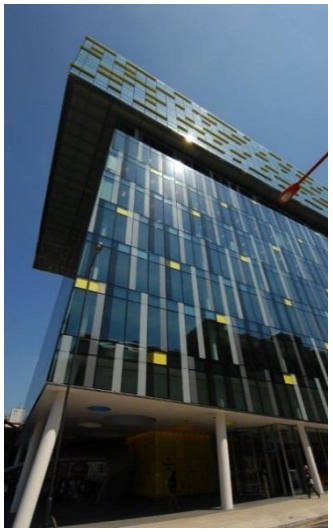
RE:FIT: Retrofitting at scale through energy performance contracting – a TfL case study

BRE Energy Performance Contracting

Andy Stanton, Transport for London

11th April 2013



CARBON TRUST STANDARD
REDUCING CO2 YEAR ON YEAR

LONDON GREEN500 GOLD 2009 Organisation No: 28

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Transport for London

MPA

TfL Property & sustainability

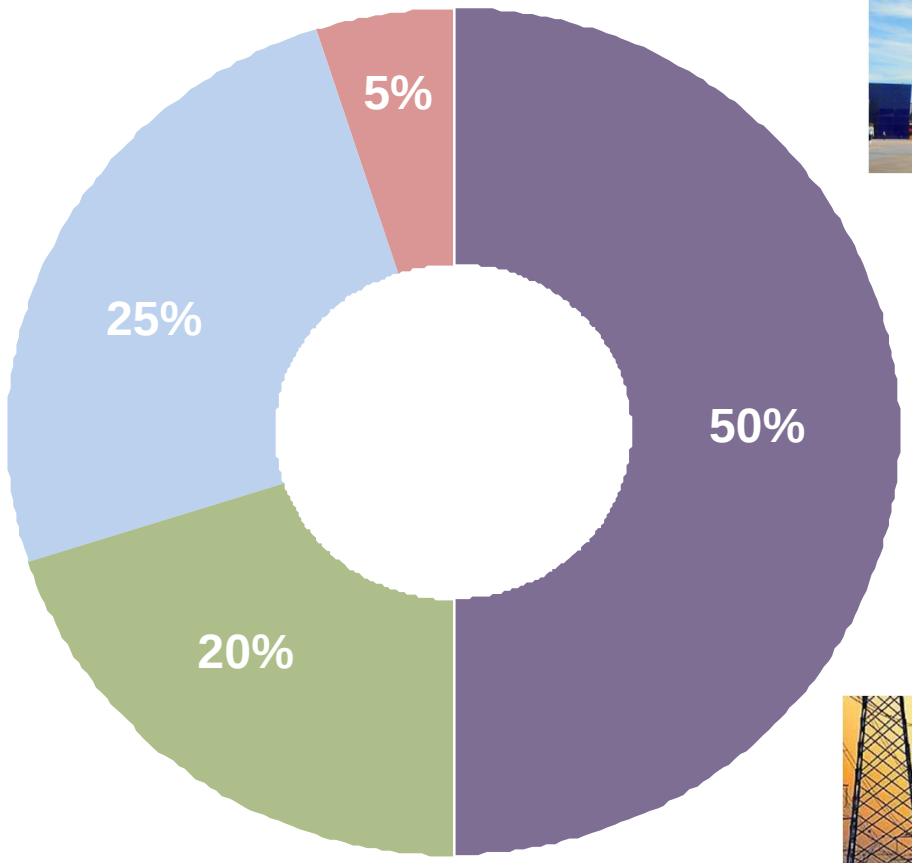
- New build
- Renewables
- Sustainable Catering
- Property carbon footprint
- DEC assessments
- BREEAM Development

LONDON
LEADING TO A GREEN LONDON

BETTER
BUILDINGS
PARTNERSHIP

Mayor's CO_2 Target for London – 60% by 2025

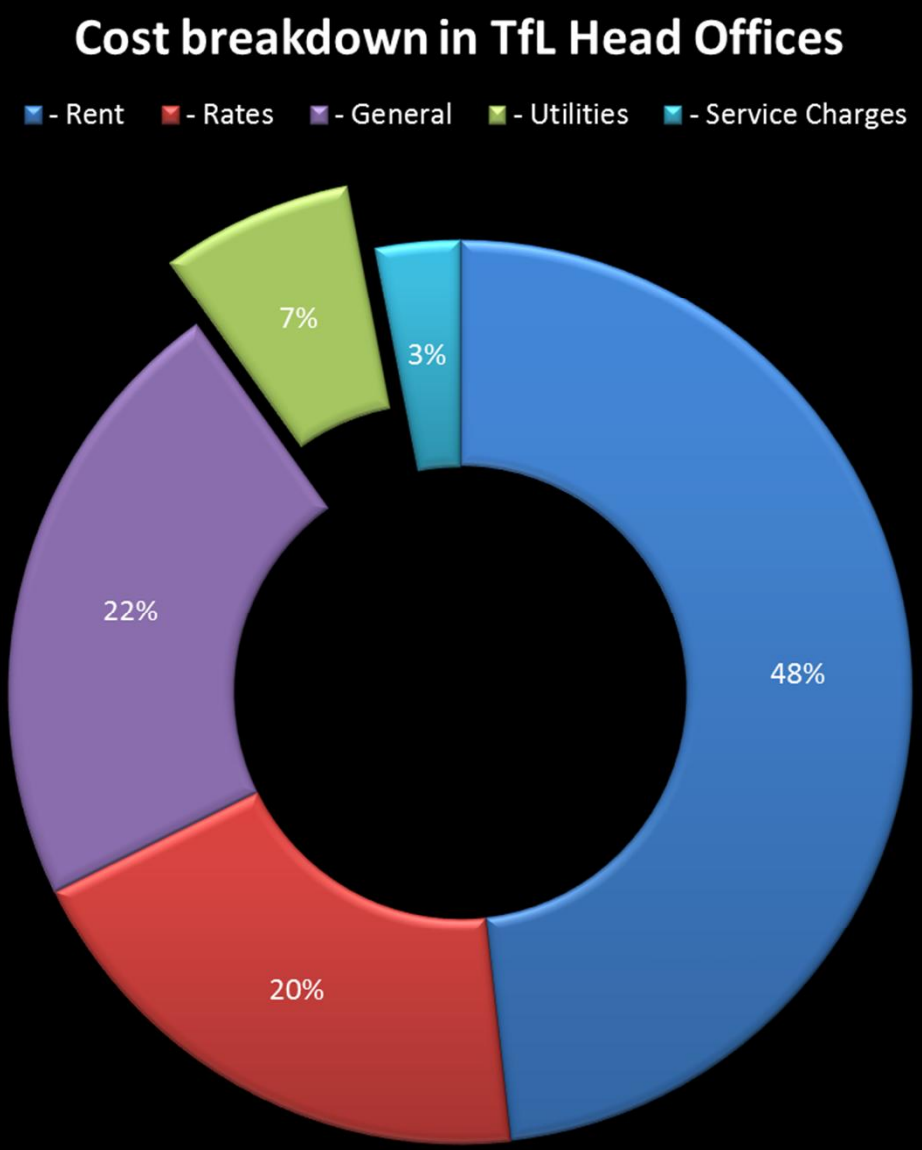
Behavioural change



Decentralised energy supply

Energy Efficiency

Costs and savings



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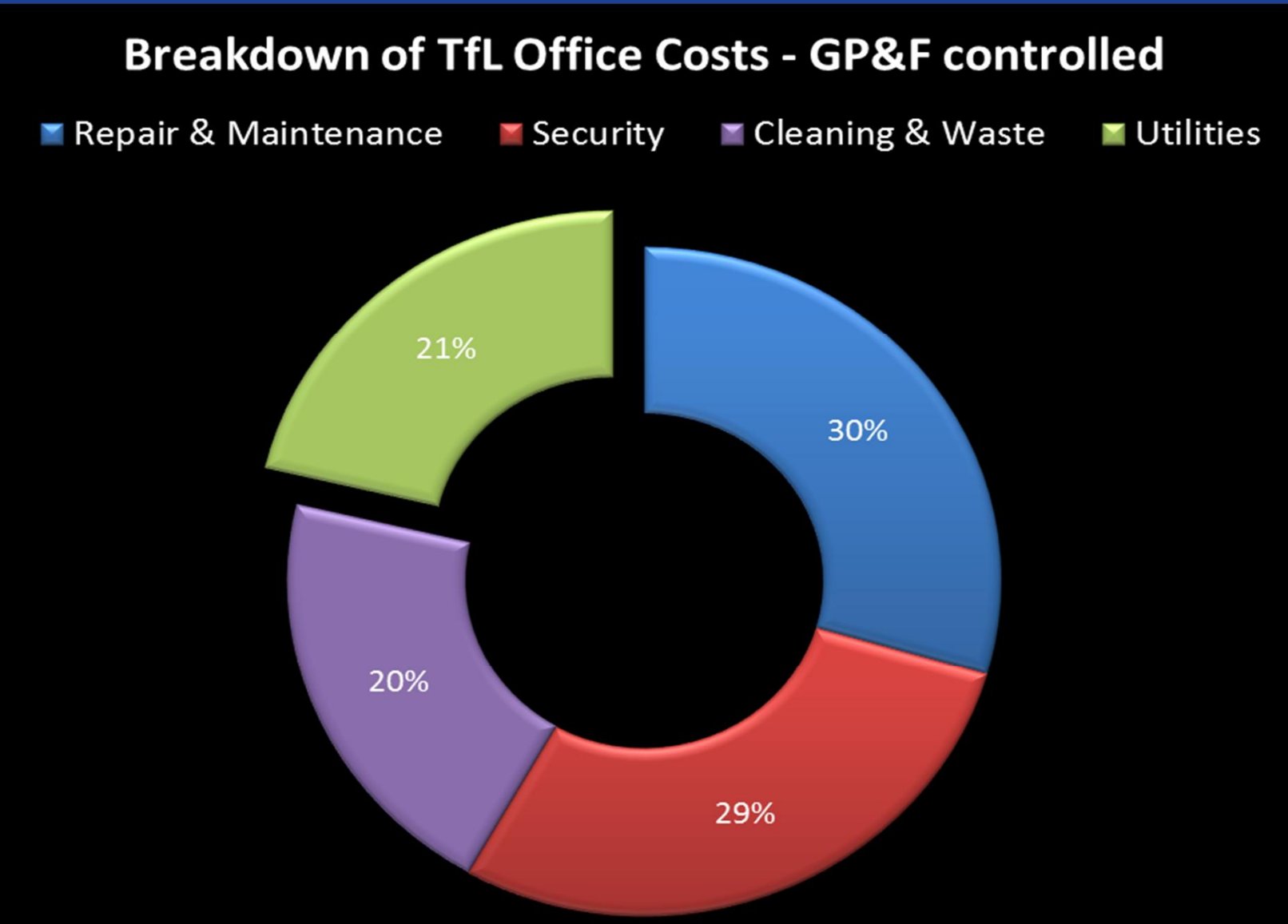

