

# The impact of MEES in the rental sector

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Andrea Carvajal P.  
Principal Sustainability Consultant



INDUSTRY INSIGHT

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## MINIMUM ENERGY EFFICIENCY STANDARDS AND HERITAGE PROPERTIES

Mitigating risks through the procurement and interpretation of Energy Performance Certificates

MAY 2018

# Industry Insight freely available to download

sturgis carbon profiling

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[betterbuildingspartnership.co.uk/mees-and-heritage-properties](https://betterbuildingspartnership.co.uk/mees-and-heritage-properties)

# Who is it for?



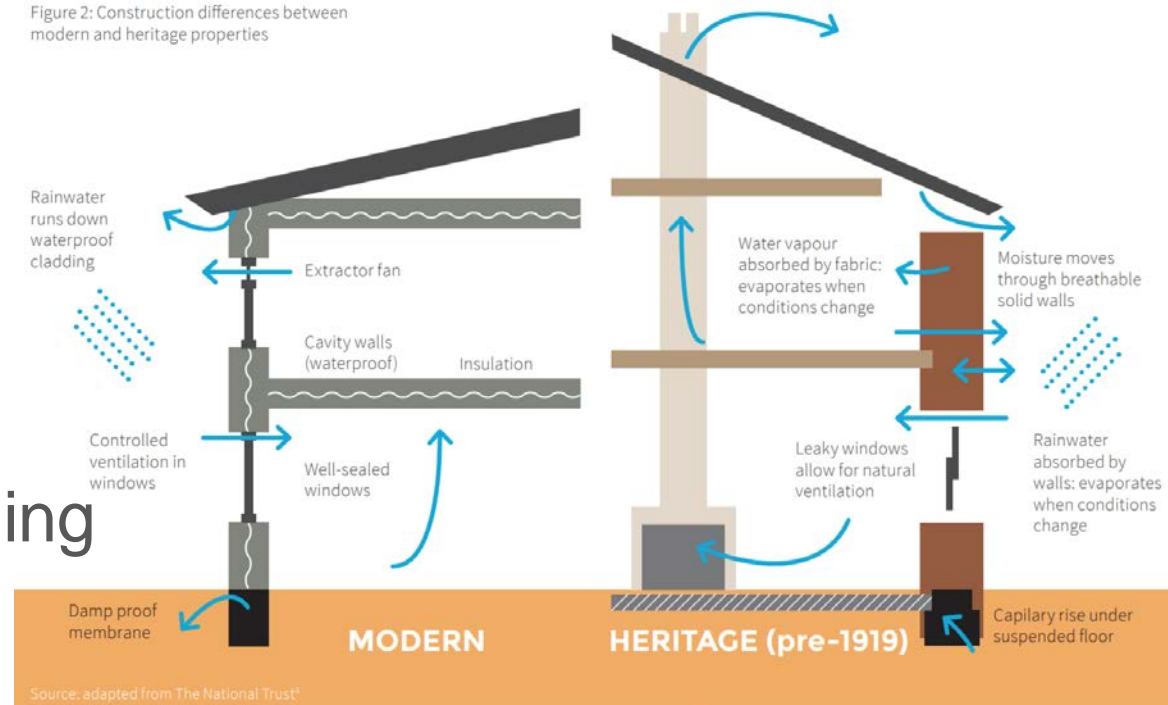
# What is the challenge?

- ❑ Heritage properties represent a significant proportion of the UK's building stock.
  - Estimate 25% buildings pre-1919
- ❑ Becoming increasingly at odds with environmental legislation – exemplified by MEES.
- ❑ Studies have indicated the historic properties are typically the worst performing in terms of EPC ratings.
- ❑ Heritage properties are significantly at risk and will require improvement works to meet regulations.
- ❑ Climate adaptation and 'future proofing'.

# Risks for commercial owners of heritage properties

- ❑ Lack of information leads to poor quality EPCs.
- ❑ Regulations and EPC methodology do not fully recognise traditional characteristics.
- ❑ Recommendations are untailored & potentially detrimental.
- ❑ No bespoke government approved certification/training for assessors.

