Delivering sustainable buildings
Savings and payback
Yetunde Abdul and Richard Quartermaine
Delivering sustainable buildings

Savings and payback

Yetunde Abdul (BRE)

Richard Quartermaine (Sweett Group)
BRE Trust is the largest UK charity dedicated specifically to research and education in the built environment. BRE Trust uses the profits made by its trading companies to fund new research and education programmes that advance knowledge, innovation and communication for public benefit.

**BRE Trust** is a company limited by guarantee, registered in England and Wales (no. 3282856) and registered as a charity in England (no. 1092193) and in Scotland (no. SC039320). Registered office: Bucknalls Lane, Garston, Watford, Herts WD25 9XX

Tel: +44 (0) 333 321 8811
Email: secretary@bretrust.co.uk
www.bretrust.org.uk

**IHS (NYSE: IHS)** is the leading source of information, insight and analytics in critical areas that shape today's business landscape. Businesses and governments in more than 165 countries around the globe rely on the comprehensive content, expert independent analysis and flexible delivery methods of IHS to make high-impact decisions and develop strategies with speed and confidence. IHS is the exclusive publisher of BRE publications.

IHS Global Ltd is a private limited company registered in England and Wales (no. 00788737).
Registered office: Willoughby Road, Bracknell, Berkshire RG12 8FB. www.ihs.com

BRE publications are available from www.brebookshop.com or IHS BRE Press
Willoughby Road
Bracknell
Berkshire RG12 8BF
Tel: +44 (0) 1344 328038
Fax: +44 (0) 1344 328005
Email: brepress@ihs.com

© IHS 2014. No part of this publication may be reproduced or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, or be stored in any retrieval system of any nature, without prior written permission of IHS. Requests to copy any part of this publication should be made to:
The Publisher
IHS BRE Press
Garston
Watford
Herts WD25 9XX
Tel: +44 (0) 1923 664761
Email: brepress@ihs.com

Printed using FSC or PEFC material from sustainable forests.

**FB 63**
First published 2014

All URLs accessed July 2014. Any third-party URLs are given for information and reference purposes only and BRE and IHS do not control or warrant the accuracy, relevance, availability, timeliness or completeness of the information contained on any third-party website. Inclusion of any third-party details or website is not intended to reflect their importance, nor is it intended to endorse any views expressed, products or services offered, nor the companies or organisations in question.

Any views expressed in this publication are not necessarily those of BRE or IHS. BRE and IHS have made every effort to ensure that the information and guidance in this publication were accurate when published, but can take no responsibility for the subsequent use of this information, nor for any errors or omissions it may contain. To the extent permitted by law, BRE and IHS shall not be liable for any loss, damage or expense incurred by reliance on the information or any statement contained herein.

This study has been funded by BRE Trust and the Cabinet Office. Publication of this report has been funded by BRE Trust.

Special thanks go to David Sutton and his team at Sweett Group, who did all the costing work for the report. The contributions of the following people or organisations are also gratefully acknowledged:

- Diana de Bastos (BRE)
- Tim Bevan (BRE)
- Nandini Bhaskar (BRE)
- Cosima Cassell (Defra)
- Simon Guy (BRE)
- Tom Harvey (BRE)
- Phil Heenan (Cabinet Office)
- Richard Mabbitt (Defra)
- Isabel McCallister (Mace)
- Sam Rowbury (Cabinet Office)
- Lucy Sydney (Cabinet Office)
- Wendy Thorpe (BRE)
- James Woodall (BRE)
- Alan Yates (BRE)

Front cover images
Left: Green wall at Waitrose (image courtesy of Waitrose)
Top right: Loudoun Square Health Centre (image courtesy of Austin-Smith:Lord LLP)
Bottom right: Canolfan Rheidol, Aberystwyth (image courtesy of Cyngor Sir Ceredigion County Council)

Back cover image
Detail of WWF’s BREEAM Outstanding Living Planet Centre in Woking (image courtesy of Atelier Ten – P. Vincent)
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive summary</td>
<td>iv</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Our approach</td>
<td>3</td>
</tr>
<tr>
<td>Case study 1: Office</td>
<td>7</td>
</tr>
<tr>
<td>Case study 2: Secondary school</td>
<td>15</td>
</tr>
<tr>
<td>Case study 3: Community healthcare centre</td>
<td>23</td>
</tr>
<tr>
<td>Discussion</td>
<td>31</td>
</tr>
<tr>
<td>Appendix A: Capital and life cycle modelling and assumptions</td>
<td>35</td>
</tr>
<tr>
<td>Appendix B: Assessment timeline</td>
<td>38</td>
</tr>
<tr>
<td>References and further reading</td>
<td>43</td>
</tr>
<tr>
<td>Glossary</td>
<td>44</td>
</tr>
</tbody>
</table>
Executive summary

Research by Sweett Group and BRE has challenged the perception that sustainable buildings are necessarily more costly to build. By applying cost data from real construction projects to three case study buildings – an office, a secondary school and a community healthcare centre – detailed capital and operational cost information has been obtained.