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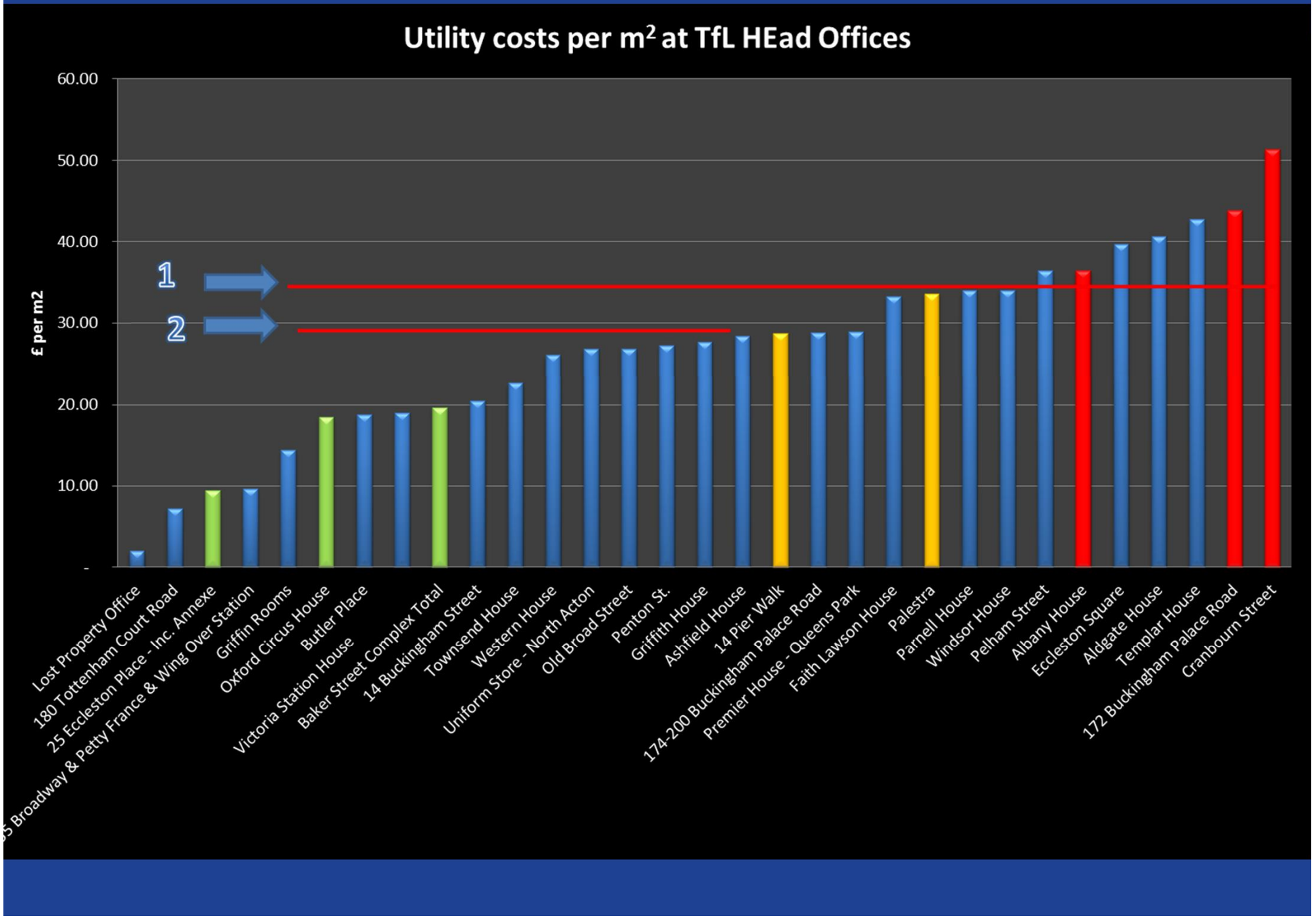


Energy challenges

Infrastructure By Numbers

94 thousand

Number of planned maintenance jobs per year

28,977

Breakdown & reactive calls

3,405

Blocked toilets

4,020

Air conditioning & heating units inspected

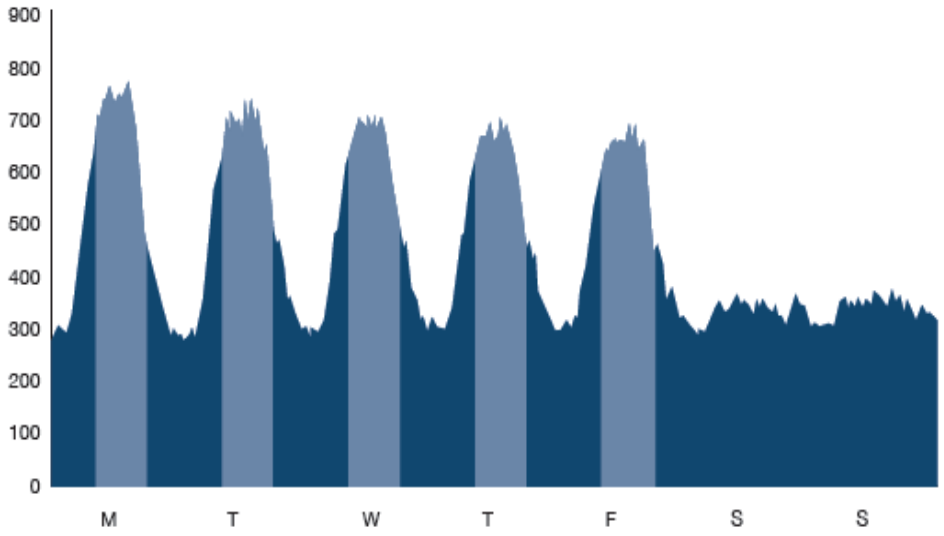
775

Water leaks

3

Number of Infrastructure related building failures in 2011/12

Analysing energy usage



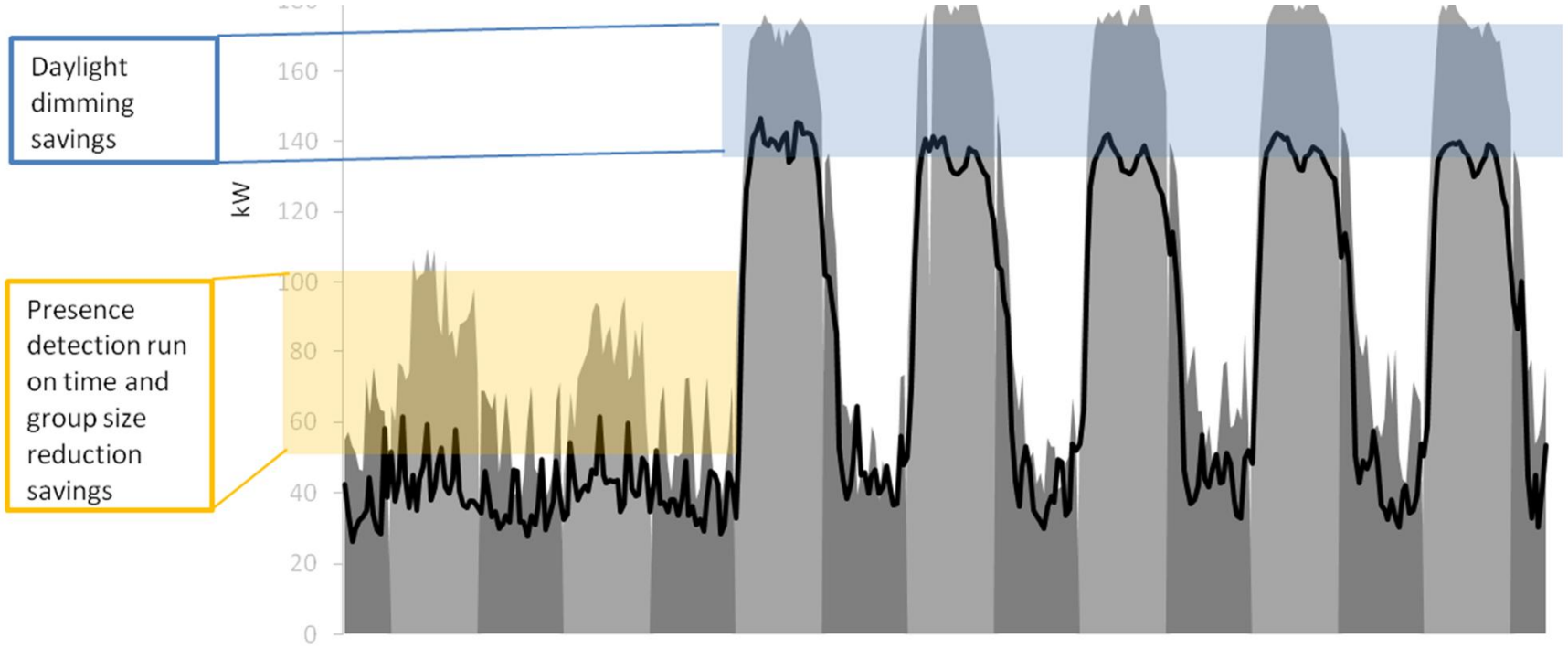
consumption during occupied hours.

consumption during unoccupied hours.