Figure 2: Construction differences between modern and heritage properties

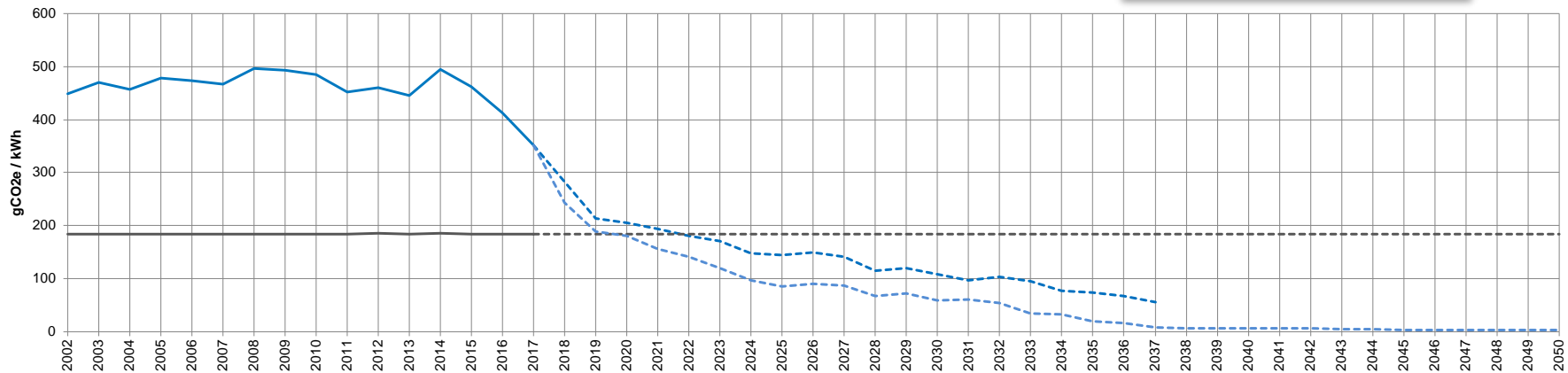
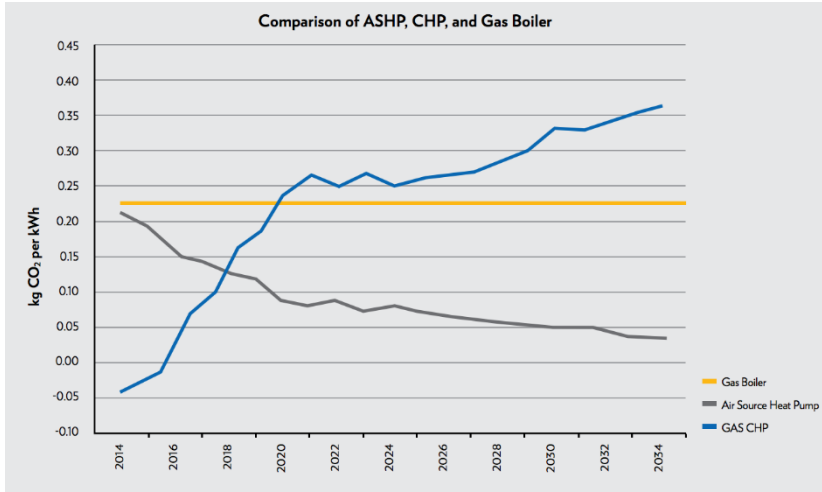


Source: adapted from The National Trust\*

# MEEES in practice

45 Elizabeth Street

## Electricity 'penalty'



**Energy Performance Certificate**

45, Elizabeth Street, LONDON, SW1W 9PP  
27 April 2018, EPN: 8588-7924-5660-5367-7992

**Summary of this home's energy performance related features**

Element	Description
Walls	Solid brick, as built, no insulation (assumed)
Roof	Pitched, 150 mm loft insulation
Floor	Flat, insulated (assumed)
Windows	Mostly double glazing
Main heating	Air source heat pump, warm air, electric
Main heating controls	Programmer and at least two room thermostats
Secondary heating	None
Hot water	Electric immersion, standard tank, plus solar
Lighting	Low energy lighting in all fixed outlets

