5189   | Shire Hall Complex (1 Northgate Street)          | 131    | £13.36 | 11                                |
| 5190   | Former Judges House                              | 235    | £11.55 | 61                                |
| 5191   | 16 Old Square                                    | 223    | £6.48  | 26                                |
| 5196   | Northgate House Conference Centre                | 176    | £13.80 | 71                                |
| 5197   | Barrack Street Block                             | 181    | £11.21 | 339                               |
| 5199   | Premises At Montague Road                        | 179    | £7.55  | 292                               |
| 5247   | St John's House Museum                           | 156    | £6.98  | 53                                |
| 5248   | County Museum (Market Hall)                      | 245    | £9.55  | 46                                |
| 5252   | County Record Office                             | 376    | £23.52 | 193                               |
| 5254   | Priory Bungalow                                  | 627    | £20.31 | 10                                |
| 5268   | Myton Park Centre                                | 186    | £8.20  | 82                                |
| 5293   | Whitnash Library & Information Centre            | 106    | £10.79 | 14                                |
| 6002   | Marle Hall Outdoor Education Centre              | 248    | £10.93 | 117                               |
| 5384-1 | Saltisford Office Park 1                         | 163    | £12.46 | 134                               |
| 5384-2 | Saltisford Office Park 2                         | 203    | £16.51 | 134                               |
| 5384-3 | Saltisford Office Park 3                         | 150    | £12.77 | 284                               |
| 4235   | Burton Farm Household Waste Recycling Centre     | 161    | £16.41 | 15                                |
| 4012   | Alcester Library & Information Centre            | 129    | £3.74  | 13                                |

## Appendix 2 - WCC Corporate Property Display Energy Certificate Profile

| Site Code | Site Name   | Grade | Rating |
|-----------|---|-------|--------|
| 1161      | Nuneaton Library & Information Centre             | B     | 34     |
| 5097      | Pound Lane Training Centre                        | B     | 44     |
| 4097      | Henley-In-Arden Fire Station                      | B     | 50     |
| 1050      | Bedworth Fire Station                             | C     | 51     |
| 5247      | St John's House Museum                            | C     | 56     |
| 2027      | Atherstone Library & Information Centre           | C     | 58     |
| 2080      | Coleshill Fire Station                            | C     | 59     |
| 5042      | Kenilworth Library & Information Centre           | C     | 59     |
| 5136      | Holly Walk House                                  | C     | 59     |
| 4389      | Winton House                                      | C     | 60     |
| 3152      | The Bridge  | C     | 62     |
| 2239      | The Arden Centre                                  | C     | 64     |
| 3243      | Oakfield Park                                     | C     | 65     |
| 5199      | Premises At Montague Road                         | C     | 65     |
| 2232      | Kingsbury Water Park Outdoor Education Centre     | C     | 66     |
| 5268      | Myton Park Centre                                 | C     | 68     |
| 4234      | Stratford-Upon-Avon Library & Information Centre  | C     | 69     |
| 5199      | Premises At Montague Road                         | C     | 69     |
| 4245      | Stratford-Upon-Avon Fire Station                  | C     | 70     |
| 5293      | Whitnash Library & Information Centre             | C     | 72     |
| 3144      | Rugby Fire Station                                | C     | 73     |
| 1188      | The Hilary Road Centre                            | C     | 74     |
| 1287      | Camp Hill Education Sports & Social (CHESS)       | C     | 74     |
| 5110      | Lillington Library & Information Centre           | D     | 76     |
| 3148      | Fawsley House                                     | D     | 82     |
| 1033      | Bedworth Library & Information Centre             | D     | 83     |
| 4255      | The Saltway Centre & Stratford Family Centre      | D     | 84     |
| 5124      | Fire & Rescue Service Headquarters                | D     | 85     |
| 5248      | County Museum (Market Hall)                       | D     | 89     |
| 1242      | Kings House                                       | D     | 92     |
| 5384      | Saltisford Office Park                            | D     | 97     |
| 5384      | Saltisford Office Park                            | D     | 97     |
| 5010      | Trading Standards Headquarters                    | E     | 101    |
| 1157      | Hatters Space Community Centre                    | E     | 107    |
| 5187      | Shire Hall Complex                                | E     | 107    |
| 5196      | Northgate House Conference Centre                 | E     | 108    |
| 1184      | Nuneaton Fire Station                             | E     | 116    |
| 5103      | The Fordsfield Complex Needs Centre               | E     | 117    |
| 5384      | Saltisford Office Park                            | E     | 124    |
| 1037      | Warwickshire Fire & Rescue Training & Dev. Centre | E     | 125    |
| 1198      | Ramsden Complex Needs Centre                      | F     | 142    |
| 5252      | County Record Office                              | G     | 173    |

## Appendix 3 - Links

### Historic Building Energy Review Reports

Similar reports for previous years can be found on the internet on the WCC Energy Performance web page:

<http://www.warwickshire.gov.uk/energyperformance>

Or from the following links:

2010/11 Building Energy Consumption Review <http://apps.warwickshire.gov.uk/api/documents/WCCC-599-14>

2011/12 Building Energy Consumption Review <http://apps.warwickshire.gov.uk/api/documents/WCCC-599-15>

2012/13 Building Energy Consumption Review  
<http://apps.warwickshire.gov.uk/api/documents/WCCC-599-42>

2013/14 Building Energy Consumption Review  
<https://apps.warwickshire.gov.uk/api/documents/WCCC-599-54>

2014/15 Building Energy Consumption Review  
<https://apps.warwickshire.gov.uk/api/documents/WCCC-599-57>

These documents contain further information about energy management at WCC.

### Energy Web Pages

The following energy related web pages have been maintained.

#### **Energy and Water Efficiency Performance**

<http://www.warwickshire.gov.uk/energyperformance>

#### **Energy Policy**

<http://www.warwickshire.gov.uk/energypolicy>

Provides links to WCC's energy policy.

<http://apps.warwickshire.gov.uk/api/documents/WCCC-599-21>

## School Energy Management

Acts as a hub for resources that will help Warwickshire schools manage their energy consumption

<http://www.warwickshire.gov.uk/schoolenergy>

AtlasWeb reports information from the SystemsLink database and presents it in tabular and graphical form. The cost and consumption data used in these reports is apportioned over the actual period over which the fuel is consumed, using meter reading dates.

Resources on the school energy page include:

- School electricity smart meter data lesson plan (PDF, 400.5 KB)  
<http://apps.warwickshire.gov.uk/api/documents/WCCC-599-51>
- Spot the difference student activity game about two different human influenced environments 2014 (PDF, 301.08 KB) <http://apps.warwickshire.gov.uk/api/documents/WCCC-599-50>
- School Energy Management Matrix (PDF, 142.29 KB)  
<http://apps.warwickshire.gov.uk/api/documents/WCCC-599-48>
- School energy policy and action plan template (PDF, 175.33 KB)  
<http://apps.warwickshire.gov.uk/api/documents/WCCC-599-49>
- Schools energy and water survey checklist 2014 (PDF, 234.35 KB)  
<http://apps.warwickshire.gov.uk/api/documents/WCCC-599-45>
- The great escape – water leaks 2014 (PDF, 143.05 KB)  
<http://apps.warwickshire.gov.uk/api/documents/WCCC-599-52>