Out of hours energy use

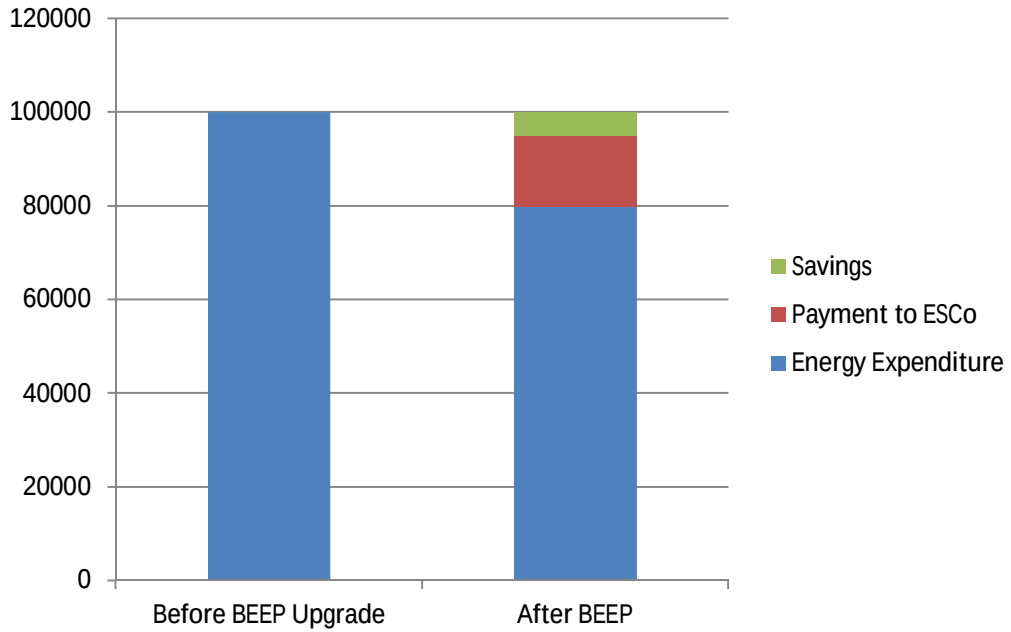
55%

Identifying waste (& savings)



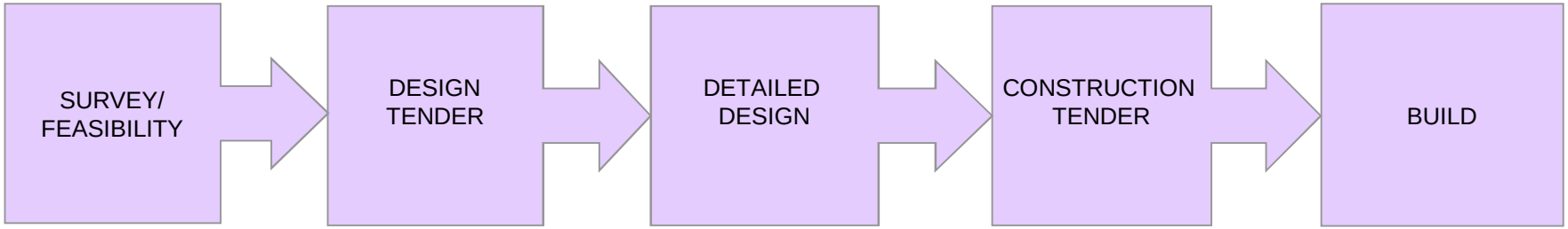
RE:FIT and energy performance contracting

- Cost neutral
- Single company or ESCo provides ‘end to end’ service
- Risk and reward split between client and ESCo
- Delivers projects with ‘not to exceed prices’
- **guaranteed** energy savings



RE:FIT
BUILDING ENERGY EFFICIENCY FOR TOMORROW

Why performance contracting? - Traditional approach

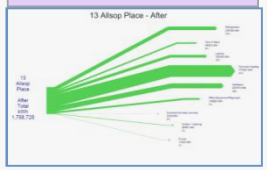


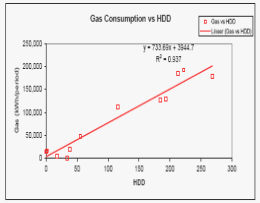
Energy performance contracting

Design & Build

M & V

DESKTOP SURVEY & MINIMUM SAVINGS GUARANTEE

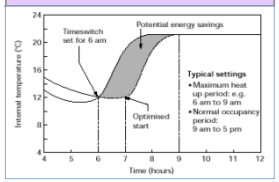


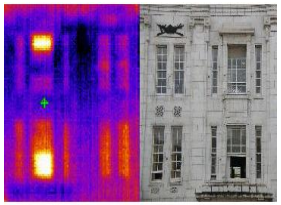


SELECTED ESCo PRODUCES INVESTMENT GRADE AUDIT

ENERGY CONSERVATION MEASURES (ECMs) INSTALLED

SAVINGS PROVED – & GUARANTEED!



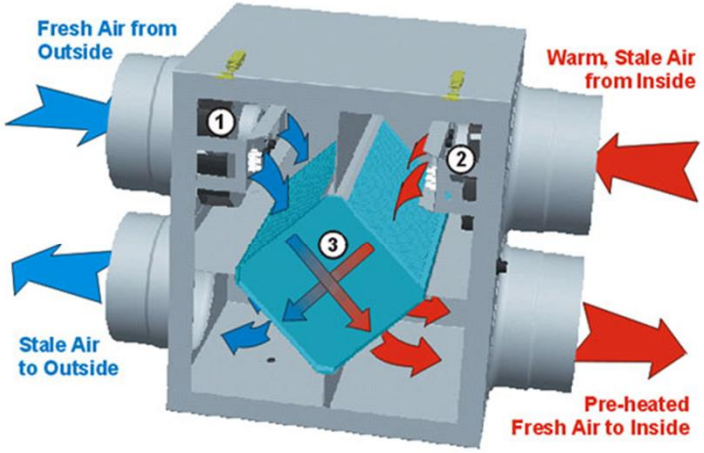


RE:FIT Tranche 1 Buildings

- 22 buildings
- 5500 workstations
- 100,000m^2 floor space
- Offices
- Listed buildings
- Control rooms
- Warehouses
- Operational & 24hr areas
- 12 to 130 years old
- Leasehold and freehold

Honeywell

Retrofit technologies



RE:FIT - Update

- 1800 new lights
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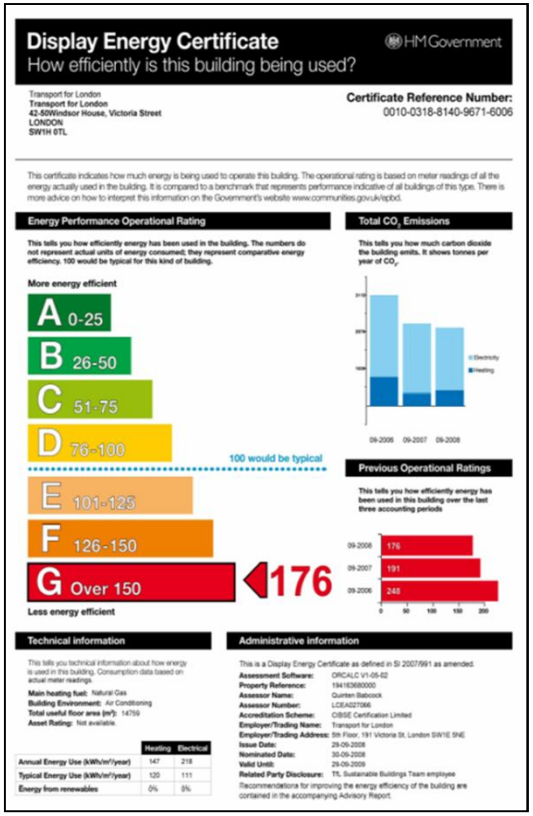
- 16 sets of variable speed fans and pumps
- Waste heat recovery ventilation
- Power optimisation at 6 sites
- 3.6km of draught stripping installed
- Controls upgrades at 12 sites

LONDON LEADING TO A GREEN LONDON | BETTER BUILDINGS PARTNERSHIP

RE:FIT BUILDING ENERGY EFFICIENCY FOR TOMORROW

RE:FIT - RESULTS

- Savings of 2500 tonnes CO_2 PA
- Payback of 8 years
- Savings ~ £500K pa
- Reduction in energy of 16%
- Improved DEC & EPC ratings



Display Energy Certificate
How efficiently is this building being used?

HM Government

Transport for London
Transport for London
42-50Windsor House, Victoria Street
LONDON
SW1H 0TL

Certificate Reference Number:
0010-0318-8140-9671-6006

This certificate indicates how much energy is being used to operate this building. The operational rating is based on meter readings of all the energy actually used in the building. It is compared to a benchmark that represents performance indicative of all buildings of this type. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The numbers do not represent actual units of energy consumed; they represent comparative energy efficiency. 100 would be typical for this kind of building.