**Estimated energy costs of dwelling for 3 years:** £ 4,635

**Over 3 years you could save:** £ 1,077

**Energy Efficiency Rating:** Current: D, Potential: C

**Top actions you can take to save money and make your home more efficient:**

Recommended measures	Indicative cost	Typical savings over 3 years
1. Internal or external wall insulation	£4,000 - £14,000	£ 957
2. Heat recovery system for mixer showers	£585 - £725	£ 120

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\* 2-year interpolation required due to the delay of GHG reporting factors to adopt actual electricity footprint  
Source: Simon Feraday (BIES) - Email 9th January 2018

# □ Electricity use ‘penalty’

44A Pimlico Road, London

	Current Property	Option A	Option B	Option C	Option D	Option E
Retrofit Measure		<b>Measure:</b> - New gas condensing combination boiler, minimum efficiency: 90% - Temperature controls: programmer, room thermostat and TRVs in all radiators	<b>Measure:</b> - High retention storage heaters (Quantum series) - Temperature controls for high retention heaters - New insulated dual immersion hot water cylinder with dedicated thermostat - Meter connection to dual electricity tariff (Economy 7 tariff)	<b>Measure:</b> - High efficient electrical ASHP to provide heating and cooling, connected to existing radiators. Ensure MCS certificate is available - Temperature controls: programmer, room thermostat and TRVs in all radiators - New insulated dual immersion hot water cylinder with dedicated thermostat - Meter connection to dual electricity tariff (Economy 7 tariff)	<b>Measure:</b> - Domestic wet central heating system with direct action electric boiler. At least 90% efficiency. - Temperature controls: programmer, room thermostat and TRVs in all radiators - New insulated dual immersion hot water cylinder with dedicated thermostat - Meter connection to dual electricity tariff (Economy 7 tariff)	<b>Measure:</b> - High efficiency, directed flow, highly radiant electric panel heaters - Temperature controls: At least two room thermostats - New insulated dual immersion hot water cylinder with dedicated thermostat - Meter connection to dual electricity tariff (Economy 7 tariff)
EPC Rating Achieved	<b>B 81</b>	<b>B 83</b>	<b>B 84</b>	<b>C 78</b>	<b>C 80</b>	<b>D 63</b>
DER	18.15 KgCO <sub>2</sub> /m <sup>2</sup> /yr	14.95 KgCO <sub>2</sub> /m <sup>2</sup> /yr	25.99 KgCO <sub>2</sub> /m <sup>2</sup> /yr	23.59 KgCO <sub>2</sub> /m <sup>2</sup> /yr	26.70 KgCO <sub>2</sub> /m <sup>2</sup> /yr	39.18 KgCO <sub>2</sub> /m <sup>2</sup> /yr
Carbon Performance		CO <sub>2</sub> reduction <b>-247</b> KgCO <sub>2</sub> /yr	CO <sub>2</sub> increase <b>603</b> KgCO <sub>2</sub> /yr	CO <sub>2</sub> increase <b>418</b> KgCO <sub>2</sub> /yr	CO <sub>2</sub> increase <b>658</b> KgCO <sub>2</sub> /yr	CO <sub>2</sub> increase <b>1,618</b> KgCO <sub>2</sub> /yr
		18%	-43%	-30%	-47%	-116%

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## ❑ Compliance gap in shell & core retrofit



- Second fit-out EPCs most likely will fall under E rating.
- Units with ratings below E are not legally let-able.

- Units with low EPC ratings are not attractive in the market. However, the rating doesn't reflect reality.
- Works are required to upgrade the EPC. Most likely these works will be obsolete.
- An EPC after tenant fit-out is not required by law.



# Recommendations



## Get to know your property

Collating as much information as possible regarding the fabric, roof and systems will provide energy assessors and consultants with the evidence required for them to deliver an accurate and high-quality EPC.