The study investigated the capital costs of design and construction strategies that enhance building sustainability and help to achieve BREEAM ratings. They include low-cost or no-cost actions that can readily be used to enhance building sustainability (‘quick wins’), and those initiatives that must be built into the project by the end of concept stage to minimise their costs. Detailed cost information for a wide selection of these actions is presented in this report.

The research team also examined the life cycle costs of operating buildings, focusing on energy and water consumption. They found that specifying sustainability measures during the building’s design and procurement stage can result in cost savings over the operational life of the building for little or no additional upfront cost.

The effect on capital costs of achieving varying levels of sustainability was calculated, with the costs associated with gaining Pass, Good, Very Good and Excellent BREEAM ratings outlined in this report. It has been shown that achieving lower BREEAM ratings can incur little or no additional cost. Targeting the higher BREEAM ratings, which equate with more challenging sustainability levels, incurs some additional cost but this is typically less than 2%. The study of operational costs shows that this can be paid back within 2–5 years through utility cost savings.

This study complements and adds to a growing body of recently published evidence on the costs and value of sustainability. This evidence supports the findings that, where properly implemented, sustainability strategies add little to capital costs, that operational savings will pay back these costs and that there is a downward trend in sustainability costs.
Introduction

Do buildings with high sustainability standards necessarily cost more to develop than those that simply comply with building regulations? This publication reports on a study designed to answer that question using real cost information. It presents the actual costs of a range of sustainable building strategies, the additional costs – if any – of achieving different overall levels of sustainability and the payback gained through reduced utility costs.

Taking sustainability into account when designing and constructing buildings is increasingly common practice in the UK, but can still be inhibited by the lingering perception that this increases development costs. In fact, there is strong evidence that a sustainable approach need not add significantly to building costs. Also, where there are additional capital costs, it has been shown that these can be repaid relatively quickly through the reduced costs of operating the building. There is now a growing awareness among the construction industry and its clients of the balance to be struck between the capital costs of enhanced environmental performance and the longer-term benefits, payback and savings. There is also growing evidence of the benefits of sustainability in terms of delivering high-quality buildings that meet the needs of owners and occupiers and provide increased rental values.

Many clients now set sustainability requirements in their project briefs. Sustainability rating standards such as the BRE Environmental Assessment Method (BREEAM; www.breeam.com) are often used to help clients and their design/construction teams address the complexities of achieving sustainability goals. BREEAM was used to measure the sustainability performance of the case study buildings investigated in this study. Sweett Group* and BRE† applied costs from real projects to three case study buildings – an office, a secondary school and a community healthcare centre – and produced authoritative capital and life cycle cost information. This information can help building developers to optimise sustainability and its value.

This report updates and widens the scope of earlier research[1] by BRE and others to identify the costs associated with sustainable solutions. It provides additional data on life cycle costs and savings to present a more complete picture of the potential economic costs and savings of sustainable buildings.

---

* Sweett Group is a global business with expertise in property and infrastructure professional services. www.sweettgroup.com.
† BRE is the UK’s leading centre of built environment expertise and research. www.bre.co.uk.
Delivering sustainable buildings

Marks & Spencer’s BREEAM Excellent Cheshire Oaks store
(image courtesy of Marks & Spencer)
Delivering sustainable buildings

Do buildings with high sustainability standards necessarily cost more to develop than those that simply comply with building regulations? Research by Sweett Group and BRE has challenged the perception that sustainable buildings are necessarily more costly to build. By applying cost data from real construction projects to three case study buildings – an office, a secondary school and a community healthcare centre – detailed capital and operational cost information has been obtained.

The project investigated the capital costs of design and construction strategies that enhance building sustainability and help to achieve BREEAM ratings. They include low-cost or no-cost actions that can readily be used to enhance building sustainability (‘quick wins’), and those initiatives that must be built into the project by the end of concept stage to minimise their costs. Detailed cost information for a wide selection of these actions is presented in this publication.

This report updates and widens the scope of earlier research by BRE and others to identify the costs associated with sustainable solutions. It provides additional data on life cycle costs and savings to present a more complete picture of the potential economic costs and savings of sustainable buildings.