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 150 176

Less energy efficient

Total CO_2 Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO_2.

Electricity
Heating

09-2006 09-2007 09-2008

Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods

09-2008 176
09-2007 191
09-2006 248

0 50 100 150 200

Technical information

This tells you technical information about how energy is used in this building. Consumption data based on actual meter readings.

Main heating fuel: Natural Gas
Building Environment: Air Conditioning
Total useful floor area (m²): 14759
Asset Rating: Not available.

	Heating	Electrical
Annual Energy Use (kWh/m²/year)	147	218
Typical Energy Use (kWh/m²/year)	120	111
Energy from renewables	0%	0%

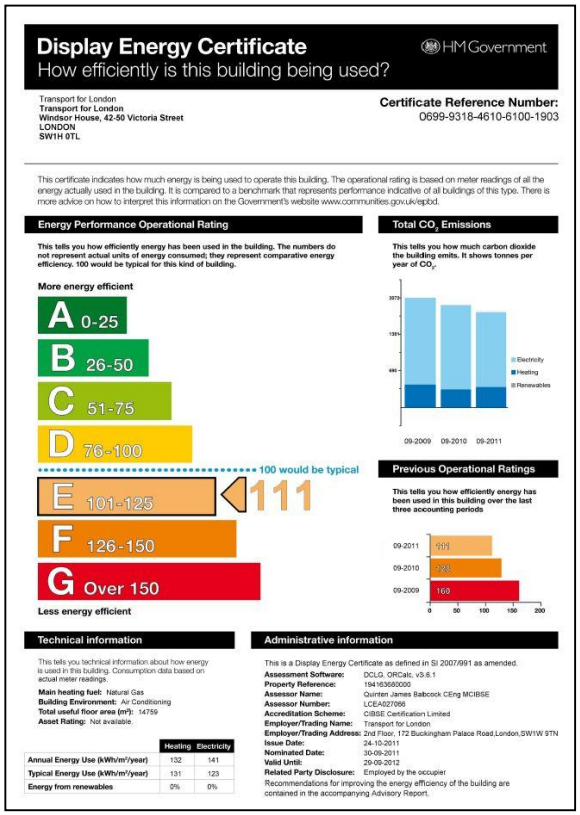
Administrative information

This is a Display Energy Certificate as defined in SI 2007/991 as amended.

Assessment Software: ORCALC V1-05-02
Property Reference: 1941836B0000
Assessor Name: Quinten Babcock
Assessor Number: LCEA027066
Accreditation Scheme: CIBSE Certification Limited
Employer/Trading Name: Transport for London
Employer/Trading Address: 5th Floor, 191 Victoria St, London SW1E 5NE
Issue Date: 29-09-2008
Nominated Date: 30-09-2008
Valid Until: 29-09-2009
Related Party Disclosure: T5, Sustainable Buildings Team employee

Recommendations for improving the energy efficiency of the building are contained in the accompanying Advisory Report.

DEC for Windsor House – pre-retrofit



Display Energy Certificate
How efficiently is this building being used?

HM Government

Transport for London
Transport for London
Windsor House, 42-50 Victoria Street
LONDON
SW1H 0TL

Certificate Reference Number:
0699-9318-4610-6100-1903

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More energy efficient

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100 would be typical
E 101-125 111
F 126-150
G Over 150

Less energy efficient

Total CO_2 Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO_2.

Electricity
Heating
Renewables

09-2009 09-2010 09-2011

Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods

09-2011 111
09-2010 123
09-2009 160

0 50 100 150 200

Technical information

This tells you technical information about how energy is used in this building. Consumption data based on actual meter readings.

Main heating fuel: Natural Gas
Building Environment: Air Conditioning
Total useful floor area (m²): 14759
Asset Rating: Not available.

	Heating	Electricity
Annual Energy Use (kWh/m²/year)	132	141
Typical Energy Use (kWh/m²/year)	131	123
Energy from renewables	0%	0%

Administrative information

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Assessment Software: DCLG, ORCalc, v3.6.1
Property Reference: 1941836B0000
Assessor Name: Quinten James Babcock CEng MCIBSE
Assessor Number: LCEA027066
Accreditation Scheme: CIBSE Certification Limited
Employer/Trading Name: Transport for London
Employer/Trading Address: 2nd Floor, 172 Buckingham Palace Road,London,SW1W 9TN
Issue Date: 24-10-2011
Nominated Date: 30-09-2011
Valid Until: 29-09-2012
Related Party Disclosure: Employed by the occupier

Recommendations for improving the energy efficiency of the building are contained in the accompanying Advisory Report.

DEC for Windsor House – post-retrofit

Publicising DECs Less-En - a ULI initiative

Home | Knowledge Bank | Mobile App | Blog | Energy Map | About Us | Contact

LessEn > Home > Energy Map

Start Over

STEP 2:

Is your building on the map? If it is, please click the marker and leave a comment about how well you think it's run.

If it isn't, please add it. It will take 1 minute and will really help our cause.

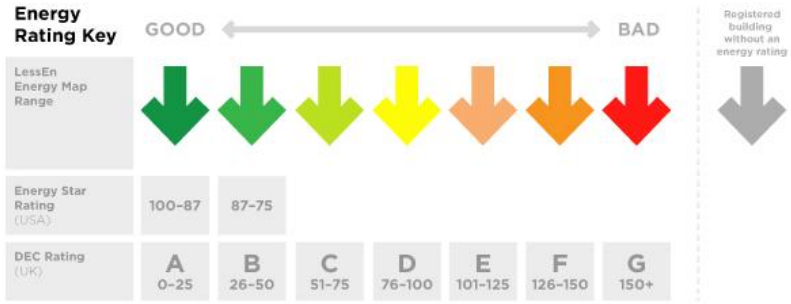
Go

LessEn's energy map, and mobile app, combines work place energy ratings from around the world - currently we have the USA and the UK, with others to follow.

The graphic on the right illustrates how LessEn's Arrow Ratings correspond to the different ratings systems that we use.

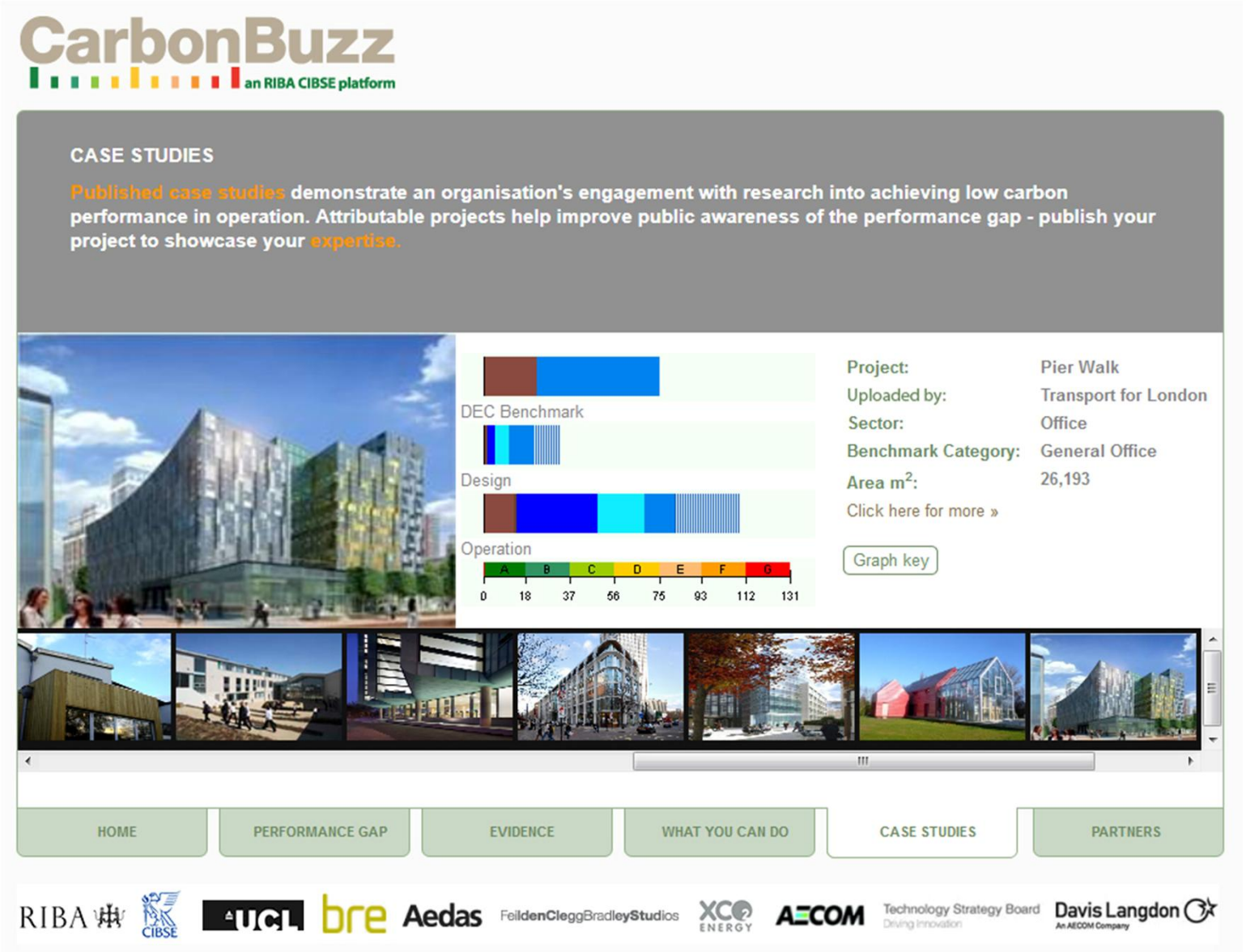
USA : Energy Star rating, buildings scoring more than 75 on a scale of 1-100, rated for energy use, are eligible for the EPA's ENERGY STAR. 50 is an average rating. Energy Star website

UK : Public buildings in England and Wales are required to display a Display Energy Certificate (DEC); rated from 0 to 150+ for worst performing buildings, and where 100 is a 'typical' rating. More information on DECs



LessEn Confusion
LessEn consumption
LessEn cost

Sharing building performance



BBP Members

British Land
CANARY WHARF LONDON
GE
GROSVENOR
Hammerson
Henderson GLOBAL INVESTORS
HERMES
LandSecurities capital commitment
Legal & General Investment Management
MAYOR OF LONDON
PRUPIM
Quintain
The Blackstone Group
Transport for London
Workspace Group

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MAYOR OF LONDON

BBP Publications & toolkits

- Best practise toolkits for industry
  - Green Lease
  - Managing Agents Sustainability Toolkit
  - Green Building Management
  - Low Carbon Retrofit
  - Sustainability Benchmarking
  - Ipad apps!