### Key Parameters Affecting EPCs

Key input	Notes	Impact on the EPC rating	Evidence collected by assessors	Supporting activities/documents that can be provided by owners
<b>Access</b>	<p>Inspect all the spaces inside the property and collect the required photographic evidence.</p> <p>Surveying all the spaces/rooms enables assessors to choose the most suitable model inputs and avoid using the worst-case energy scenarios.</p>	<b>High</b>	<ul style="list-style-type: none"> <li>– Walk through of the property</li> <li>– Identify the construction type, building services and lighting systems found in each room/zone</li> <li>– Take relevant photographs</li> </ul>	<ul style="list-style-type: none"> <li>– Ensure that all the rooms (including plant rooms, cupboards, loft spaces) are accessible</li> <li>– Communicate with the assessor before the survey and determine the scope of the site survey in advance</li> <li>– Site Plans / Building Survey</li> </ul>
<b>Building age</b>	<p>Default values and design assumptions are based on the age of the building.</p>	<b>High</b>	<ul style="list-style-type: none"> <li>– No evidence required</li> </ul>	<ul style="list-style-type: none"> <li>– Age of construction, if known</li> <li>– Details of any retrofitting works carried out (including extensions and alterations)</li> </ul>
<b>Building Services Systems</b>	<p>Buildings services systems such as space heating systems, hot water, cooling or mechanical ventilation play the most important role in determining the EPC rating of a property.</p> <p>Inefficient and poorly maintained building systems can significantly increase the energy consumption and cause damage to the property.</p>	<b>High</b>	<ul style="list-style-type: none"> <li>– Identify the brand and model of heating and hot water systems</li> <li>– Photos and manufacturer details</li> </ul>	<ul style="list-style-type: none"> <li>– If available, as-built drawings and manufacturer details of space heating, cooling and hot water systems can be shared with the assessor. Sources may include an asset register for the property or previous M&amp;E survey</li> </ul>
<b>Wall, roof and ground floor build-up</b>	<p>Insulating the external building elements can reduce the heat losses resulting in significant energy savings.</p> <p>To be able to reflect the positive impact of insulation in the energy rating, relevant documentation is required.</p>	<b>High</b>	<ul style="list-style-type: none"> <li>– Photos, invoices and U-Value calculations</li> </ul>	<ul style="list-style-type: none"> <li>– Building Survey</li> <li>– Insulation type and thickness</li> <li>– Photographic evidence</li> <li>– U-value calculations carried by accredited professionals</li> <li>– Invoices of insulation purchased</li> <li>– As-built drawings with the location of insulation and details of the build-up</li> </ul>
<b>Source of energy</b>	<p>The assessor is required to indicate if gas is available in the property.</p> <p>Electricity is 2.5 times more carbon intensive than gas (subject to grid decarbonisation).</p>	<b>High</b>	<ul style="list-style-type: none"> <li>– Inspect and provide evidence of gas meters</li> </ul>	<ul style="list-style-type: none"> <li>– Indicate if gas connections are not available in the property</li> </ul>



## Select an energy assessor with experience of heritage properties

- Knowledge & experience of heritage properties.
- Experience of producing EPCs.
- Ability to outline a bespoke approach that addresses limitations within the EPC methodology when assessing heritage properties.



## Review the EPC carefully

Before committing to any improvement works, assess the quality of the EPC by checking that key information is correct.

### Key EPC Review Criteria

- Property details: e.g. address, floor area, location in the building.
- Main heating fuel identified.
- Main building characteristics: e.g. wall type, windows, roof, etc.
- All improvements and changes carried out since the building was originally built have been included: e.g. additional insulation.
- The software model used.
- Level of default values.



