Description

This guide to green 'retro-fitting' for corporate real estate, facility managers and occupiers struggling to reduce their building’s carbon footprint will help in the planning and management of a sustainable refurbishment programme.

Facilities managers have a key role in improving and maintaining a building’s sustainability credentials over its whole life – through benchmarking and developing improvement strategies, energy efficiency measures and installation of low carbon technologies, as well as through waste minimisation and appropriate material use.

The first part of the book gives the context, providing the structure and linkage between the other chapters, together with an overview on sustainable development and refurbishment projects separately and the value gained from a sustainable refurbishment.

Part 2 details the regulatory and financial drivers, together with market pressures, and provides an overview of where this is leading together with the implications for sustainable refurbishment.

Part 3 provides technical support on carbon measures, helping to determine the feasibility of good practices as part of the refurbishment. Included is a review of energy efficiency, renewable and low carbon technologies and embodied carbon to enable lifecycle carbon calculations, together with the necessary behavioural change aspects needed to embed the changes. Linkages and benefits between the technologies will be highlighted.

Part 4 reviews refurbishment from a wider environmental perspective, understanding the challenges and opportunities that exist for particular developments from a materials, water, biodiversity and transport perspective.

See More

Table of Contents

Preface ix
Acknowledgements xi
Abbreviations xii

Part 1 Introduction to Building Refurbishment 1

Chapter 1 What is Building Refurbishment? 3

1.1 Introduction 4

1.2 Definitions of Refurbishment 5

1.3 Building Refurbishment Market and Size 10

Endnotes 14

Chapter 2 Sustainable Refurbishment 15

2.1 Introduction 16

2.2 Overview of Sustainable Development 17

2.3 Sustainable Development and Building Refurbishment 29

Endnotes 33

Chapter 3 Occupant Evaluation 34

3.1 Introduction 35

3.2 Changes in Work Patterns 37

3.3 Pre- and Post-Occupancy Evaluations (POE) 38

Endnotes 45

Part 2 Managing Refurbishment as a Process 47

Chapter 4 Drivers for Sustainable Refurbishment? 49

4.1 Market Pressures 50

4.2 Return on Investment 55

4.3 Regulatory Incentives 60

4.4 Financial Incentives and Taxes 65

4.5 Climate Change 71

4.6 Corporate Responsibility 76

4.7 Skills 79

Endnotes 81

Chapter 5 Developing a Business Plan and Strategy 84

5.1 Costs and Risks to Refurbish 85
5.2 Barriers to Refurbishment 86
5.3 Delivering Commercially Viable Refurbishment 87
5.4 Factors to Consider to Improve the Performance 88
5.5 Defining the Strategy 89
Endnotes 89

Chapter 6 Managing Delivery 90

6.1 Delivering a Sustainable Refurbishment 91
6.2 Minor Refurbishment Approach 92
6.3 Major and Comprehensive Refurbishment Approach 94
6.4 Green Leases 96
6.5 ISO 14001 Environmental Management Standards 98
6.6 Energy Star 101
6.7 Managing-Delivery Checklist 102
Endnote 102

Chapter 7 Managing Impacts 103

7.1 International Standards 104
7.2 LEED and BREEAM 106
7.3 Project Sustainability Assessment 110
7.4 Performance Improvements from Standards 114
7.5 Behavioural Change 116
Endnotes 117

Part 3 Low-Carbon Technologies and Materials 119

Chapter 8 Energy-Efficiency Measures 121

8.1 Introduction 122
8.2 Refurbishment Options and Approach 125
8.3 Assessing Costs of Energy-Efficiency Measures 130
8.4 Fabric and Passive Energy-Efficiency Measures 134
8.5 Energy-Efficiency Measures – Mechanical 141
8.6 ESCOs and Energy-Performance Contracting 148
8.7 Energy-Efficiency and Low-Carbon Checklist 154

8.8 Health and Indoor-Environment Checklist 155

Endnotes 156

Chapter 9 Behavioural Change 157

9.1 Commissioning Buildings 158

9.2 Energy Conservation as a Behaviour 160

Endnotes 164

Chapter 10 Renewable Energy 165

10.1 Introduction 166

10.2 Photovoltaic (PV) Panels 168

10.3 Solar Thermal Hot-Water Systems 170

10.4 Wind Turbines 173

10.5 Biofuel Heating 175

10.6 Geothermal Energy 179

10.7 Combined Heat and Power (CHP) 180

10.8 Heat Pumps 183

Endnote 185

Chapter 11 Embodied Carbon 186

11.1 Introduction 187

11.2 Embodied Carbon Standards 188

11.3 Varying Embodied Carbon Values in Buildings 192

Case Study 1 – London Fire and Emergency Planning Authority (LFEPA): Energy Case Study 196

Case Study 2 – 89 Culford Road: Extreme Low-Carbon Dwelling Refurbishment 202

Case Study 3 – Empire State Building to Become a Model of Energy 205

Endnotes 214

Part 4 Environmental Areas 215

Chapter 12 Material Use and Resource Efficiency 217

12.1 Introduction 218

12.2 Material-Certification Schemes 219
12.3 Material Procurement 221
12.4 Designing-in Sustainable Materials 222
12.5 Material Resource Efficiency 224
12.6 Site Waste Management 226
12.7 Materials and Resource Efficiency Checklist 230
Endnotes 231

Chapter 13 Water Conservation 233
13.1 Performing a Water Audit 234
13.2 Reducing Water Use 236
13.3 Rainwater Harvesting 238
13.4 Flood Risk and Sustainable Drainage Systems 240
13.5 Water-Conservation Checklist 240
Endnote 241

Chapter 14 Biodiversity 242
14.1 Introduction 243
14.2 Green Roofs and Walls 244
14.3 Provision for Birds 253
14.4 Biodiversity Checklist 254
Endnotes 255

Chapter 15 Transport 256
15.1 Developing a Travel Plan 257
15.2 Delivery Travel Plans 259
15.3 Transport Checklist 260
Glossary 262
Further Reading and Websites 266
Index 271
Wide consultancy experience, reviewing lifecycle environmental and social impacts from facilities. Has worked across several sectors, with involvement in a range of landmark projects:

- Environment Agency Carbon Footprint tool, recognised as an industry standard and developed for civil engineering projects

**See More**

**Reviews**

“This book provides insight into the planning and management of a sustainable refurbishment project, from the point of view of the facility manager. It includes comprehensive improvement strategies and technical support, from examples of the installation of low-carbon technologies to waste minimisation and suggested material use.” (Building Design, 16 November 2012)

**Related Titles**

- **Sustainable Practice for the Facilities Manager** by Sunil Shah
- **Facilities Manager's Desk Reference** by Jane M. Wiggins
- **The Sustainable Laboratory Handbook: Design, Equipment, and Operation** by Egbert Dittrich (Editor)
- **Brandschutz-Wegweiser: Technischer Brandschutz und Brandschutzsysteme, 2nd Edition** by Siemens