Freely available for download at:
www.betterbuildingspartnership.co.uk

www.tfl.gov.uk

www.betterbuildingspartnership.co.uk/

www.less-en.org/

www.carbonbuzz.org/

www.cibse.org/

www.esta.org.uk/

www.energyinst.org/home

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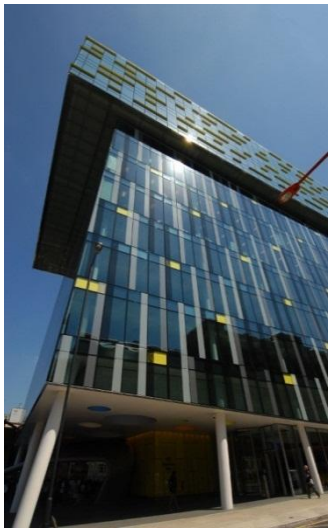

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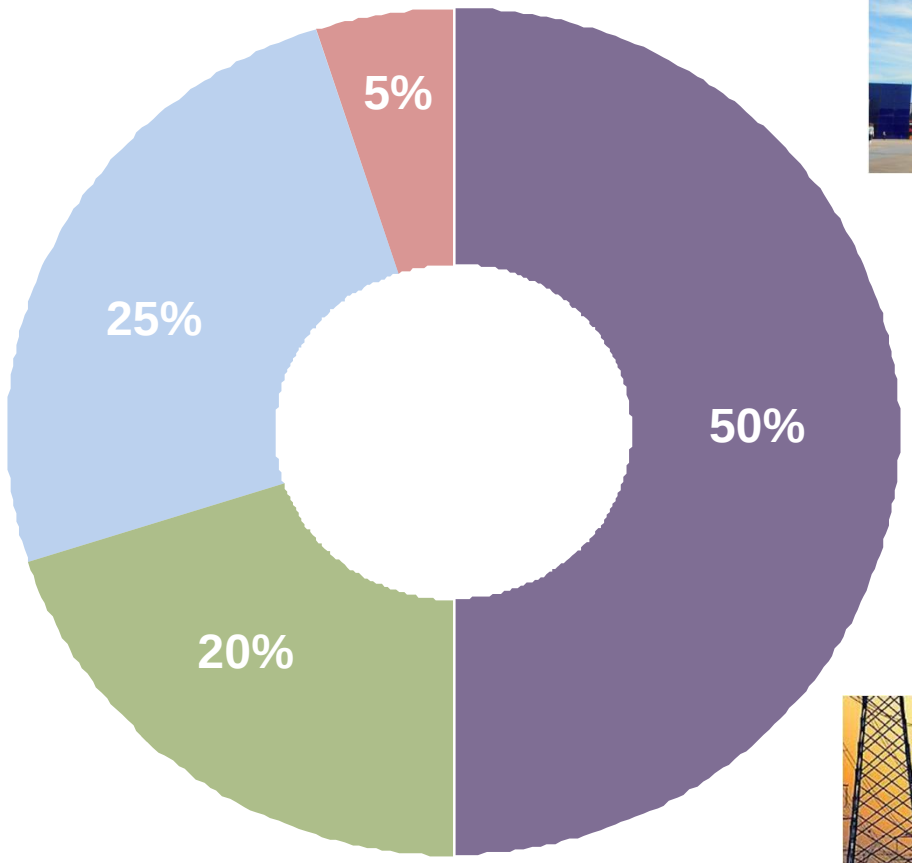
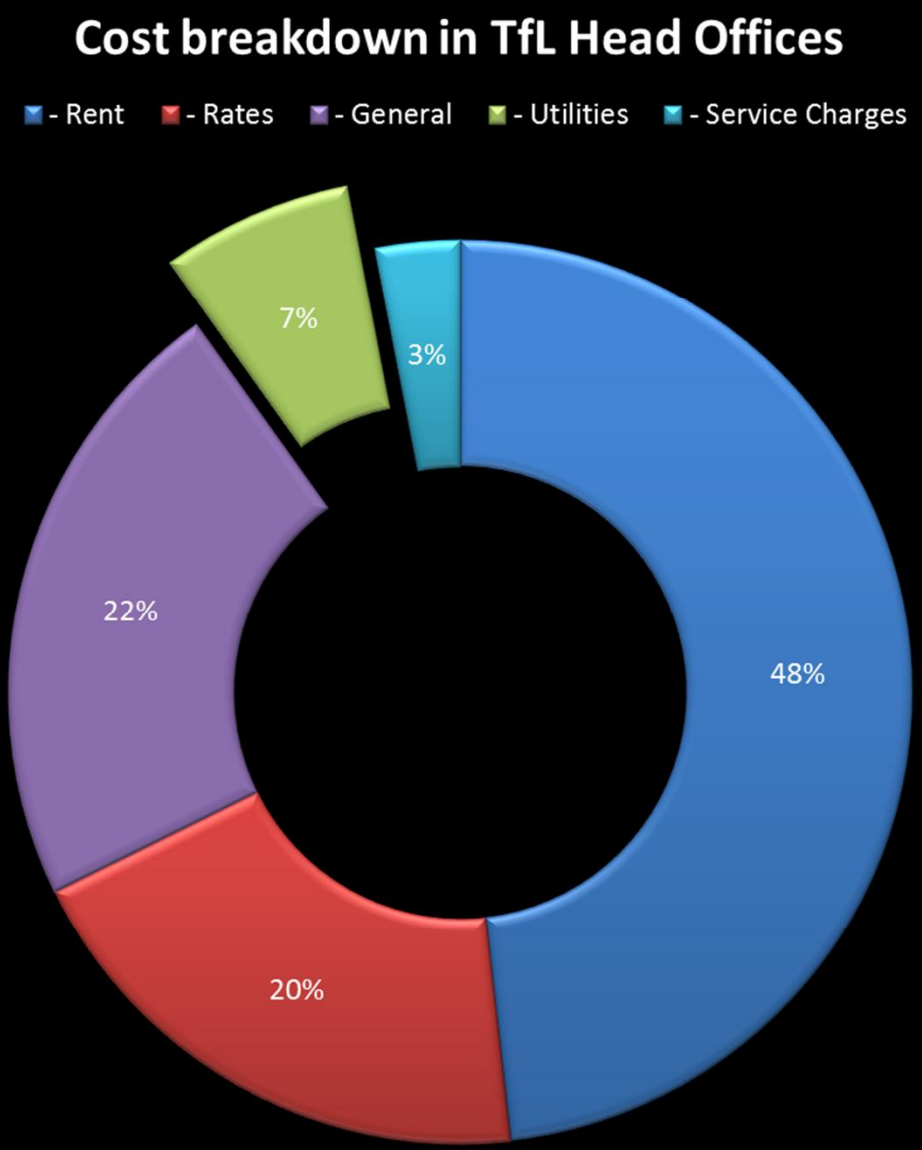