# Select appropriate improvement measures

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## MAINTENANCE ACTIVITIES

- External walls
- Roof
- Ground floor & basement
- Mechanical ventilation
- Fans
- BMS
- Boilers
- Fireplace

## LOW COST, NON-INTRUSIVE WORKS

- Energy efficiency lighting
- Lighting controls
- Control systems
- Draught-proofing

## BUILDING SERVICES SYSTEMS

- Boilers
- Heat pumps
- Fans
- Chillers
- TVRs
- Domestic hot-water
- Heat recovery

## BUILDING FABRIC

- Roof insulation
- External wall insulation
- Group floor insulation
- Glazing
- Air-tightness

## RENEWABLE & LOW-CARBON TECHNOLOGY

- PV
- Solar thermal
- ASHP
- GSHP



# Involve your future tenants

**Environmental Performance Evaluation**


Address: Basement, 3 Spanish Pl  
London, W1U 3HX

Property Code: 55003  
Designation: Listed Grade II  
Use: Office  
Area: 64.70 m<sup>2</sup>  
Instruction: Jessica Lennox

WSP Ref: T0553007-001  
Assessor: CN  
Date: 05/11/2018

**MINIMUM CARBON SAVINGS**  
70%  
5,926  
KgCO<sub>2</sub>/yr

**ENHANCED CARBON SAVINGS**  
71%  
6,093  
KgCO<sub>2</sub>/yr



OPERATIONAL PERFORMANCE	Current	Minimum Scope	Enhanced Scope
<b>CARBON PERFORMANCE</b>	131.77 KgCO <sub>2</sub> /m <sup>2</sup> /yr	40.18 KgCO <sub>2</sub> /m <sup>2</sup> /yr	37.60 KgCO <sub>2</sub> /m <sup>2</sup> /yr
<b>HEATING DEMAND</b>	323 kWh/yr	149 kWh/yr	143 kWh/yr
<b>LIGHTING DEMAND</b>	9,357 kWh/yr	2,204 kWh/yr	2,225 kWh/yr
<b>COOLING DEMAND</b>	315 kWh/yr	262 kWh/yr	306 kWh/yr
<b>EPC</b>	G 263	Band D	Band C

**RENEWABLE SOURCES**

PV CARBON PERFORMANCE: N/A | N/A | N/A

**NOTES**  
This analysis was based on the most representative property in the building. It comprises a number of assumptions with regard to operational energy performance and the use of materials to achieve low carbon solutions. All figures are indicative and subject to verification after works completion.  
EPC's are calculated in line with PAS 206. EPCAP results are calculated in line with PAS 4012. These models provide estimates for the portion of Building Energy Consumption legislated in the UK through Part L and statutory renewable requirements. It is anticipated that additional emissions will be generated from other unregulated sources not included. Predicted savings and performance were based on typical use patterns defined by the methodology. Results may vary depending on actual occupant behavior.

**CONTENTS**

- Scope of Works
- EPC Variation Chart
- MAC Curve
- O&M Guidelines
- EPC
- MCS Report

THE PORTMAN ESTATE

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## RESPONSIBLE FIT-OUT TOOLKIT: OFFICES

Key components of the toolkit include:

- Responsible Fit-out Process
- Finding Space (Occupiers Seeking Space)
- Agreement & Engagement (Setting Requirements, Legal Agreement)
- Framework (Guidance, Checklist)
- Indoor Air Quality (and ventilation in low polluted areas)
- Temperature and relative humidity
- Lighting
- Acoustics
- Health and safety
- Energy
- Water
- Waste
- Materials
- Accessibility
- Security
- Insurance
- Liability
- Compliance
- Documentation
- Reporting
- Monitoring
- Review
- Handover
- Post-occupancy
- Feedback
- Continuous Improvement



# Additional expertise and guidance

## Appendix 3: EPC Recommendations and Risk Analysis for Domestic Properties

This section includes the standard EPCs. Each measure is assessed in terms of its likely impact on the exterior properties, and likely structural risks.