Decentralised energy supply

Energy Efficiency

Costs and savings



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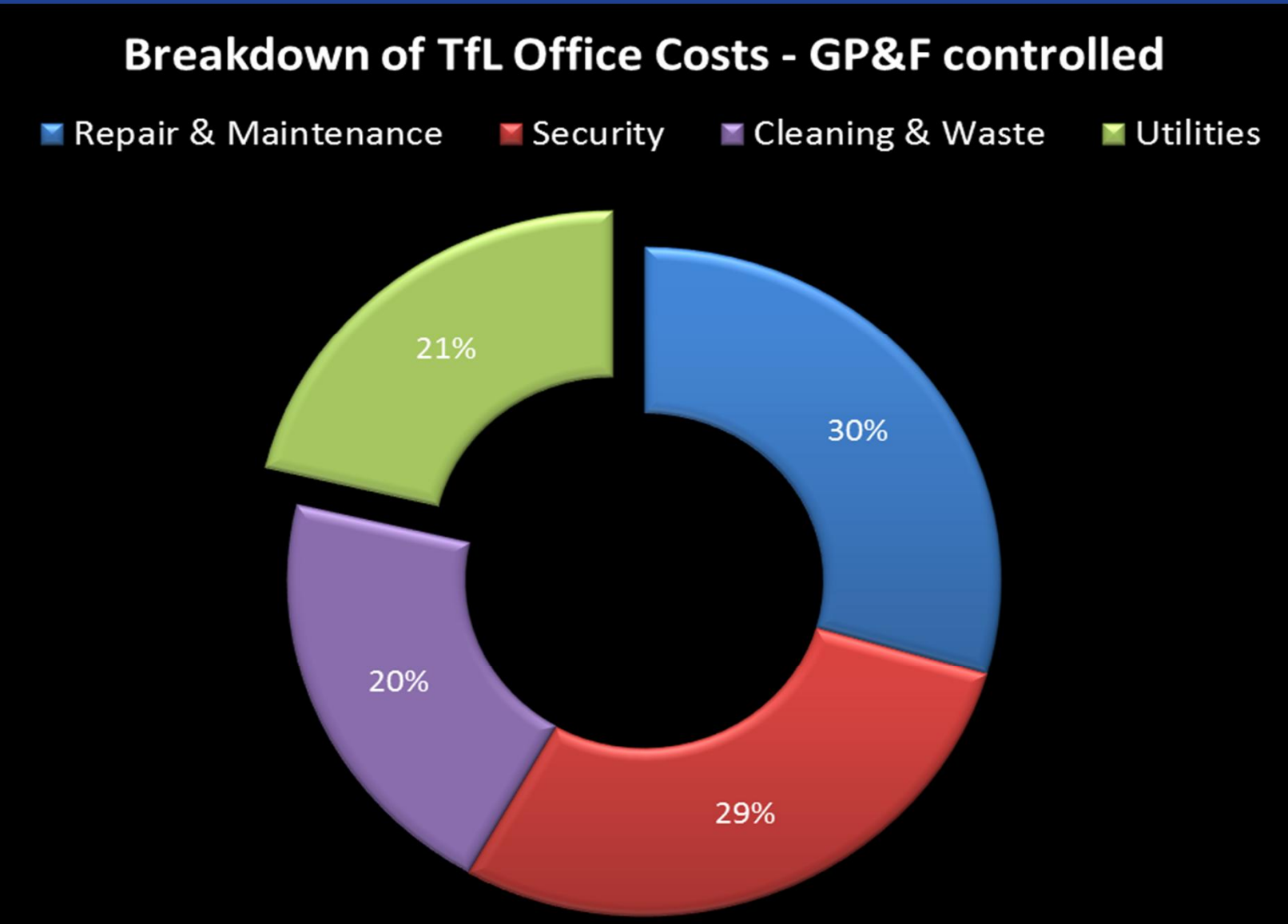

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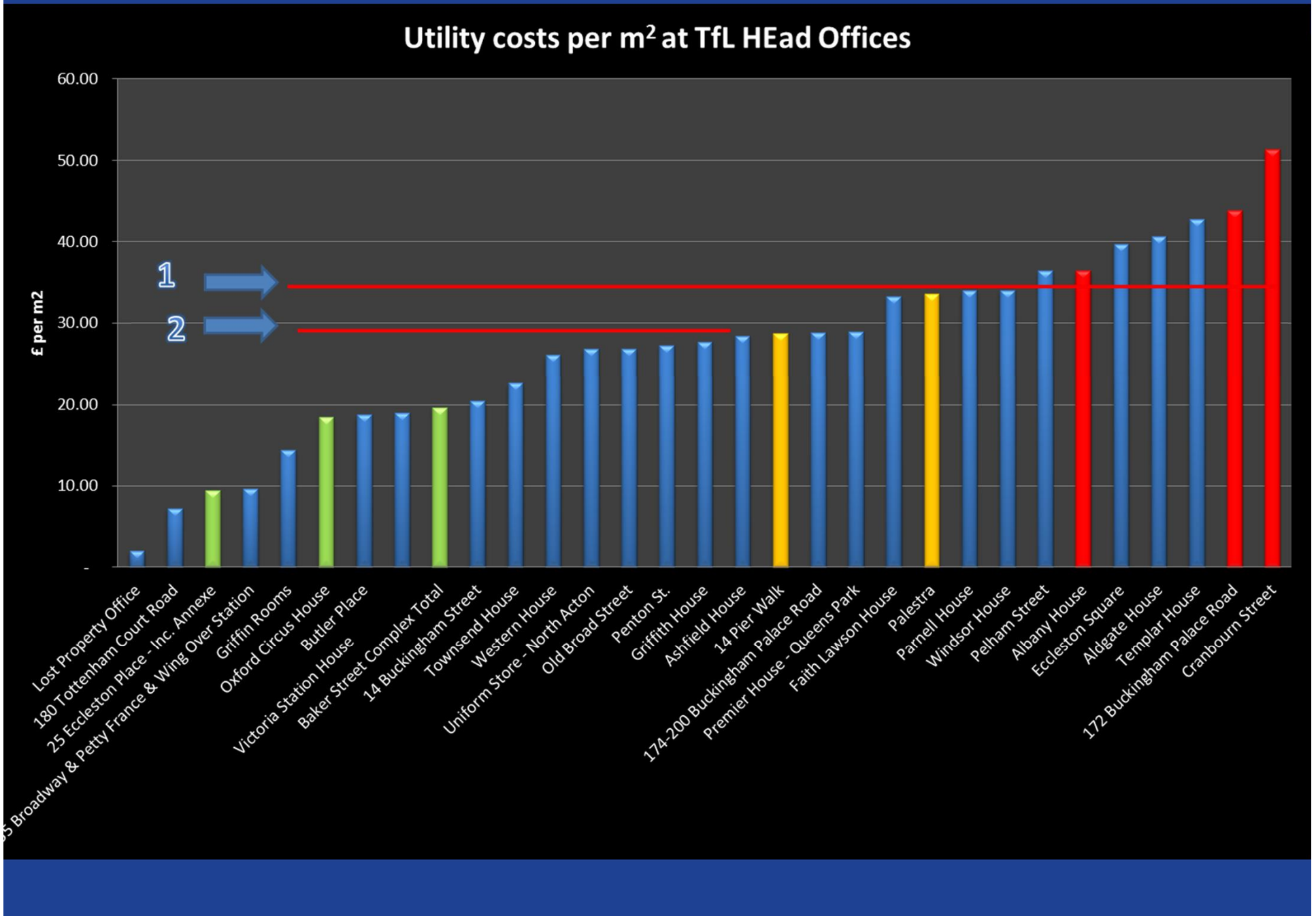

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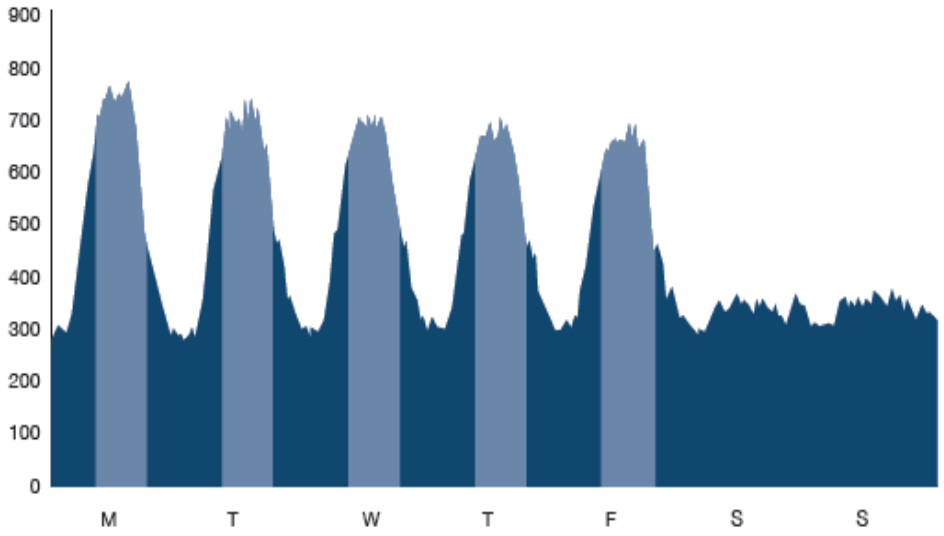

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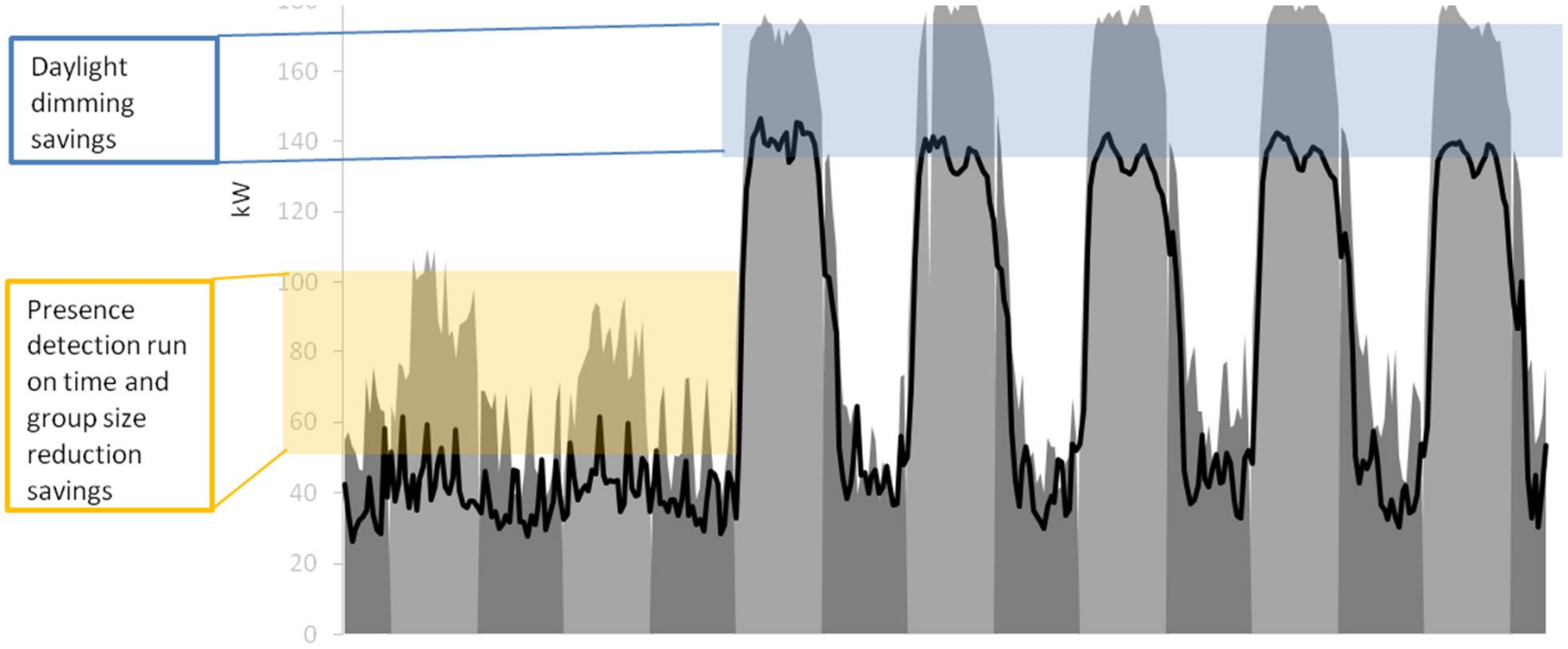