### Recommendations for the Envelope

Element	Recommendation
Roof	Loft insulation
Roof	Flat roof
Roof	Room-in-roof
External Wall	External insulation
External wall	Internal insulation
External Wall	Cavity wall insulation
Floor	Floor insulation
Window	Double glazing
Window	Secondary glazing
Draught proofing	Draught proofing

### Recommendations for Heating and Hot Water

Element	Recommendation
Heating system	Change heating system
Heating system	Upgrade heating system
Heating system	Flue gas extraction
Heating system	New or replacement boiler
Heating system	Replacement radiators
Controls	Heating controls
Controls	Heating controls for room temperature

## Appendix 4: EPC Recommendations and Risk Analysis for Non-Domestic Properties

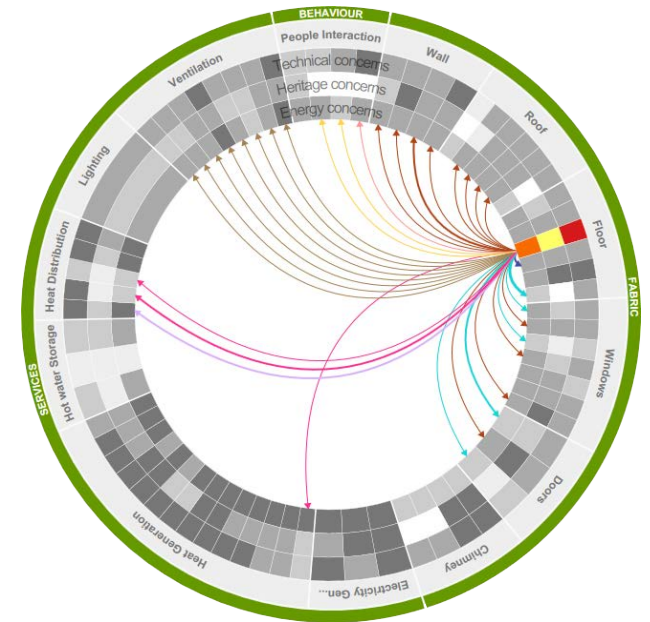
This section includes the standard measures found in non-domestic EPCs. Each measure is assessed in terms of planning limitations, their likely impact on the exterior aesthetic value of heritage properties, and likely structural and condensation risks.

It must be noted that this risk assessment is indicative only. Before making any investment decisions or before retrofitting a heritage property, consult a technical advisor and obtain further guidance.

### Recommendations for the Envelope

Element	Recommendation	Planning limitations may apply	Likely impact on aesthetic heritage	Likely structural risk	Likely condensation risk
Roof	Roof is poorly insulated. Install or improve insulation of roof.	Yes	Low	Moderate	Moderate
Roof	Some loft spaces are poorly insulated. Install or improve insulation.	Yes	Low	Moderate	Moderate
External Wall	Some walls have uninsulated cavities. Introduce cavity wall insulation.	Yes	Low	Moderate	Low
External Wall	Some solid walls are poorly insulated. Introduce or improve internal insulation.	Yes	Low	Moderate	High
Floor	Some floors are poorly insulated. Introduce and/or improve insulation. Add insulation to the exposed surfaces of floors adjacent to underground or unheated spaces.	No	Low	Low	Low
Window	Some windows have high U-values. Consider installing secondary glazing.	Yes	Low	Low	Moderate
Window	Some glazing is poorly performing. Replace/improve glazing and/or frames.	Yes	High	Low	Moderate
Air-tightness	Carry out a pressure test. Identify and treat air leakage. Enter result in EPC calculation.	No	Low	Low	Low

## STBA SUSTAINABLE TRADITIONAL BUILDINGS ALLIANCE



## ...to sum up

- ❑ In complying with MEEES and upgrading heritage properties commercial property owners need to understand and **appreciate** their **unique nature**.
- ❑ The installation of **inappropriate measures** can **devalue a property** from both a financial and cultural perspective, causing damage & requiring future investment for repairs.
- ❑ Upgrading heritage properties **requires special expertise**; however, high energy efficiency standards are possible.
- ❑ Strategies should **maximise improvements** to an EPC rating whilst **minimising** detrimental **impacts** to building fabric, internal conditions and historic value.



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[andrea.carvajal@wsp.com](mailto:andrea.carvajal@wsp.com)

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