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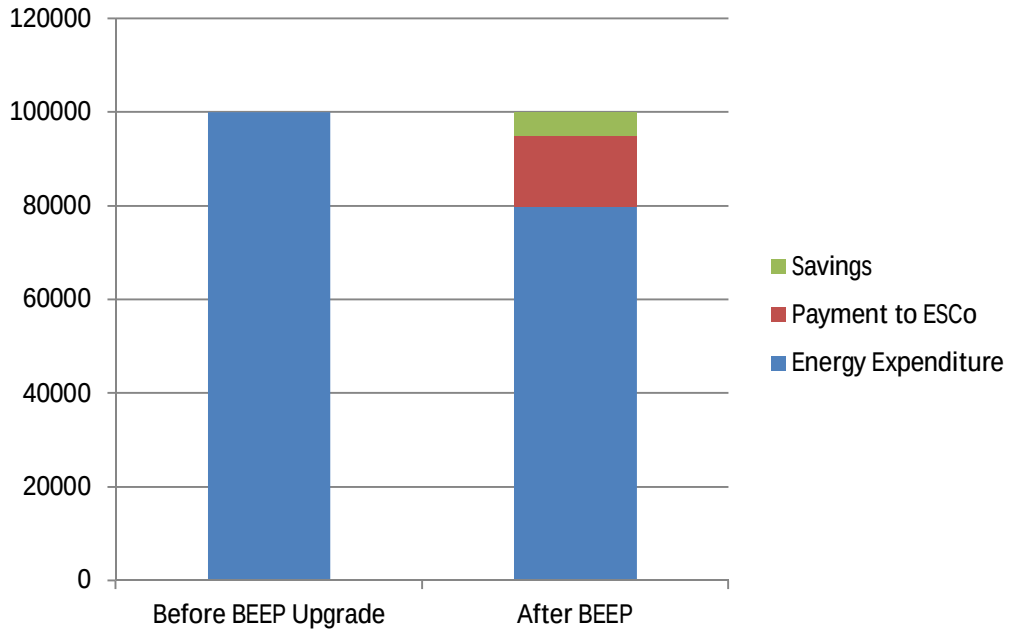

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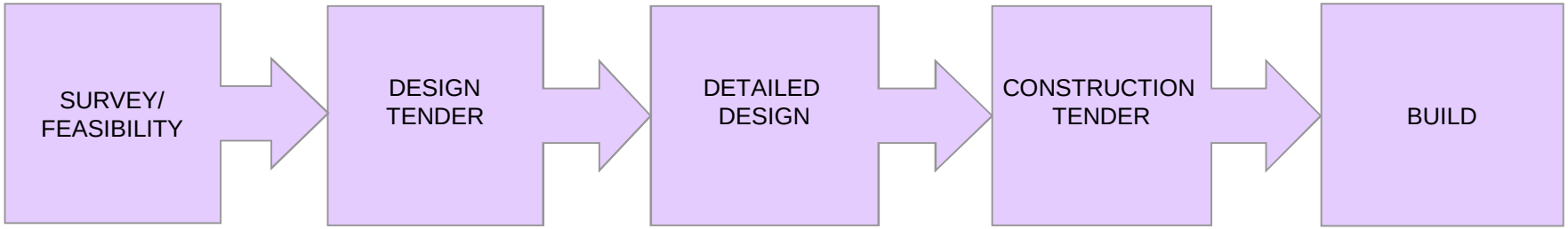

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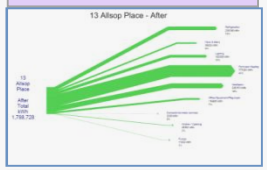

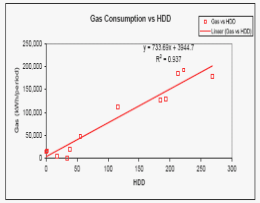

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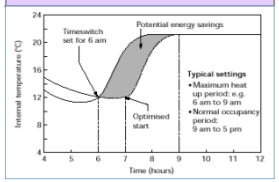

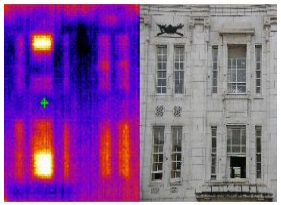

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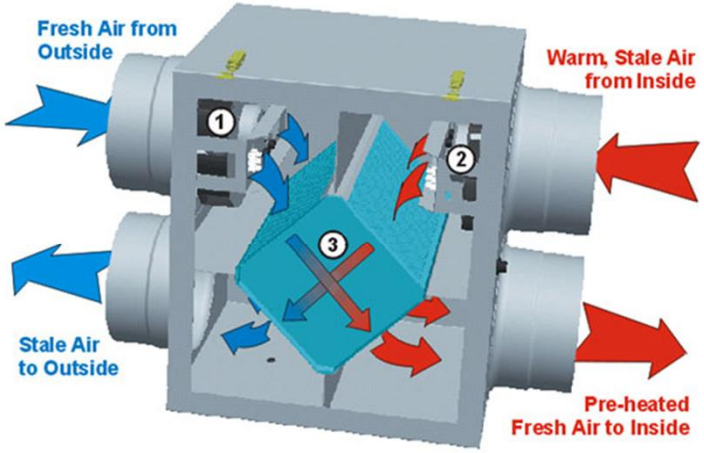

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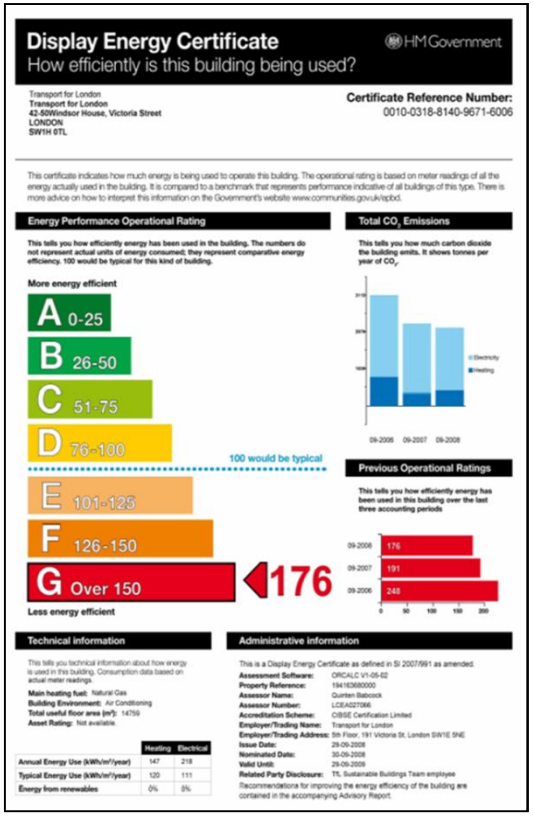

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B 26-50
C 51-75
D 76-100
100 would be typical
E 101-125
F 126-150
G Over 150 176

Less energy efficient

Total CO_2 Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO_2.

Electricity
Heating

09-2006 09-2007 09-2008

Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods

09-2008 176
09-2007 191
09-2006 248

0 50 100 150 200

Technical information

This tells you technical information about how energy is used in this building. Consumption data based on actual meter readings.

Main heating fuel: Natural Gas
Building Environment: Air Conditioning
Total useful floor area (m²): 14759
Asset Rating: Not available.

	Heating	Electrical
Annual Energy Use (kWh/m²/year)	147	218
Typical Energy Use (kWh/m²/year)	120	111
Energy from renewables	0%	0%

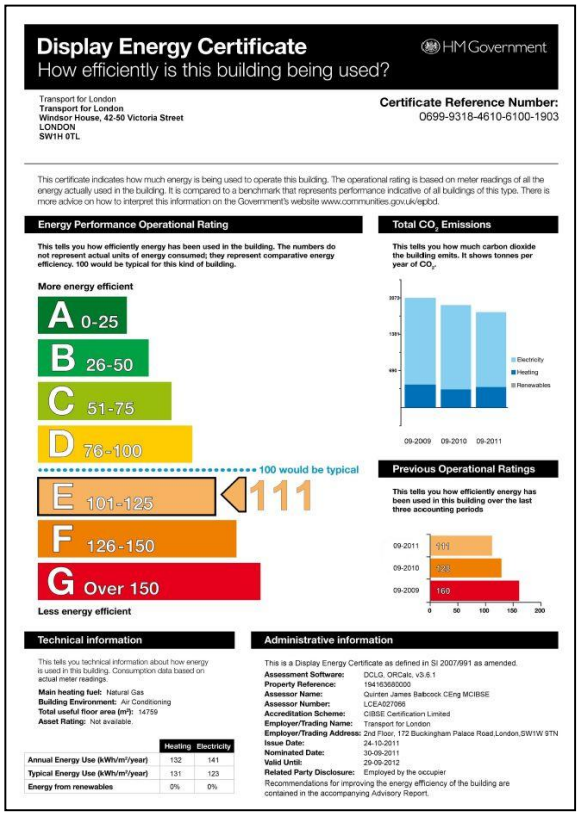
Administrative information

This is a Display Energy Certificate as defined in SI 2007/991 as amended.

Assessment Software: ORCALC V1-05-02
Property Reference: 1941836B0000
Assessor Name: Quinten Babcock
Assessor Number: LCEA027066
Accreditation Scheme: CIBSE Certification Limited
Employer/Trading Name: Transport for London
Employer/Trading Address: 5th Floor, 191 Victoria St, London SW1E 5NE
Issue Date: 29-09-2008
Nominated Date: 30-09-2008
Valid Until: 29-09-2009
Related Party Disclosure: T5, Sustainable Buildings Team employee

Recommendations for improving the energy efficiency of the building are contained in the accompanying Advisory Report.

DEC for Windsor House – pre-retrofit



Display Energy Certificate
How efficiently is this building being used?

HM Government

Transport for London
Transport for London
Windsor House, 42-50 Victoria Street
LONDON
SW1H 0TL

Certificate Reference Number:
0699-9318-4610-6100-1903

This certificate indicates how much energy is being used to operate this building. The operational rating is based on meter readings of all the energy actually used in the building. It is compared to a benchmark that represents performance indicative of all buildings of this type. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Operational Rating

This tells you how efficiently energy has been used in the building. The numbers do not represent actual units of energy consumed; they represent comparative energy efficiency. 100 would be typical for this kind of building.

More energy efficient

A 0-25
B 26-50
C 51-75
D 76-100
100 would be typical
E 101-125 111
F 126-150
G Over 150

Less energy efficient

Total CO_2 Emissions

This tells you how much carbon dioxide the building emits. It shows tonnes per year of CO_2.

Electricity
Heating
Renewables

09-2009 09-2010 09-2011

Previous Operational Ratings

This tells you how efficiently energy has been used in this building over the last three accounting periods

09-2011 111
09-2010 123
09-2009 160

0 50 100 150 200

Technical information

This tells you technical information about how energy is used in this building. Consumption data based on actual meter readings.

Main heating fuel: Natural Gas
Building Environment: Air Conditioning
Total useful floor area (m²): 14759
Asset Rating: Not available.

	Heating	Electricity
Annual Energy Use (kWh/m²/year)	132	141
Typical Energy Use (kWh/m²/year)	131	123
Energy from renewables	0%	0%

Administrative information

This is a Display Energy Certificate as defined in SI 2007/991 as amended.

Assessment Software: DCLG, ORCalc, v3.6.1
Property Reference: 1941836B0000
Assessor Name: Quinten James Babcock CEng MCIBSE
Assessor Number: LCEA027066
Accreditation Scheme: CIBSE Certification Limited
Employer/Trading Name: Transport for London
Employer/Trading Address: 2nd Floor, 172 Buckingham Palace Road,London,SW1W 9TN
Issue Date: 24-10-2011
Nominated Date: 30-09-2011
Valid Until: 29-09-2012
Related Party Disclosure: Employed by the occupier

Recommendations for improving the energy efficiency of the building are contained in the accompanying Advisory Report.

DEC for Windsor House – post-retrofit

Publicising DECs Less-En - a ULI initiative

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LessEn > Home > Energy Map

Start Over

STEP 2:

Is your building on the map? If it is, please click the marker and leave a comment about how well you think it's run.

If it isn't, please add it. It will take 1 minute and will really help our cause.

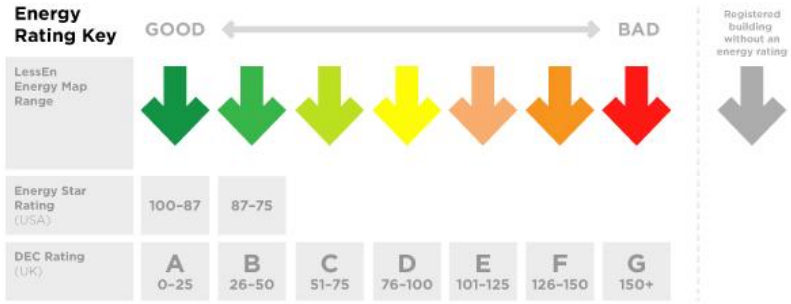
Go

LessEn's energy map, and mobile app, combines work place energy ratings from around the world - currently we have the USA and the UK, with others to follow.

The graphic on the right illustrates how LessEn's Arrow Ratings correspond to the different ratings systems that we use.

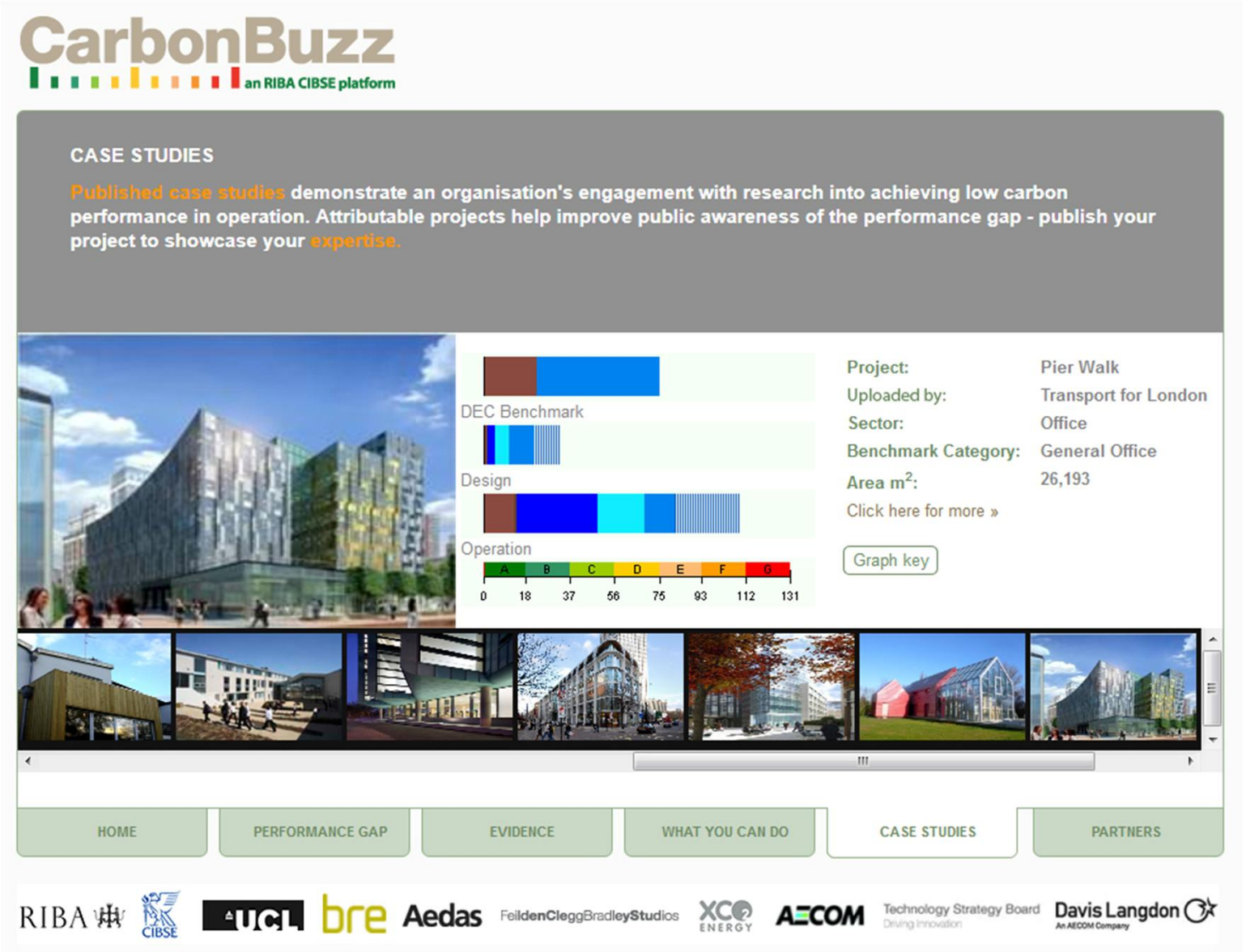
USA : Energy Star rating, buildings scoring more than 75 on a scale of 1-100, rated for energy use, are eligible for the EPA's ENERGY STAR. 50 is an average rating. Energy Star website

UK : Public buildings in England and Wales are required to display a Display Energy Certificate (DEC); rated from 0 to 150+ for worst performing buildings, and where 100 is a 'typical' rating. More information on DECs



LessEn Confusion
LessEn consumption
LessEn cost

Sharing building performance



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Transport for London
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LONDON LEADING TO A GREEN LONDON | BETTER BUILDINGS PARTNERSHIP

MAYOR OF LONDON

BBP Publications & toolkits

- Best practise toolkits for industry
  - Green Lease
  - Managing Agents Sustainability Toolkit
  - Green Building Management
  - Low Carbon Retrofit
  - Sustainability Benchmarking
  - Ipad apps!

Freely available for download at:
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